

Filling gaps in knowledge of North Sea benthic biodiversity

Identifying priority areas for conservation



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Wij worden gesteund door



INTRODUCTION

The North Sea is one of the best-studied marine areas in the world, yet serious gaps remain in the knowledge – and therefore also in the protection – of its benthic biodiversity. Although the current network of marine protected areas (MPAs) covers roughly 22% of the North Sea, most of these MPAs are designed to target only pelagic species and birds, and benthic protection is particularly lacking in offshore areas. The aim of this project was to fill information gaps for key

areas, by documenting benthic habitats and communities in locations previously identified as being of ecological importance, but from which data on benthos were lacking. The ultimate goal of this research is to help strengthen the North Sea MPA network, through detailed proposals for the creation of new MPAs, expansion of existing ones, and the implementation of stronger management measures for benthic biodiversity protection.

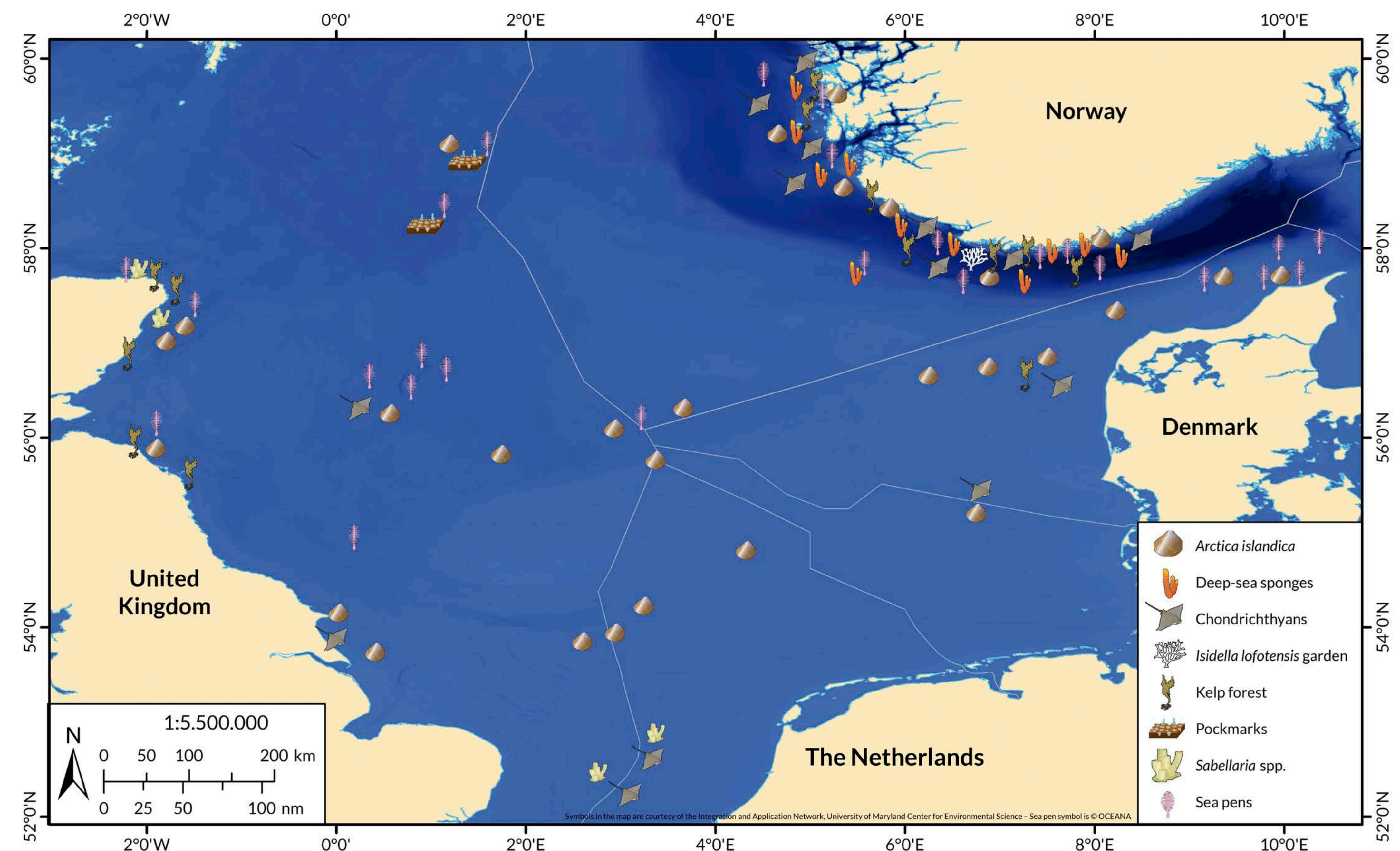
METHODOLOGY

In 2016 and 2017, we carried out two research cruises on board the *MV Neptune*. Over a total of 16 weeks, we surveyed 25 areas in the waters of five countries (Denmark, Germany, Netherlands, Norway, and the United Kingdom), using a combination of visual sampling via a remotely operated vehicle (ROV) and filming by professional SCUBA divers; acoustic seafloor mapping with a multibeam echosounder; and benthic grab sampling.

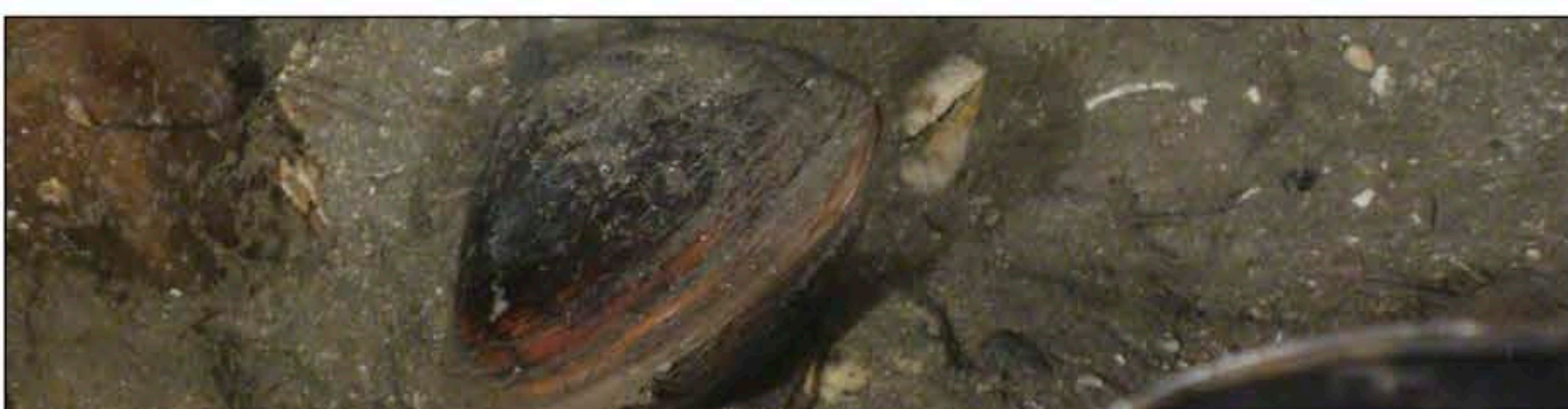


RESULTS AND CONCLUSIONS

We documented and identified roughly 1400 taxa (more than 900 to species level), from depths ranging from 8 to 460 m. Here, we present the distributions of a selection of benthic species, habitats, and communities of ecological interest. Among them, we include: engineering species that form biogenic reefs; recognised indicators of vulnerable marine ecosystems (VMEs); and threatened, commercial and iconic species. The map at right highlights those areas surveyed that were of particular importance for these features. The data collected on their distribution and abundance help to form the basis of proposals being developed for new, extended, and more effective MPAs in North Sea waters.

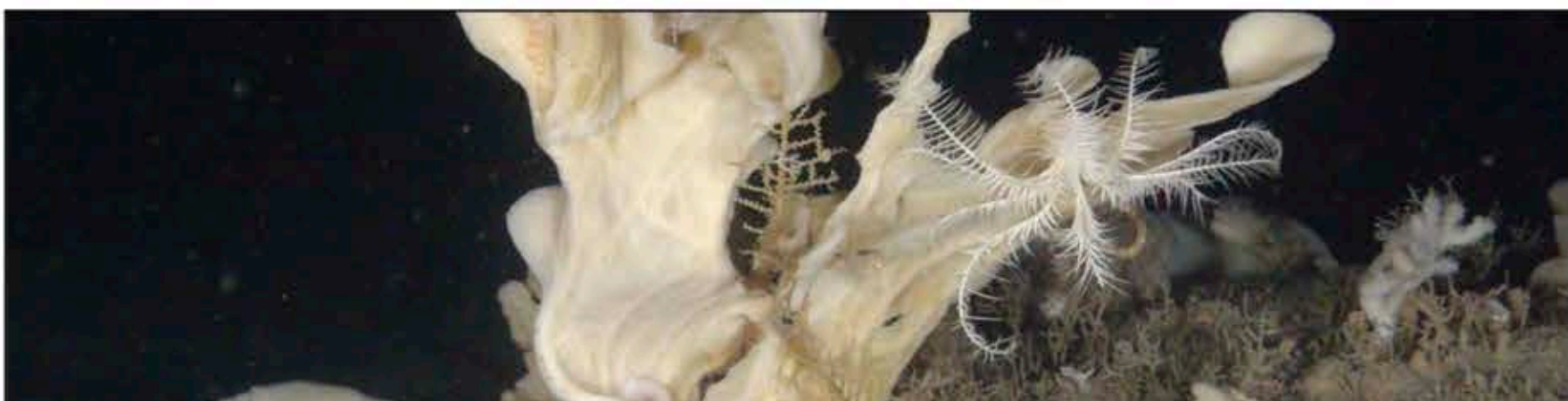


1. *Arctica islandica*



Countries: DE, DK, NL, NO, UK. **Depth range:** 12-263 m
The ocean quahog is an emblematic species, among the most long-lived bivalves (up to 500 y¹), with a very slow growth rate. It is a protected species under OSPAR, due to significant population declines driven by beam trawling.² Most of the specimens were found dead.

2. Deep-sea sponge aggregations



Country: NO. **Depth range:** 104-460 m
Species identified were *Antho dichotoma*, *Axinella infundibuliformis*, *A. rugosa*, *Craniella cranium*, *Geodia atlantica*, *G. barretti*, *G. macandrewii*, *Mycale lingua*, *Phakellia robusta* and *P. ventilabrum*, which are long-lived, engineering species that create structures supporting high associated biological diversity.³ Their aggregations are considered VMEs⁴ and some are also protected under OSPAR.⁵ The gorgonian *Paramuricea placomus* was also found within these rich communities.

3. Chondrichthyans



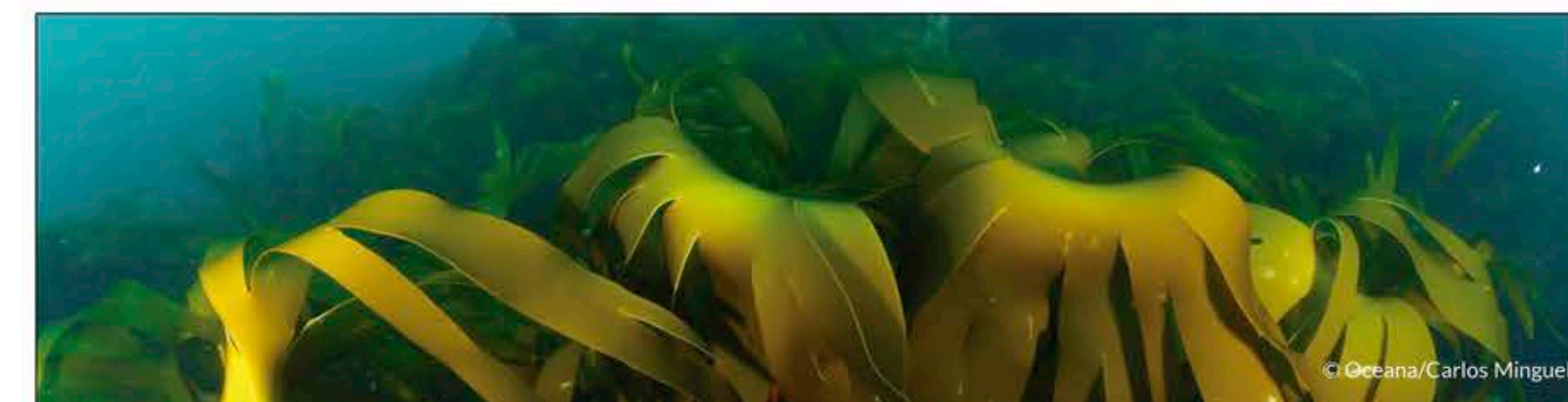
Countries: DK, NL, NO, UK. **Depth range:** 21- 460 m
Species identified included *Chimaera monstrosa*, *Etmopterus pusillus*, *E. spinax*, *Galeus melastomus*, *Rajella fyllae*, *Raja clavata*, and *Scyliorhinus canicula*. These species are considered vulnerable to human pressure,⁶ and *R. clavata* is included in the OSPAR List of Threatened and/or Declining Species.⁷ The greatest diversity of chondrichthyans was recorded in Norwegian waters.

4. *Isidella lofotensis* garden



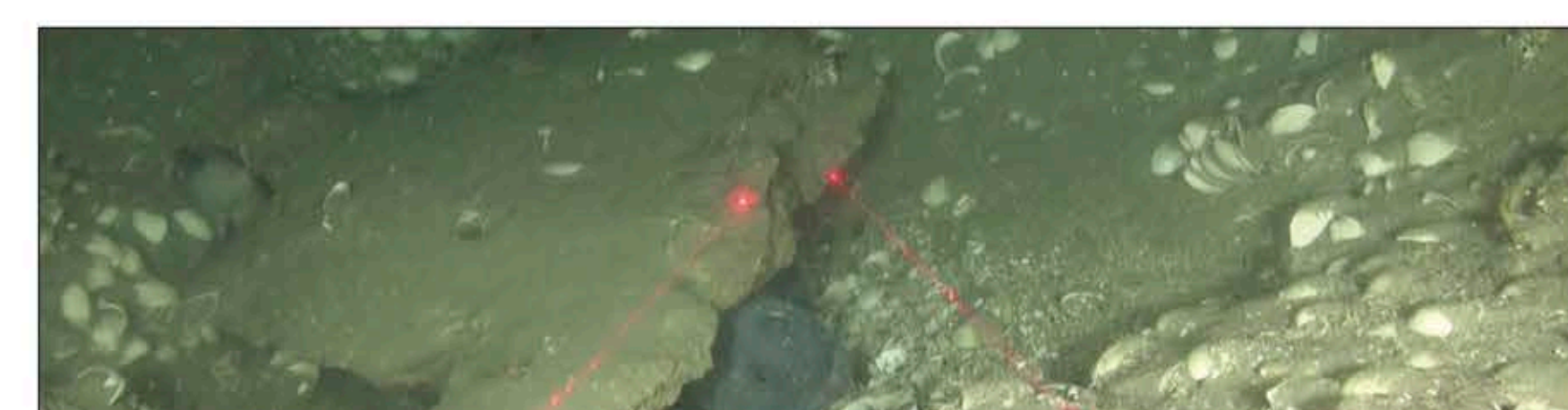
Country: NO. **Depth range:** 317-384 m
Only limited information is available about this gorgonian, which forms key habitats on soft bottoms. The 2017 surveys provided the first-ever *in situ* footage of this species in southern Norwegian waters. Bamboo corals are considered VMEs⁴ of high conservation value, due to their rich associated fauna.⁸

5. Kelp forest



Countries: NO, UK. **Depth range:** 28-42 m
Identified species were *Laminaria digitata*, *L. hyperborea* and *Saccharina latissima*. Kelp forest represents one of the most complex and productive ecosystems, providing three-dimensional habitat for other marine organisms.⁹ An overall decreasing trend is affecting North Sea populations, together with a northwards regression, primarily due to climate change and pollution.¹⁰

6. Pockmarks



Country: UK. **Depth range:** 124-131 m
We documented communities associated with pockmark depressions related to leaking gas systems, with concretions of MDAC as a result of bacterial activity. These formations are listed under the EU Habitats Directive. The data collected will contribute to ongoing biodiversity monitoring in two MPAs designated to protect pockmark systems in UK waters (Braemar Pockmarks and Scanner Pockmark).

7. *Sabellaria* spp.



Countries: NL, UK. **Depth range:** 31-85 m
Both *Sabellaria alveolata* and *S. spinulosa* were documented. We discovered three *S. spinulosa* reefs – considered biodiversity hotspots¹¹ – in good condition, in the Brown Bank (NL). These formations, thought to have been extinct in Dutch waters, are scarce in the North Sea and are very fragile to physical disturbance.¹² They are protected under both OSPAR¹³ and the Habitats Directive.¹⁴

8. Sea pens



Countries: DK, NO, UK. **Depth range:** 49-412 m
We documented all of the sea pens described from the North Sea: *Funiculina quadrangularis*, *Halipteris finmarchita*, *Kophobelemnion stelliferum*, *Pennatula phosphorea*, *Protoptilum carpenteri*, *Virgularia mirabilis* and *V. tuberculata*. These habitat-forming species increase the complexity in soft bottoms, therefore acting as substrate and refuge for eggs, larvae and juvenile fishes.¹⁵ Due to their important ecological role and their vulnerability to human pressures, they are classified as VMEs,⁴ and are protected under OSPAR.¹⁶

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