Update of the Protected Area Management Principles of Metsähallitus Parks & Wildlife Finland regarding marine data

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Protected areas and management in Finland

Nature reserves, wilderness areas and national parks established on state-owned lands are the central parts of the protected area system in Finland. Almost all of these are included in the European Union's network of Natura 2000 areas. Most of Finland's protected area surface is state-owned and managed by the government agency Metsähallitus Parks & Wildlife Finland. The protected area management principles are partly determined directly by national legislation and partly by Parks & Wildlife Finland as the landowner and site manager. Many of the principles are also national and regional best practices that have been developed and agreed over time.

Management plans include analysis of the current state and most important values of the area and guide the future management and use. Management plan provides a strategic framework for the planning of concrete conservation actions, whilst taking into consideration other uses of the area, such as recreation. Holistic approach supports management of the site and target the restoration measures. Protected area management plans define the development directions for 10–20 years, zoning the area of different land uses. The plan presents the baseline information needed for management decisions, including analysis of natural and cultural values and the threats and pressures affecting them. Participatory management planning conciliates the conservation measures and various uses of the Natura 2000 sites, and as a result conflicts between conservation and other uses can be settled.

Even though management planning of MPAs has long history in Finland and Parks & Wildlife Finland has long and solid experience in preparing management plans for protected areas with different pressures and values, it is often the case that plans tend to overlook the marine environment. To date, plans, restrictions, and mitigation measures have focused predominantly on the terrestrial environment, as there has not been sufficient information from underwater nature for a holistic approach.

This is no longer the case due to VELMU programme (The Finnish inventory programme for the underwater marine environments) and other mapping efforts during the past decade. During CoastNet LIFE project, our aim is to update extended management plan for Bothnian Bay area and develop management plan for Archipelago Sea area. Recent underwater inventories on both sites have brought a lot of new information about the underwater habitats and species. Complementary underwater inventories were planned to be conducted in CoastNet LIFE -project for certain deeper and shallower data deficiency areas. Inventories outside the CoastNet LIFE project area have in Bothnian Bay been conducted in EU funded project SEAmBOTH, and in Archipelago Sea with national funding of VELMU programme. All the data gathered from the underwater inventories has been and will be processed in the management planning evaluations. With modern modelling and prioritization tools we can also make predictions of occurrence and identify hot spots of habitats and species.

Underwater inventories conducted in the CoastNet LIFE project

Bothnian Bay National Park

During the CoastNet LIFE project 475 underwater sample points were mapped in the Bothnian Sea National Park by diving and with drop-video method (Figure 1) between 28th of June and 9th of August in 2020. During these inventories 23 species/taxa was found (See Annexes). The total mapped area was 9 140 hectares.

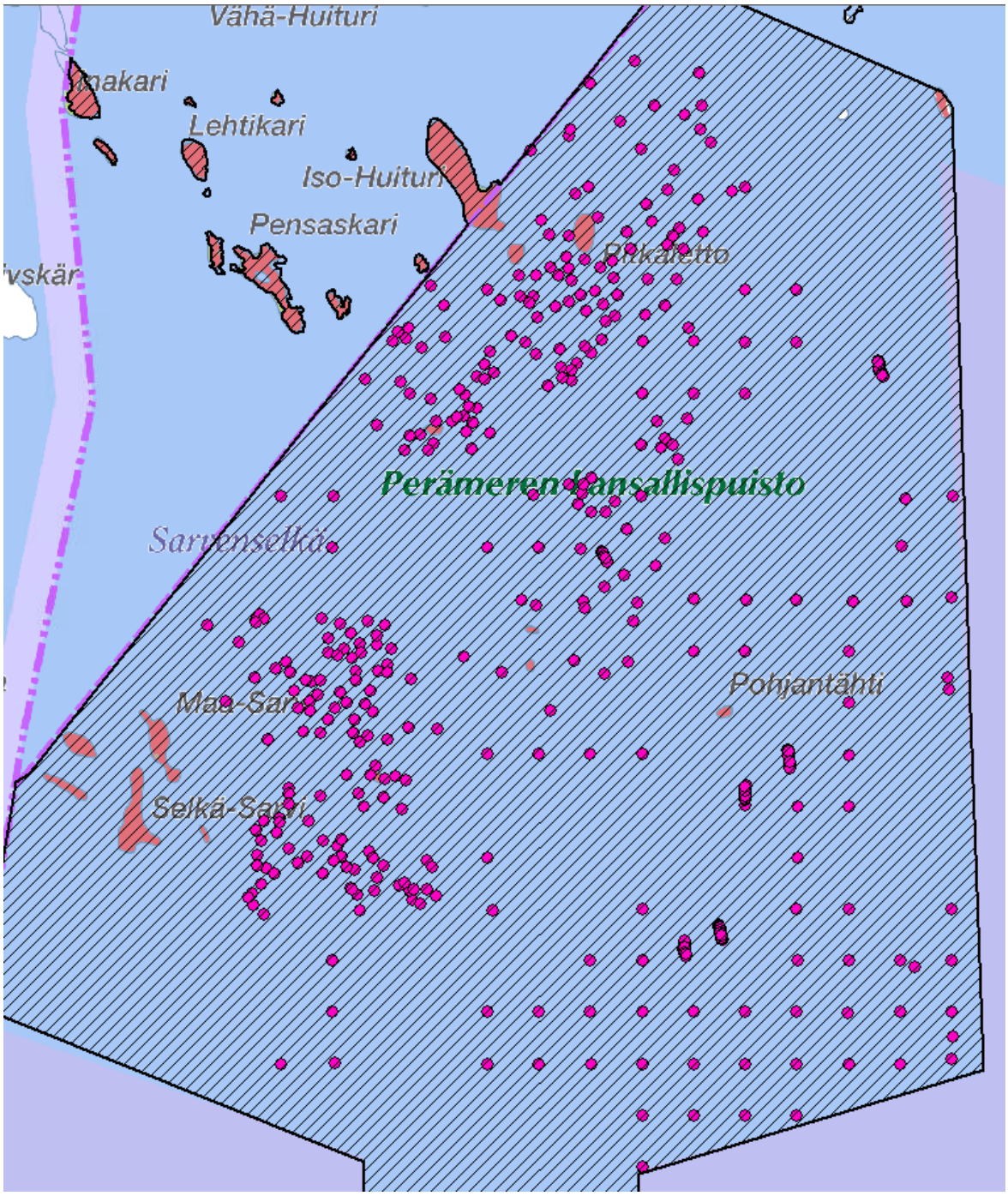

Figure 1. Underwater inventories (drop-video, dive and wading sites: pink dots) conducted in the CoastNet LIFE project in the Bothnian Bay National Park. Natura 2000 area (national park) is marked with a diamond grid. © Metsähallitus, MML 2022.

Natura 2000 area ”Perämeren saaret”

During the CoastNet LIFE project 165 sample points were mapped inside the Natura 2000 area called Perämeren saaret by diving, wading and with drop-video method and Luther-rake (Figure 2) between 12th of July and 18th of August in 2020. During these inventories 54 species/taxa was found (See Annexes). The total mapped area was 640 hectares.

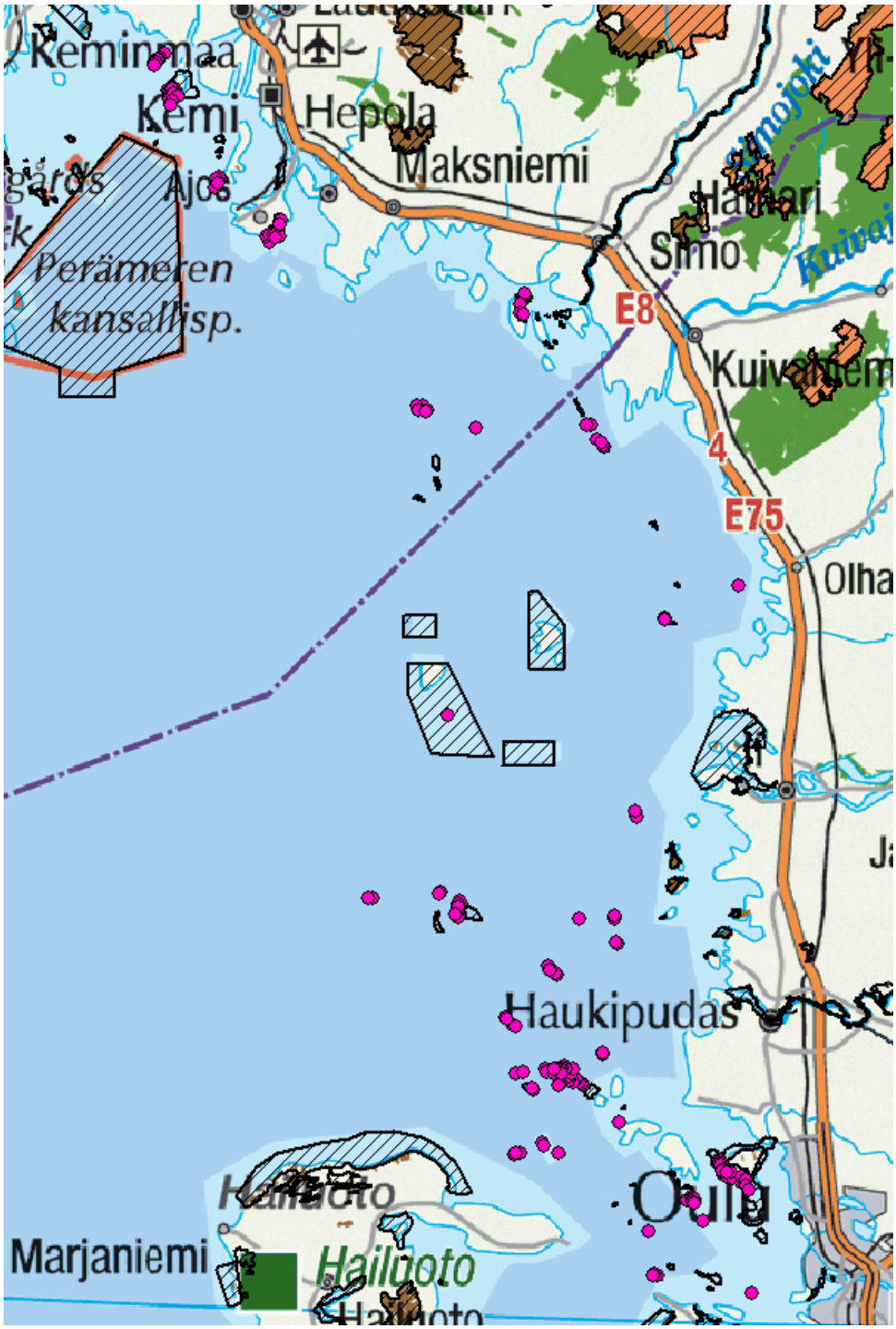

Figure 2. Mapped sites (pink dots) conducted in the CoastNet LIFE project in Natura 2000 area called Perämeren saaret. Natura 2000 area is marked with a diamond grid. Some parts of the N2000 area on the map are so tiny that pinks dots are covering them. © Metsähallitus, MML 2022.

Archipelago Sea National Park

During the CoastNet LIFE project 2504 underwater sample points were mapped inside the Archipelago Sea National Parks Natura area by diving and with drop-video method (Figure 3) between 11th of June and 7th of October 2020. During these inventories 117 species/taxa was found. The total mapped area was 40 900 hectares.

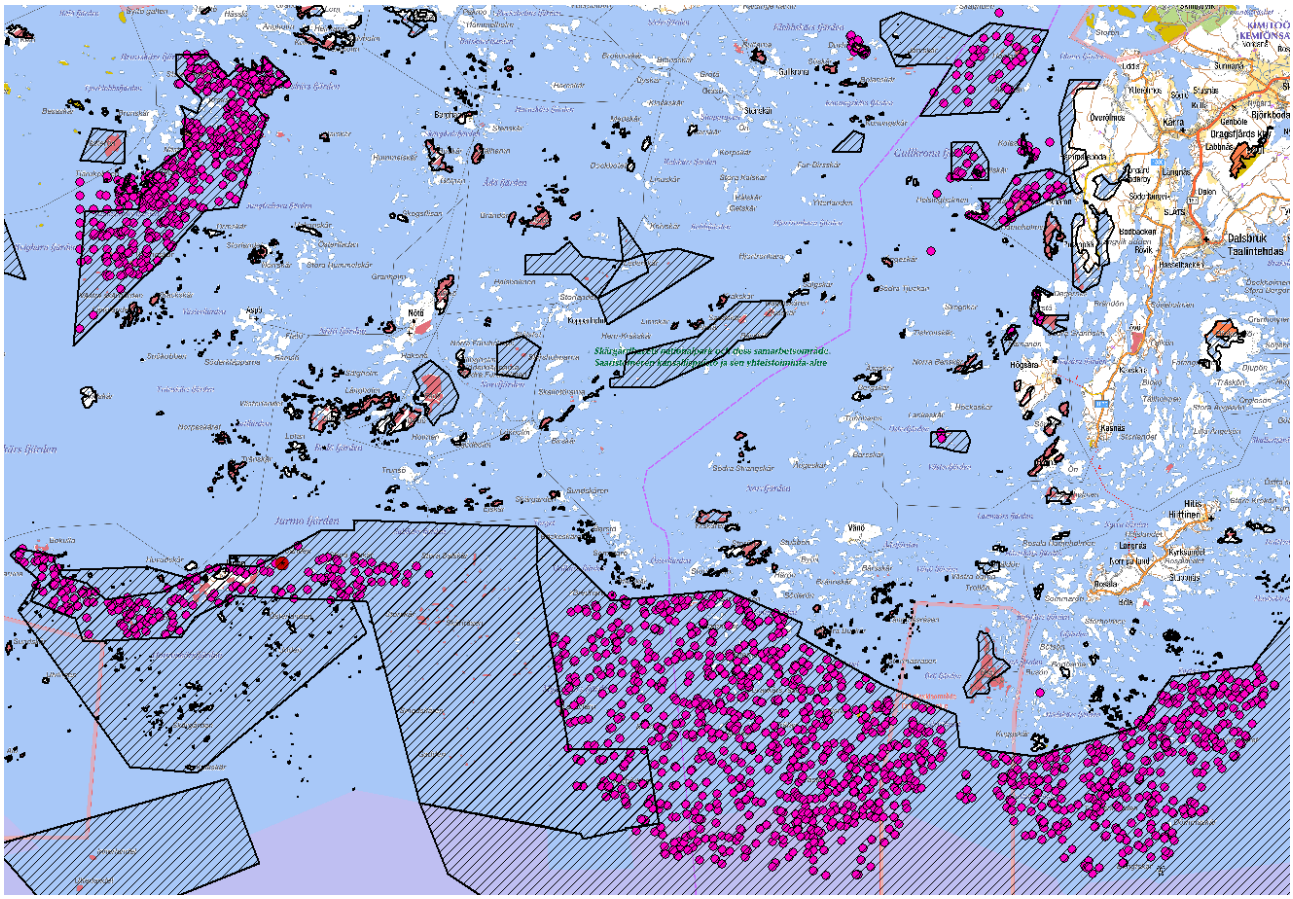

Figure 3. Underwater inventories (drop-video, dive sites: pink dots) conducted in the CoastNet LIFE project in the Archipelago Sea National Park and Natura 2000 area. N2000 area is marked with a diamond grid. © Metsähallitus, MML 2022.

Use of underwater mapping data

Data from underwater inventories conducted in CoastNet LIFE project were combined with previously collected data to produce a series of spatially based maps that will be used to delineate marine biodiversity hot-spots, valuable habitats, and species. These will be examined in relation to known human pressures, recreational use of the areas, shipping, and recreational boating. In addition, data collected from the field helped us to identify sites where the state of marine nature has deteriorated for various reasons. For these sites, various restoration measures are being considered, which can be included in the management plans and implemented in the coming years. Both management plans are still in progress but will be completed within the next year 2023. Bothnian Bay area's management plan is currently a little further along in the process.

Bothnian Bay area

The following measures have already been tentatively identified in the Bothnian Bay area's management plan to improve the state of marine nature:

Measures planned to maintain, conserve and enhance underwater habitats and species:

- Habitat restoration in a deteriorated underwater meadow
- Movement control in restriction zone to protect marine nature
- Invasive species removal and habitat restoration
- Advocacy on marine nature

Habitat restoration: On certain site, 10-20 cm of soft sediment will be dredged from the silted, previously mixed aquatic vegetation meadow. After dredging, original aquatic vegetation will be transplanted. Additionally, a new opening to investigate whether the four-leaf water's tale (*Hippuris tetraphylla*) benefits from transplanting to new areas. The possibility of transplanting will be explored during the life of the management plan.

Movement control in restriction zone to protect marine nature: speed limit for boats in Sarvi archipelago area to reduce siltation.

Invasive species removal and habitat restoration: restoration of Pensaskar glo-lake, removal of Canadian waterweed (*Elodea canadensis*). Monitoring the spread of an alien species round goby (*Neogobius melanostomus*) based on surveys carried out and future monitoring.

Advocacy on marine nature: Working with and raising awareness of the values of marine nature with tenants in the area to reduce the negative impacts of small-scale dredging. Other advocacy work on marine nature, for example monitoring the use of surrounding waters (fish farming, fairways, wind farms) of national park and other state-owned protected areas based on up-to-date information of underwater marine nature.

The management plan of the Bothnian bay area will be sent to stakeholders for comments during next spring 2023 and it is possible that there will be further additions or changes to measures listed above.

Archipelago Sea area

Archipelago National Park consists of state-owned sea and land areas scattered over a large geographical area. Large variety of sea bottom types and depth zones call for suitable inventory tools, professional scuba divers and proper seafaring equipment. Despite the extensive mapping efforts conducted in the Archipelago Sea in national inventory programme of underwater nature (VELMU), there was still data deficiency of marine species and habitats, especially those situated in vast outer archipelago of the National Park, where small scattered islets and shallow reefs meet rough deep sea conditions. This open sea area was included in the Natura 2000 network of the Archipelago Sea in 2018. Besides exposed hard bottoms, sand moraine bottoms with eelgrass meadows were important target for CoastNet LIFE underwater inventories in the Archipelago Sea National Park.

Underwater mapping conducted in CoastNet LIFE project provided plentiful information of underwater species and habitats, completing the existing knowledge of marine life in the Archipelago National Park area. Enhanced data enable more comprehensive view on marine nature in the management planning process concerning the planning area. Human impacts, such as vessel traffic and tourism, will be reflected against marine biodiversity in management planning. As a result, enhancing the nature conservation in MPAs e.g. with area enlargements or visitor restrictions will be considered.

Conservation and management of eelgrass (*Zostera marina*), which is one of the key species in the area, will take notable leap forward along the complemented inventory data. Restoration of eelgrass meadows will be launched in Biodiversea IP LIFE project, and comprehensive knowledge of species distribution and occurrence is indispensable. Underwater inventories also revealed new observations of marine invasive species. Eradication pilot of Harris mud crab (*Rhithropanopeus harrisii*) will take place in Archipelago National Park as a part of the Biodiversea IP LIFE project.

Pressures of human-induced actions reach out to marine areas worldwide and Archipelago Sea is no exception. Reliable and influential environmental impact assessments require extensive data of marine biodiversity. Rapidly growing wind power industry and increasing marine traffic place demands on knowledge of marine biodiversity, especially for sensitive outer archipelago Marine Protected Areas. For example, in case of oil spill, essential areas for high biodiversity could be detected and protected.

The measures in the management plan for the Archipelago Sea area, which aim to improve the state of marine nature and protect it from different pressures, will be further refined over the next year as the plan progresses.

Annexes

List of species found during the CoastNet LIFE surveys from Bothnian Bay National Park

Aegagropila linnaei	*Cladophora glomerata*	Myriophyllum
Drifting macrophyte	*Cordylophora caspia*	Mysidae
Drifting filamentous algae	*Ephydatia fluviatilis*	*Oxyrrhynchium speciosum*
Drifting unidentified plant material	*Fissidens fontanus*	*Pot. pectinatus* / *Pot. filiformis* / Ruppia sp. / Zannichellia sp.
Bacillariophyta	*Fontinalis antipyretica*	*Cladophora fracta*
Biofilm	*Fontinalis hypnoides*	*Potamogeton perfoliatus*
Bryophyta	Hydrozoa	*Saduria entomon*
	Attached unidentified filamentous algae < 5 cm	*Ulothrix zonata*

List of species found during the CoastNet LIFE surveys from Perämeren saaret Natura-area

Drifting macrophyte	*Galium palustre*	*Potamogeton perfoliatus*
Drifting filamentous algae	Hydrozoa	Ranunculus
Drifting unidentified plant material	*Isoëtes lacustris*	*Ranunculus baudotii*
Alisma wahlenbergii	Attached filamentous green algae	*Ranunculus reptans*
Anodonta anatina	Attached unidentified filamentous algae < 5 cm	Rivularia sp.
Biofilm	Attached unidentified filamentous algae > 5 cm	*Rosa rugosa*
Bryophyta	*Lysimachia thyrsiflora*	Sagittaria
Callitriche hermaphroditica	Myriophyllum	*Sagittaria ×lunata*
Caltha palustris	*Myriophyllum alterniflorum*	*Sparganium*
Carex	*Myriophyllum sibiricum*	*Stuckenia filiformis*
Chara aspera	*Myriophyllum spicatum*	*Stuckenia pectinata*
Chara/Nitella	Nitella sp.	*Subularia aquatica*
Cicuta virosa	*Phragmites australis*	Ulva sp.
Crassula aquatica	Poa	Utricularia
Elatine hydropiper	*Pot. pectinatus* /*Pot. filiformis* / Ruppia sp. / Zannichellia sp.	Vaucheria sp.
Eleocharis	Potamogeton	Zannichellia
Eleocharis acicularis	*Potamogeton × nitens*	*Zannichellia palustris*
Ephydatia fluviatilis	*Potamogeton berchtoldii*	
Fontinalis antipyretica	*Potamogeton natans*	

List of species found during the CoastNet LIFE surveys from the Archipelago Sea area

Aglaothamnion roseum	Attached filamentous unidentified filamentous algae > 5 cm	*Pylaiella littoralis / Ectocarpus siliculosus*
Drifting Fucus (living)	Crushed shells	Ranunculus
Drifting Fucus (dead) sp.	*Laomedea loveni*	*Ranunculus baudotii*
Drifting macrophyte	*Leathesia marina*	*Rhithropanopeus harrisii*
Drifting filamentous algae	Lymnea sp.	*Rhodochorton purpureum*
Amphibalanus improvisus	*Macoma balthica*	*Rhodomela confervoides*
Bacillariophyta	Macrophyte	Filamentous algae
Chara sp.	Marenzelleria sp.	Ruppia sp.
Coccotyllus / Phyllophora / Furcellaria	Monostroma sp.	*Ruppia spiralis*
Coccotylus truncates / Phyllophora pseudoceranoides	*Mya arenaria*	*Saduria entomon*
Cordylophora caspia	*Myoxocephalus quadricornis*	Carpet forming blue-green algae
Cottus sp.	*Myoxocephalus scorpius*	Spirogyra sp.
Dictyosiphon chordaria	Myriophyllum sp.	Spirulina sp.
Dictyosiphon foeniculaceus	*Myriophyllum spicatum*	*Stictyosiphon tortilis*
Dictyosiphon foeniculaceus / Stictyosiphon tortilis	Mysidae	Stuckenia sp.
Ectocarpus siliculosus	Mytilus / Mytilopsis / Dreissena	*Stuckenia pectinata*
Elachista fucicola	*Mytilus trossulus*	*Syngnathus typhle*
Ephydatia fluviatilis	*Neogobius melanostomus*	*Taurulus bubalis*
Gasterosteiformes	*Osmerus eperlanus*	*Theodoxus fluviatilis*
Halosiphon tomentosus	*Phyllophora pseudoceranoides*	*Tolypella nidifica*
Hydra sp.	*Platichthys flesus sensu lato*	Ulva sp.
Attached membranous red algae	Polysiphonia sp.	*Ulva intestinalis*
Attached membranous brown algae	Pomatoschistus sp.	Vaucheria sp.
Attached membranous green algae	*Pot. pectinatus* / *Pot. filiformis* / Ruppia sp. / Zannichellia sp.	Zannichellia sp.
Attached filamentous red algae	*Potamogeton perfoliatus*	*Zannichellia major*
Attached filamentous brown algae	*Potamopyrgus antipodarum*	*Zannichellia palustris*
Attached filamentous green algae	*Pungitius pungitius*	*Zoarces viviparus*
Attached filamentous unidentified filamentous algae < 5 cm	*Pylaiella littoralis*	*Zostera marina*