# New information on the underwater environment in the Finnish coastal areas

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Willow moss. Credit: Metsähallitus

The underwater conditions of the Bay of Bothnia are unique, and up until now very little has been known about this part of Finnish nature. The inventories of the recently completed FINMARINET project showed that aquatic bryophyte species, water mosses, classified as regionally threatened in the Bay of Bothnia, such as Platyhypnidium

riparioides and Fissidens fontanus, in fact form extensive underwater mats, which provide benthic organisms with shelter and food. Previously, very little information has been available on the distribution of water mosses.

"The information gained from the inventories may even change the Red List category of aquatic bryophytes," says Essi Keskinen, Marine Conservation Biologist at Metsähallitus.

"FINMARINET has produced new information on the occurrence of species and biotic communities formed by them in Finland's marine areas. More detailed information is now available on the occurrence of habitats that are important for biodiversity, such as reefs and sandbanks. Data was collected in current Natura 2000 sites and their surrounding areas. We now know much more about the species and habitats of the offshore areas. This information will be made available for authorities to facilitate the assessment of the adequacy of the conservation area network and the planning of any further action needed," says Pasi Laihonen, Project Manager at the Finnish Environment Institute (SYKE).

FINMARINET is part of the Finnish Inventory Program for the Underwater Marine Environment (VELMU), which is a comprehensive programme mapping underwater biodiversity in Finland's marine areas. The four-year FINMARINET project collected data on benthic animal and plant species in more than 22,000 sampling sites in six target areas. In addition, geological data was collected by sounding almost 800 $km^2$ of sea bottom, for example.

More detailed information is now also available on the underwater nature of the Bothnian Sea. In the outer archipelago of Rauma, the underwater environment is dominated by moraine and rocky reefs, and extensive clay areas, usually covered with sand and gravel. Rare De Geer

moraine formations were found for the first time in the Rauma area. Due to strong currents, there are only a few areas where the bottom is covered with soft substrate. The rock- or stone-surfaced reefs are widely covered with mats of bladderwrack, which can extend to a depth of eight to nine metres as continuous zones. Red algae (Rhodophyta), such as Furcellaria lumbricalis and Polysiphonia sp., are also found in this and deeper zones.

The southern edge of the Archipelago Sea borders the Baltic Sea proper directly and represents the most marine area in terms of the living conditions of aquatic organisms in Finland. In this area, the archipelago dives into the sea to continue under the surface and form a magnificent zone of underwater reefs. According to the results of FINMARINET, the reefs maintain a rich ecosystem of benthic organisms and also provide seals and seabirds with an excellent area for feeding and resting. The common eiders of the Archipelago Sea stay here during their moult period, and seals use the outermost islets for resting between meals.

## Results of the FINMARINET project to support the marine spatial planning

The use of marine areas is continuously increasing, and without information on underwater nature, it would be difficult to locate ship routes, dredging and wind power production sites in an environmentally sustainable way. Without sufficient information on nature, the location of various activities might cause more harm than good. The results of FINMARINET will be used as background material for the planning of marine areas and in the planning of the management and use of current nature conservation areas. In addition, the information produced will be used in the context of EU obligations, such as the national maritime management plan as well as reporting under the Habitats Directive.

"The effects and risks of activities altering the environment to be carried out in sea areas can only be assessed on the basis of sufficiently extensive background information. Thanks to this project, our knowledge of underwater nature has increased significantly," says Pasi Laihonen.

## Several mapping methods, productive cooperation

FINMARINET was launched in 2009. Data collected during four summers has been analysed, processed and combined with data collected previously.

Several methods were used for underwater data collection: echo-sounding, benthic sampling , diving and underwater video recordings. The Geological Survey of Finland (GTK) conducted acoustic-seismic sounding surveys of the areas. Metsähallitus and SYKE collected data by taking samples and making video recordings.

SYKE and Åbo Akademi University have compiled all the data produced on the areas, and on the basis of this data, SYKE and Åbo Akademi University have produced maps on the occurrence and distribution of habitats that are valuable in terms of biodiversity.

The University of Turku provided the background data for this work. The results will be published in June in an Internet-based map service developed jointly by the University of Turku and SYKE.

Surveying the underwater marine environment is laborious and expensive. As all areas cannot be surveyed, the observations made will be generalised to apply to more extensive areas by means of statistical methods. The sufficient number of observations made during the FINMARINET project has enabled the development of better models for predicting the distribution of different species and habitats.