MONITORING PROGRAMME	BALEE-D0104-1_BirdsWinter - Abundance of wintering birds			
Introduction/overview of programme	The aim of the programme is to monitor the abundance of waterbirds in the Estonian coastal and off-shore areas during the wintering season. It provides data to monitoring strategy "SD1.1 – Biological diversity – Birds". The programme is related to GES Descriptor D1, Criterion D1C2 and potentially D1C3 and D1C4, as well as GES Descriptor D4, Criteria D4C1 and D4C2. Monitoring is conducted yearly with a goal to cover the whole area (coastal and off-shore areas) every five years. Visual counting from land in defined sectors and flight counting in off-shore areas are conducted. The programme (data collection) is regionally coordinated by HELCOM and Wetlands International. Data are annually reported to the national environmental monitoring database KESE (by 1 March). Data collection into the regional database for assessment purposes is coordinated by the HELCOM/ICES JWGBird Group. The programme was updated and modified since 2014 by adding the monitoring of the abundance of wintering waterbirds in the off-shore area. The programme corresponds to the following monitoring programmes in the indicative list: Mobile species – distribution, abundance and/or biomass; Mobile species – population characteristics.			
Purpose of programme	Effectiveness of measures, Environmental state and impacts			
Other EU or international policies to which programme contributes	Monitoring programme targeting at national legislation, Birds Directive, Habitats Directive			
Monitoring details	Visual counting from land in defined sectors and flight counting in off-shore areas are conducted. The observation sector includes an easily demarcated stretch of coastline with the sea. 116 sectors have been selected for regular monitoring in the coastal area. As a rule, all coastal (<2 km) waterbirds are counted. Age is also fixed for swans. Several other parameters such as weather (wind strength, visibility, ice cover %) are also recorded during the observations. In order to count the wintering waterbirds in off-shore areas, the flights are conducted every 5 years covering the entire Estonian sea area. The number of birds by species per covered counting section during a certain period of time is fixed from counting transects with a defined width. The monitoring is being conducted in the Estonian marine area up to 50 m depth line. All species are counted during the monitoring and their abundance assessed.			
Ecosystem components, anthropogenic pressures and activities monitored	Surface-feeding birds			
	Elements monitored	Larus ridibundus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range), Distribution (spatial)
		Larus argentatus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)

			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range), Distribution (spatial)
		Larus canus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range), Distribution (spatial)
		Hydrocoloeus minutus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range), Distribution (spatial)
		Larus marinus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range), Distribution (spatial)
	Pelagic-feeding birds			
	Elements monitored	Gavia stellata		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution

			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range), Distribution (spatial)
		Mergellus albellus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range), Distribution (spatial)
		Mergus merganser		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range), Distribution (spatial)
		Mergus serrator		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range), Distribution (spatial)
		Podiceps cristatus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range), Distribution (spatial)

		Phalacrocorax carbo		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range), Distribution (spatial)
		Alca torda		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range), Distribution (spatial)
		Gavia arctica		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range), Distribution (spatial)
	Benthic-feeding birds			
	Elements monitored	Clangula hyemalis		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range), Distribution (spatial)
		Aythya fuligula		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)

			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range), Distribution (spatial)
		Aythya marila		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range), Distribution (spatial)
		Bucephala clangula		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range), Distribution (spatial)
		Melanitta fusca		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range), Distribution (spatial)
		Melanitta nigra		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution

			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range), Distribution (spatial)
		Polysticta stelleri		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range), Distribution (spatial)
		Somateria mollissima		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range), Distribution (spatial)
	Grazing birds			
	Elements monitored	Cygnus columbianus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range), Distribution (spatial)
		Cygnus cygnus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution
			D1C4 Population distributional range and pattern	

			Parameters monitored	Distribution (pattern), Distribution (range), Distribution (spatial)
		Cygnus olor		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range), Distribution (spatial)
		Fulica atra		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range), Distribution (spatial)
		Anas platyrhynchos		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range), Distribution (spatial)
Spatial zones monitored	Coastal waters (WFD), Territorial waters, EEZ (or similar)			
Start(and end) date of the programme	1967-9999			
Frequency of the monitoring	Yearly			
Type of monitoring	Visual observation, Remote flight imagery			
Data management and access	Data are annually reported to the national environmental monitoring database KESE (by 1 March). Data collection into the regional database for assessment purposes is coordinated by the HELCOM/ICES JWGBird Group.			
Indicators to which the programme contributes	BALEED1C2.4 - Abundance of waterbirds in the wintering season			

Contact	Estonian Environment Agency, kaur@envir.ee; Estonian Ornithological Society, eoy@eoy.ee; Estonian University of Life Sciences, Institute of Agricultural and Environmental Sciences, Leho Luigujõe, leho.luigujoe@emu.ee.
References	The monitoring programme is approved by the minister of the environment and available at https://www.envir.ee/et/eesmargid-tegevused/merekeskkonna-kaitse/meres trateegia (https://www.envir.ee/sites/default/files/mereala_seireprogramm_2021_2026.pdf) (in Estonian).

MONITORING PROGRAMME	BALEE-D0104-2_BirdsBreeding - Abundance of water birds in the breeding season				
Introduction/overview of programme	The aim of the programme is to monitor the abundance of waterbirds in Estonian coastal areas during the breeding season. It provides data to monitoring strategy "SD1.1 – Biological diversity – Birds" and "SD8 – Contaminants". The programme is related to GES Descriptor D1, Criterion D1C2 and potentially D1C3 and D1C4, as well as GES Descriptor D4, Criteria D4C2 and D4C4 and Descriptor D8, Criterion D8C2. Monitoring is conducted yearly on small islands (island groups) where the full number of nests and species are registered. White-tailed eagle breeding success is monitored to assess the impact of contaminants. The monitoring area of the white-tailed eagle relevant to marine status assessment covers the area up to 20 km landward from the seashore. The programme data collection is regionally coordinated via HELCOM. Data are annually reported to the national environmental monitoring database KESE (annually by 1 March). The programme corresponds to following monitoring programmes in the indicative list: Mobile species – distribution, abundance and/or biomass; Mobile species – health status; Mobile species – population characteristics.				
Purpose of programme	Environmental state and impacts, Pressures in the marine environment				
Other EU or international policies to which programme contributes	Monitoring programme targeting at national legislation, Birds Directive, Habitats Directive				
Monitoring details	Monitoring is carried out on selected small islands (island groups) and nesting sites of white-tailed eagle (on land up to 20 km from seashore). Breeding pairs, as well as a monitoring-year nest and/or pair or single bird, are used as counting units. All breeding species on the island are registered. The indexes for the assessment of the abundance trend by species are based on whole gathered data from small islands. For assessment of white-tailed eagle productivity their nesting sites are monitored and the number of occupied nests and fledglings are registered. The nests are usually being controlled in late May-early July. The productivity is counted as the mean number of fledglings per occupied nest. The monitoring on small islands is carried out every year on sites with continuous monitoring and where cormorant, Sandwich tern and Caspian tern colonies are monitored continuously. Other sites are monitored in rotation – at least once per 6-year period. The monitoring of white-tailed eagle nesting sites is done in rotation, and all nests are controlled at least once every 3 years. Breeding birds monitoring is mainly being conducted in frames of the national monitoring programme. Updated and detailed information on the monitoring plan according to the national monitoring programme is available at https://www.keskkonnaagentuur.ee/eesmargid-tegevused/keskkonnaseire/seireankeedid.				
Ecosystem components, anthropogenic pressures and activities monitored	Surface-feeding birds				
	Elements monitored	Hydroprogne caspia			
		GES criteria addressed	D1C2 Population abundance		
			Parameters monitored	Abundance (number of individuals)	
			D1C3 Population demographic characteristics		
			Parameters monitored	Breeding success	
			D1C4 Population distributional range and pattern		
			Parameters monitored	Distribution (pattern), Distribution (range)	

		Larus argentatus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Breeding success
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range)
		Larus canus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Breeding success
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range)
		Larus fuscus graellsii		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Breeding success
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range)
		Larus fuscus intermedius		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Breeding success
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range)
		Larus marinus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Breeding success

			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range)
		Sterna albifrons		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Breeding success
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range)
		Sterna hirundo		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Breeding success
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range)
		Sterna paradisaea		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Breeding success
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range)
		Sterna sandvicensis		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Breeding success
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range)
		Haliaeetus albicilla		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)

			D1C3 Population demographic characteristics	
			Parameters monitored	Breeding success, Brood size
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern)
		Hydrocoloeus minutus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Breeding success
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range)
		Larus ridibundus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Breeding success
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range)
	Pelagic-feeding birds			
	Elements monitored	Mergus merganser		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Breeding success
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range)
		Mergus serrator		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Breeding success
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range)

		Phalacrocorax carbo		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Breeding success
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range)
		Podiceps cristatus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Breeding success
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range)
	Benthic-feeding birds			
	Elements monitored	Aythya ferina		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Breeding success
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range)
		Aythya fuligula		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Breeding success
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range)
		Melanitta fusca		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Breeding success

			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range)
		Somateria mollissima		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Breeding success
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range)
	Grazing birds			
	Elements monitored	Anser anser		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Breeding success
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range)
		Branta leucopsis		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Breeding success
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range)
		Cygnus olor		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Breeding success
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range)
		Fulica atra		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)

			D1C3 Population demographic characteristics	
			Parameters monitored	Breeding success
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range)
	Wading birds			
	Elements monitored	Arenaria interpres		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Breeding success
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range)
		Calidris alpina		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Breeding success
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range)
		Charadrius hiaticula		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Breeding success
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range)
		Haematopus ostralegus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Breeding success
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range)

		Recurvirostra avosetta		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Breeding success
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range)
		Tadorna tadorna		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Breeding success
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range)
	Coastal ecosystem			
	Elements monitored	Apex predators		
		GES criteria addressed	D4C1 Trophic guild species diversity	
			Parameters monitored	Species composition
			D4C2 Abundance across trophic guilds	
			Parameters monitored	Abundance (number of individuals), Distribution (pattern); Distribution (range)
			D4C4 Trophic guild productivity	
			Parameters monitored	Breeding success
	Adverse effects on species or habitats			
	Elements monitored	Haliaeetus albicilla		
		GES criteria addressed	D8C2 Adverse effects of contaminants	
			Parameters monitored	Productivity; Brood size; Breeding success
Spatial zones monitored	Coastal waters (WFD), Territorial waters			
Start(and end) date of the programme	1957-9999			
Frequency of the monitoring	Yearly			
Type of monitoring	Visual observation			
Data management and access	Data are annually reported to the national environmental monitoring database KESE (by 1 March). Data collection into the regional database for assessment purposes is coordinated by the HELCOM/ICES JWGBird Group.			
Indicators to which the programme contributes	BALEED1C2.3 - Abundance of waterbirds in the breeding season, BALEED8C2.1 - White tailed eagle productivity			
Contact	Meelis Leivits, Estonian Environment Agency, meelis.leivits@envir.ee			

References	The monitoring programme is approved by the minister of the environment and available at https://www.envir.ee/et/eesmargid-tegevused/merekeskkonna-kaitse/meres trateegia (https://www.envir.ee/sites/default/files/mereala_seireprogramm_2021_2026.pdf) (in Estonian).

MONITORING PROGRAMME	BALEE-D0104-3_BirdsMigrateThrough - Abundance of migratory water birds (coastal area)			
Introduction/overview of programme	The aim of the programme is to monitor the abundance of migrating waterbirds at their migration routes in the Estonian coastal areas. It provides data to monitoring strategy "SD1.1 – Biological diversity – Birds". The programme is related to GES Descriptor D1, Criterion D1C2 and D1C3. Monitoring is conducted once in five years on two locations on the coast. Waterbird species and abundances are recorded by visual observations every day during the migration period four hours after the sunrise and two hours before the sunset. The programme is not regionally coordinated yet. The data are reported to the environmental monitoring database KESE (by 1 March next year). Two possible indicators are still under development: abundance index of migratory waterbirds and sex/age ratio of migratory waterbirds. The programme corresponds to the following monitoring programmes in the indicative list: Mobile species – distribution, abundance and/or biomass; Mobile species – population characteristics.			
Purpose of programme	Environmental state and impacts			
Other EU or international policies to which programme contributes	Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention), Birds Directive, Habitats Directive, Agreement on the Conservation of African-Eurasian Migratory Waterbirds			
Monitoring details	Waterbird species and abundances are recorded by visual observations every day during the migration period four hours after the sunrise and two hours before the sunset. All waterbirds are counted (swans, geese, ducks, loons, grebes, cormorants, auks), wading birds and seagulls (excluding great black-backed and European herring gulls). If possible, the sex and age composition of flocks are also fixed for counted species groups. The monitoring is mainly project-based and is conducted every 5 years. The counting is performed on the Põõsaspea site in autumn and the Kabli site in spring.			
Ecosystem components, anthropogenic pressures and activities monitored	Grazing birds			
	Elements monitored	Anser anser		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Branta leucopsis		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Cygnus columbianus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution

		Cygnus cygnus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Cygnus olor		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Anas platyrhynchos		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Anser albifrons		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Branta bernicla		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Anas acuta		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Anas crecca		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Branta canadensis		

		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Anas penelope		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Anas clypeata		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
	Wading birds			
	Elements monitored	Arenaria interpres		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Calidris alpina		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Charadrius hiaticula		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Haematopus ostralegus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Tadorna tadorna		

		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Pluvialis apricaria		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Pluvialis squatarola		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Vanellus vanellus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Calidris canutus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Calidris alba		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Calidris minuta		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Calidris ferruginea		
		GES criteria	D1C2 Population abundance	

		addressed	Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Calidris alpina		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Philomachus pugnax		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Limosa lapponica		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Numenius phaeopus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Numenius arquata		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Actitis hypoleucos		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Tringa nebularia		
		GES criteria	D1C2 Population abundance	

		addressed	Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Tringa glareola		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Tringa totanus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
	Surface-feeding birds			
	Elements monitored	Hydroprogne caspia		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Larus canus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Larus fuscus graellsii		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Larus fuscus intermedius		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Hydrocoloeus minutus		
		GES criteria	D1C2 Population abundance	

		addressed	Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Larus ridibundus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Sterna albifrons		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Sterna hirundo		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Sterna paradisaea		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Sterna sandvicensis		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Stercorarius parasiticus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Chlidonias niger		
		GES criteria	D1C2 Population abundance	

		addressed	Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
	Pelagic-feeding birds			
	Elements monitored	Alca torda		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Gavia arctica		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Gavia stellata		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Mergellus albellus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Mergus merganser		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Mergus serrator		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Podiceps cristatus		
		GES criteria	D1C2 Population abundance	

		addressed	Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Phalacrocorax carbo		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Podiceps grisegena		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Podiceps auritus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Uria aalge		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Cepphus grylle		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
	Benthic-feeding birds			
	Elements monitored	Clangula hyemalis		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Aythya ferina		
		GES criteria	D1C2 Population abundance	

		addressed	Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Aythya fuligula		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Aythya marila		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Bucephala clangula		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Melanitta fusca		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Melanitta nigra		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
		Somateria mollissima		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution, Sex distribution
	Adverse effects on species or habitats			
	Elements monitored	Grazing birds		
		GES criteria	GES component not relevant	

		addressed	Parameters monitored	Incidence
		Wading birds		
		GES criteria addressed	GES component not relevant	
			Parameters monitored	Incidence
		Surface-feeding birds		
		GES criteria addressed	GES component not relevant	
			Parameters monitored	Incidence
		Pelagic-feeding birds		
		GES criteria addressed	GES component not relevant	
			Parameters monitored	Incidence
		Benthic-feeding birds		
		GES criteria addressed	GES component not relevant	
			Parameters monitored	Incidence
Spatial zones monitored	Coastal waters (WFD)			
Start(and end) date of the programme	2004-9999			
Frequency of the monitoring	Other (specify)			
Type of monitoring	Visual observation			
Data management and access	The data collected during the monitoring are submitted to the national environmental monitoring database KESE. More detailed data are also available at Põõsaspea monitoring website of Estonian Ornithological Society (https://www.eoy.ee/poosaspea/).			
Contact	Meelis Leivits, Estonian Environment Agency, meelis.leivits@envir.ee			
References	The monitoring programme is approved by the minister of the environment and available at https://www.envir.ee/et/eesmargid-tegevused/merekeskkonna-kaitse/meres trateegia (https://www.envir.ee/sites/default/files/mereala_seireprogramm_2021_2026.pdf) (in Estonian).			

MONITORING PROGRAMME	BALEE-D0104-4_BirdsMigrateStay - Abundance of migratory water birds (feeding in off-shore areas)			
Introduction/overview of programme	The aim of the programme is to monitor the abundance of migratory waterbirds during their migration and feeding in the Estonian off-shore areas. It provides data to monitoring strategy "SD1.1 – Biological diversity – Birds". The programme is related to GES Descriptor D1, Criterion D1C2 and potentially D1C4, as well as GES Descriptor D4, Criteria D4C1 and D4C2. Monitoring is conducted with a goal to cover all areas once in five years. Waterbird species and abundances are recorded by flight monitoring during the migration period. The programme is regionally coordinated via HELCOM/ICES JWGBirdGroup. Data are reported to the national environmental monitoring database KESE (by 1 March next year). There are no operational indicators yet, but the proposals have been done. The programme corresponds to the following monitoring programmes in the indicative list: Mobile species – distribution, abundance and/or biomass.			
Purpose of programme	Environmental state and impacts			
Other EU or international policies to which programme contributes	Birds Directive, Habitats Directive, Agreement on the Conservation of African-Eurasian Migratory Waterbirds, Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention)			
Monitoring details	The main method used for the data collection is counting and aerial surveys are mainly used in this programme. The Estonian marine area up to 50 m water depth is covered by the monitoring and divided to 10 monitoring areas. The visual aerial survey line transect method presents the counting the number of all migratory bird species from moving platform at a certain time period by line transect sections. There is a main bar of a transect with a certain width, and the number of individuals is registered on it. The main bar is also divided into the sections so that detectability of birds could be accounted in distant parts. The main bar and its divisions also allow estimating the density and the total abundance of migratory birds in the monitoring areas as well as compose detailed maps of birds distribution. The primary counting data are collected by a passed distance of the transect section within a certain time period: with 5 sec of aerial survey corresponds to 250 m distance of transect. The distance between counting transects is usually 3 km, but sometimes 6 km distances could be implemented in areas, where low abundancy could be expected, e.g deep-sea areas. The monitoring is mainly project-based yet and conducted annually with rotation (all monitoring areas are covered once in a five-year period). The need and rationality of carrying out of the ship-based surveys as additional counting method will be specified as the regular monitoring starts.			
Ecosystem components, anthropogenic pressures and activities monitored	Surface-feeding birds			
	Elements monitored	Larus argentatus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range), Distribution (spatial)
		Larus canus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C4 Population distributional range and pattern	

			Parameters monitored	Distribution (pattern), Distribution (range), Distribution (spatial)
		Hydrocoloeus minutus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range), Distribution (spatial)
	Pelagic-feeding birds			
	Elements monitored	Alca torda		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range), Distribution (spatial)
		Gavia arctica		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range), Distribution (spatial)
		Gavia stellata		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range), Distribution (spatial)
		Phalacrocorax carbo		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range), Distribution (spatial)
	Benthic-feeding birds			
	Elements monitored	Clangula hyemalis		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C4 Population distributional range and pattern	

			Parameters monitored	Distribution (pattern), Distribution (range), Distribution (spatial)
		Melanitta fusca		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range), Distribution (spatial)
		Melanitta nigra		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range), Distribution (spatial)
		Somateria mollissima		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (pattern), Distribution (range), Distribution (spatial)
Spatial zones monitored	Territorial waters, Coastal waters (WFD), EEZ (or similar)			
Start(and end) date of the programme	2022-9999			
Frequency of the monitoring	Yearly			
Type of monitoring	Visual observation, Remote flight imagery			
Data management and access	Data collected during the monitoring are submitted to the national environmental monitoring database KESE (by 1 March).			
Contact	Estonian Environment Agency, kaur@envir.ee; Estonian University of Life Sciences, Institute of Agricultural and Environmental Sciences, Leho Luigujõe, leho.luigujoe@emu.ee.			
References	The monitoring programme is approved by the minister of the environment and available at https://www.envir.ee/et/eesmargid-tegevused/merekeskkonna-kaitse/meres trateegia (https://www.envir.ee/sites/default/files/mereala_seireprogramm_2021_2026.pdf) (in Estonian).			

MONITORING PROGRAMME	BALEE-D0104-5_SealsAbundance - Seals – abundance			
Introduction/overview of programme	The aim of the programme is to monitor the abundance of grey and ringed seals at the haulouts on land or ice, in order to produce estimates of abundance and abundance trends as well as the distributions and distribution trends of these species during their moulting and pupping seasons. It provides data for the status assessments under GES criteria D1C2 (population abundance) and D1C4 (distributional range and pattern). Monitoring is conducted yearly at the designated sites. The program is regionally coordinated by HELCOM and the HELCOM monitoring guidelines are followed. Data are yearly reported to the national environmental monitoring database KESE (by 1 November), but for ringed seals, data are publicly available only in a generalised form due to protection requirements. The programme corresponds to the following monitoring programmes in the indicative list: Mobile species – distribution, abundance and/or biomass; Mobile species – population characteristics.			
Purpose of programme	Environmental state and impacts, Effectiveness of measures			
Other EU or international policies to which programme contributes	Habitats Directive, HELCOM Monitoring programmes, Monitoring programme targeting at national legislation			
Monitoring details	The counting is performed using aerial observations. All monitoring areas are inspected 2-3 times. The moulting period counting of seals takes place during regionally agreed period from 23 May to 5 June. The aerial counting of ringed seals takes place between 12 and 25 April. The early spring flight surveys can be conducted in cold winters and ice cover occurrence, otherwise visual observations from boat or seashore are done (warmer winters with no ice cover).			
Ecosystem components, anthropogenic pressures and activities monitored	Seals			
	Elements monitored	Halichoerus grypus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
		Pusa hispida		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals)
Spatial zones monitored	Territorial waters, Coastal waters (WFD)			
Start(and end) date of the programme	1994-9999			
Frequency of the monitoring	Yearly			
Type of monitoring	Remote flight imagery, Visual observation			
Data management and access	Data collected during the monitoring are submitted to the national environmental monitoring database KESE. The data concerning ringed seals are publicly available only in a generalised form.			
Indicators to which the programme contributes	BALEED1C2.1 - Grey seal abundance, BALEED1C4.1 - Distributional range of grey seal, BALEED1C4.3 - Distributional pattern of grey seal, BALEED1C2.2 - Ringed seal abundance, BALEED1C4.2 - Distributional range of ringed seal, BALEED1C4.4 - Distribution pattern of ringed seals			
Contact	Estonian Environment Agency: Piret Kiristaja: piret.kiristaja@envir.ee, Anastasiia Kovtun-Kante: anastasiia.kovtun-Kante@envir.ee; Arthur Kivi: arthur.kivi@envir.ee.			

References	The monitoring programme is approved by the minister of the environment and available at https://www.envir.ee/et/eesmargid-tegevused/merekeskkonna-kaitse/meres trateegia (https://www.envir.ee/sites/default/files/mereala_seireprogramm_2021_2026.pdf) (in Estonian).

MONITORING PROGRAMME	BALEE-D0104-6_SealsReproduction - Seals – breeding success			
Introduction/overview of programme	The aim of the programme is to monitor the breeding success of grey seals. Visual counting of pups (including dead specimen) is conducted on their breeding sites on land (islands) several times during the breeding period from 15 February to 31 March every year. The number of pups and their death rate is estimated. Monitoring provides data for the status assessments under the GES criterion D1C2 (population abundance) and D1C4 (distributional range and pattern). The program data collection is regionally coordinated by HELCOM. Data are yearly reported to the national environmental monitoring database KESE (by 1 November). The programme corresponds to the following monitoring programmes in the indicative list: Mobile species – distribution, abundance and/or biomass; Mobile species – health status; Mobile species – population characteristics.			
Purpose of programme	Environmental state and impacts, Pressures in the marine environment			
Other EU or international policies to which programme contributes	Habitats Directive, Monitoring programme targeting at national legislation			
Monitoring details	Grey seal pups are surveyed during land visits to breeding sites, 4 times during the breeding period (15 February - 31 March). The monitoring is conducted in accordance with HELCOM recommendations (HELCOM, 2018. Guidelines for monitoring Seal abundance and distribution in the HELCOM area). The detailed methodology is described by Jüssi and Jüssi in 2008 (Hüljeste aruanne, https://seire.keskkonnainfo.ee/index.php?option=com_content&view=article&id=1161:2008-a&catid=1029:elusloodus-mitmekesisuse-ja-maastike-seire&Itemid=3877).			
Ecosystem components, anthropogenic pressures and activities monitored	Seals			
	Elements monitored	Halichoerus grypus		
		GES criteria addressed	D1C3 Population demographic characteristics	
			Parameters monitored	Breeding success
Spatial zones monitored	Coastal waters (WFD)			
Start(and end) date of the programme	1990-9999			
Frequency of the monitoring	Yearly			
Type of monitoring	Visual observation			
Data management and access	Data collected during the monitoring are submitted to the national environmental monitoring database KESE.			
Indicators to which the programme contributes	BALEED1C2.1 - Grey seal abundance			
Contact	Estonian Environment Agency: Piret Kiristaja: piret.kiristaja@envir.ee, Anastasiia Kovtun-Kante: anastasiia.kovtun-Kante@envir.ee; Arthur Kivi: arthur.kivi@envir.ee.			
References	The monitoring programme is approved by the minister of the environment and available at https://www.envir.ee/et/eesmargid-tegevused/merekeskkonna-kaitse/meres trateegia (https://www.envir.ee/sites/default/files/mereala_seireprogramm_2021_2026.pdf) (in Estonian).			

MONITORING PROGRAMME	BALEE-D010403-7_FishCoastal - Coastal fish			
Introduction/overview of programme	The aim of the programme is to monitor the status of the coastal fish species and communities (Species composition of the group; Size, age and sex structure; fecundity, survival and mortality/injury rates; Habitat for the species (extent, suitability); Species abundance (numbers of individuals and/or biomass)). It provides data to monitoring strategy "SD1.4 Biodiversity – Fish", „SD3–Commercially exploited fish" and "SD4/SD1 Food webs / Biodiversity – ecosystems", but also to "SD2– Non-indigenous species". The program is regionally coordinated by HELCOM (partially also by ICES) and the HELCOM monitoring manual is followed. During the annual monitoring programme, all coastal fish species are included in the dataset, but special attention is directed towards economically significant or ecologically relevant key species (perch, flounder, pikeperch). Atlantic salmon is used as an indicator species for migratory (anadromous) fishes and is monitored in coastal waters and selected rivers (salmonid habitats). Monitoring of protected fish species under HD needs to be developed for the sea area as well. The programme was modified from 2014 by adding migratory fishes that were as a separate sub-programme in 2014. The programme corresponds to following monitoring programmes in the indicative list: Mobile species – distribution, abundance and/or biomass; Mobile species – population characteristics; Mobile species – mortality/injury rates from fisheries (targeted and/or incidental).			
Purpose of programme	Environmental state and impacts, Human activities causing the pressures, Effectiveness of measures			
Other EU or international policies to which programme contributes	Data Collection Framework Multi-Annual Plan (Common Fisheries Policy), Habitats Directive, Monitoring programme targeting at national legislation			
Monitoring details	Data on all coastal fish species are being collected annually in discrete monitoring areas within the national fisheries data collection programme (https://www.envir.ee/et/eesmargid-tegevused/kalandus/kalanduse-riiklik-andmekoguminen-programm-akp).			
Ecosystem components, anthropogenic pressures and activities monitored	Coastal fish			
	Elements monitored	Abramis brama		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Alburnus alburnus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Alosa fallax		

		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Ammodytes tobianus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Anguilla anguilla		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Abundance index of European eel in monitoring catches (CPUE); Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Blicca bjoerkna		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Carassius carassius		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution

		Carassius gibelio		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Coregonus maraena		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Cyprinus carpio		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Esox lucius		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Gadus morhua		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Gobius niger		
		GES criteria	D1C2 Population abundance	

		addressed	Parameters monitored	Abundance (number of individuals), Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Gymnocephalus cernua		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Hyperoplus lanceolatus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Lampetra fluviatilis		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Leuciscus aspius		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Leuciscus idus		
		GES criteria	D1C2 Population abundance	

		addressed	Parameters monitored	Abundance (number of individuals), Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Leuciscus leuciscus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Lota lota		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Neogobius melanostomus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Osmerus eperlanus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Rutilus rutilus		
		GES criteria	D1C2 Population abundance	

		addressed	Parameters monitored	Abundance (number of individuals), Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Scardinius erythrophthalmus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Scophthalmus maximus [Psetta maxima]		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Squalius cephalus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Zoarces viviparus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Tinca tinca		
		GES criteria	D1C2 Population abundance	

		addressed	Parameters monitored	Abundance (number of individuals), Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Vimba vimba		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Platichthys flesus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Biomass, Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Sander lucioperca		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Biomass, Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Cobitis taenia		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Biomass, Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
			D1C4 Population distributional range and pattern	

			Parameters monitored	Distribution (spatial)
		Coregonus widegreni		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Biomass, Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Gobio gobio		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Biomass, Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Platichthys solemdali		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Biomass, Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
	Pelagic shelf fish			
	Elements monitored	Belone belone		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Coregonus albula		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Mass (catch weight per unit effort)

			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Coregonus lavaretus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (spatial)
		Cyclopterus lumpus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Pelecus cultratus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Salmo trutta trutta		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Clupea harengus		
		GES criteria	D1C2 Population abundance	

		addressed	Parameters monitored	Abundance (number of individuals), Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Salmo salar		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Sprattus sprattus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
	Demersal shelf fish			
	Elements monitored	Myoxocephalus quadricornis		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Myoxocephalus scorpius		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Taurulus bubalis		
		GES criteria	D1C2 Population abundance	

		addressed	Parameters monitored	Abundance (number of individuals), Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Perca fluviatilis		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Biomass, Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
		Cottus gobio		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Abundance (number of individuals), Mass (catch weight per unit effort)
			D1C3 Population demographic characteristics	
			Parameters monitored	Length, Sex distribution, Age distribution
			D1C4 Population distributional range and pattern	
			Parameters monitored	Distribution (spatial)
	Commercially exploited fish and shellfish			
	Elements monitored	Clupea harengus		
		GES criteria addressed	D3C2 Spawning stock biomass (SSB)	
			Parameters monitored	Biomass of Spawning Stock (SSB), Abundance (number of individuals)
			D3C1 Fishing mortality rate (F)	
			Parameters monitored	Mortality rate
			D3C3 Population age/size distribution	
			Parameters monitored	Age distribution
		Salmo salar		
		GES criteria addressed	D3C2 Spawning stock biomass (SSB)	
			Parameters monitored	Abundance (number of individuals), Mass (commercial catch weight per unit effort)
			D3C3 Population age/size distribution	

			Parameters monitored	Length
		Perca fluviatilis		
		GES criteria addressed	D3C1 Fishing mortality rate (F)	
			Parameters monitored	Ratio between annual commercial catch and biomass index (WPUE in monitoring area)
			D3C2 Spawning stock biomass (SSB)	
			Parameters monitored	Abundance (number of individuals), Mass (commercial catch weight per unit effort)
			D3C3 Population age/size distribution	
			Parameters monitored	Length, Age distribution; Sex distribution
		Platichthys flesus		
		GES criteria addressed	D3C1 Fishing mortality rate (F)	
			Parameters monitored	Ratio between annual commercial catch and biomass index (WPUE in monitoring area)
			D3C2 Spawning stock biomass (SSB)	
			Parameters monitored	Abundance (number of individuals), Mass (commercial catch weight per unit effort)
			D3C3 Population age/size distribution	
			Parameters monitored	Length, Age distribution; Sex distribution
		Platichthys solemdali		
		GES criteria addressed	D3C1 Fishing mortality rate (F)	
			Parameters monitored	Ratio between annual commercial catch and biomass index (WPUE in monitoring area)
			D3C2 Spawning stock biomass (SSB)	
			Parameters monitored	Abundance (number of individuals), Mass (commercial catch weight per unit effort)
			D3C3 Population age/size distribution	
			Parameters monitored	Length, Age distribution; Sex distribution
		Sander lucioperca		
		GES criteria addressed	D3C1 Fishing mortality rate (F)	
			Parameters monitored	Ratio between annual commercial catch and biomass index (WPUE in monitoring area)
			D3C2 Spawning stock biomass (SSB)	

			Parameters monitored	Abundance (number of individuals), Mass (commercial catch weight per unit effort)
			D3C3 Population age/size distribution	
			Parameters monitored	Length, Sex distribution; Age distribution
	Coastal ecosystem			
	Elements monitored	Fish community		
		GES criteria addressed	D4C2 Abundance across trophic guilds	
			Parameters monitored	Abundance (number of individuals), Abundance of coastal fish key functional groups (CPUE)
			D4C1 Trophic guild species diversity	
			Parameters monitored	Species composition; Trophic level class of fish species
	Extraction of, or mortality/injury to, wild species (by commercial and recreational fishing and other activities)			
	Input of litter (solid waste matter, including micro-sized litter)			
Spatial zones monitored	Territorial waters, Coastal waters (WFD), EEZ (or similar)			
Start(and end) date of the programme	1975-9999			
Frequency of the monitoring	Yearly			
Type of monitoring	In-situ sampling coastal, In-situ sampling offshore			
Data management and access	Data are reported annually to the Ministry of the Environment and the Ministry of Rural Affairs. The raw data are also stored in databases of Estonian Marine Institute at Tartu University.			

Indicators to which the programme contributes	BALEED1C5.1 - The smolt production of Baltic salmon (Salmo salar) relative to the level of natural smolt production capacity on a riverby river basis, BALEED3C2.5 - The smolt production of Baltic salmon (Salmo salar) relative to the level of natural smolt production capacity on a riverby river basis, BALEED1C3.1 - Mean maximum length across all fish species found in monitoring catches (MMLI), BALEED3C1.2 - Fishing mortality (F) of subpopulation of spring spawning baltic herring (Clupea harengus membras) in Gulf of Riga, BALEED3C1.4 - Ratio between annual commercial catch and biomass index (WPUE in monitoring area) of flounder (Platichthys flesus), BALEED3C1.5 - Ratio between annual commercial catch and biomass index (WPUE in monitoring area) of perch (Perca fluviatilis), BALEED3C1.6 - Ratio between annual commercial catch and biomass index (WPUE in monitoring area) of pikeperch (Sander lucioperca), BALEED3C2.2 - Spawning stock biomass (SSB) of subpopulation of spring spawning baltic herring (Clupea harengus membras) in Gulf of Riga, BALEED3C2.4 - Abundance index of sexually mature flounder (Platichthys flesus) in monitoring catches, BALEED3C2.6 - Abundance index of sexually mature perch (Perca fluviatilis) in monitoring catches, BALEED3C2.7 - Abundance index of sexually mature female pikeperch (Sander lucioperca) in monitoring catches, BALEED3C3.1 - 95 % percentile of the length distribution of flounder (Platichthys flesus) in monitoring catches, BALEED3C3.3 - 95 % percentile of the length distribution of pikeperch (Sander lucioperca) in monitoring catches, BALEED3C3.2 - Abundance index of large(TL>250 mm) perch (Perca fluviatilis) in monitoring catches, BALEED4C1.1 - Fish community trophic index, BALEED4C2.1 - Abundance of coastal Fish key functional groups: abundance of cyprinids in monitoring catches, BALEED4C2.2 - Abundance of coastal Fish key functional groups: abundance of piscivores in monitoring catches, BALEED1C2.5 - The abundance of European eel (Anguilla anguilla) in Estonian coastal waters - new planned indicator, BALEED1C4.5 - Distributional range of spined loach (Cobitis taenia) in Estonian coastal waters - new planned indicator, BALEED1C4.6 - Distributional range of European bullhead (Cottus gobio) in Estonian coastal waters - new planned indicator, BALEED1C4.7 - Distributional range of European whitefish (Coregonus lavaretus) in Estonian coastal waters - new planned indicator
Contact	Ministry of the Environment: Elo Rasmann (elo.rasmann@envir.ee); University of Tartu, Estonian Marine Institute: Redik Eschbaum, redik.eschbaum@ut.ee, Lauri Saks, lauri.saks@ut.ee.
References	The monitoring programme is approved by the minister of the environment and available at https://www.envir.ee/et/eesmargid-tegevused/merekeskkonna-kaitse/meres trateegia (https://www.envir.ee/sites/default/files/mereala_seireprogramm_2021_2026.pdf) (in Estonian).

MONITORING PROGRAMME	BALEE-D010403-8_FishOffshore - Off-shore fish				
Introduction/overview of programme	The aim of the programme is to monitor the status of the commercially exploited pelagic fish species – sprat and herring in the offshore areas of the Estonian marine waters. The biomass and fishing mortality of stocks are assessed. It provides data to monitoring strategy "SD1.4 Biodiversity – Fish" and „SD3-commercially exploited fish". Monitoring is conducted annually. The program is regionally coordinated via ICES and the ICES monitoring manual is followed. The programme corresponds to following monitoring programmes in the indicative list: Mobile species – distribution, abundance and/or biomass; Mobile species – mortality/injury rates from fisheries (targeted and/or incidental).				
Purpose of programme	Environmental state and impacts, Human activities causing the pressures, Effectiveness of measures				
Other EU or international policies to which programme contributes	Data Collection Framework Multi-Annual Plan (Common Fisheries Policy)				
Monitoring details	For monitoring offshore fish species the hydro-acoustic surveys and scientific trawlings are carried out. In addition, ICES coordinated cruises (BIAS, BITS) are carried out and the data are submitted to the ICES database.				
Ecosystem components, anthropogenic pressures and activities monitored	Extraction of, or mortality/injury to, wild species (by commercial and recreational fishing and other activities)				
	Commercially exploited fish and shellfish				
	Elements monitored	Clupea harengus			
		GES criteria addressed	D3C2 Spawning stock biomass (SSB)		
			Parameters monitored	Biomass of Spawning Stock (SSB), Abundance (number of individuals)	
			D3C1 Fishing mortality rate (F)		
			Parameters monitored	Mortality rate	
			D3C3 Population age/size distribution		
			Parameters monitored	Age distribution	
		Sprattus sprattus			
		GES criteria addressed	D3C2 Spawning stock biomass (SSB)		
			Parameters monitored	Biomass of Spawning Stock (SSB), Abundance (number of individuals)	
			D3C1 Fishing mortality rate (F)		
			Parameters monitored	Mortality rate	
			D3C3 Population age/size distribution		
			Parameters monitored	Age distribution	
	Pelagic shelf fish				
	Elements monitored	Clupea harengus			
		GES criteria addressed	D1C1 Mortality rate from incidental by-catch		
			Parameters monitored	Mortality rate	
			D1C2 Population abundance		

			Parameters monitored	Abundance (number of individuals), Biomass
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution
		Sprattus sprattus		
		GES criteria addressed	D1C2 Population abundance	
			Parameters monitored	Biomass, Abundance (number of individuals)
			D1C1 Mortality rate from incidental by-catch	
			Parameters monitored	Mortality rate
			D1C3 Population demographic characteristics	
			Parameters monitored	Age distribution
Spatial zones monitored	Territorial waters, EEZ (or similar)			
Start(and end) date of the programme	1992-9999			
Frequency of the monitoring	Yearly			
Type of monitoring	In-situ sampling offshore			
Data management and access	Data are reported annually to the Ministry of the Environment and the Ministry of Rural Affairs. The raw data are also stored in databases of Estonian Marine Institute at Tartu University.			
Indicators to which the programme contributes	BALEED3C2.1 - Spawning stock biomass (SSB) of subpopulation of spring spawning baltic herring (Clupea harengus membras) in Estonian marine areas (ICES subregions SD 27-29, 32), BALEED3C2.3 - Spawning stock biomass (SSB) of Baltic sprat (Sprattus sprattus balticus), BALEED3C1.1 - Fishing mortality (F) of subpopulation of spring spawning baltic herring (Clupea harengus membras) in Estonian marine areas (ICES subregions SD 27-29, 32), BALEED3C1.3 - Fishing mortality (F) of Baltic sprat (Sprattus sprattus balticus)			
Contact	Ministry of the Environment: Elo Rasmann (elo.rasmann@envir.ee); University of Tartu, Estonian Marine Institute: Redik Eschbaum, redik.eschbaum@ut.ee, Lauri Saks, lauri.saks@ut.ee.			
References	The monitoring programme is approved by the minister of the environment and available at https://www.envir.ee/et/eesmargid-tegevused/merekeskkonna-kaitse/meres trateegia (https://www.envir.ee/sites/default/files/mereala_seireprogramm_2021_2026.pdf) (in Estonian).			

MONITORING PROGRAMME	BALEE-D010403-9_FishMigratory - Migratory fish
Introduction/overview of programme	The programme is no longer in place as a separate programme, monitoring will proceed under the programme "Coastal fish" (BALEE-D010403-7_FishCoastal)

MONITORING PROGRAMME	BALEE-D010405-10_Phytop - Phytoplankton species composition, abundance and biomass			
Introduction/overview of programme	The aim of the programme is to monitor phytoplankton communities (species composition, abundance, biomass and seasonal cycle of dominant groups) in the water column. It provides data to monitoring strategy "SD5 – Eutrophication", as well as "SD1.6 Biodiversity – pelagic habitats", "SD4/SD1 Food webs / Biodiversity – ecosystems" and "SD2– Non-indigenous species". The programme is related to GES Descriptor D5, Criterion D5C2, Descriptor D1, Criterion D1C6 and Descriptor D4, Criterion D4C1. Data are gathered to assess spatial variability, temporal trends and environmental status in coastal water bodies and off-shore sub-basins of the Baltic Sea (HELCOM divisions) in response to pressure levels. Monitoring is conducted yearly or at least once in six years with a frequency of 5 to 12 times a year at the designated monitoring stations (at least 3 stations in each coastal water body and 11 in the Estonian off-shore areas). The program is regionally coordinated via HELCOM and the HELCOM monitoring manual is followed. Data are yearly reported to the national environmental monitoring database KESE (by 1 March) and ICES (HELCOM Combine). The threshold values for the indicator of seasonal succession of dominating phytoplankton groups are still missing for some assessment units of the Baltic Sea (incl. Estonian marine area), mainly due to the lack of data corresponding to the set criteria. The programme is essentially the same as in 2014, only minor changes in some monitoring stations and frequencies were undertaken. The programme corresponds to the following monitoring programmes in the indicative list: Pelagic habitats – community characteristics.			
Purpose of programme	Environmental state and impacts			
Other EU or international policies to which programme contributes	Water Framework Directive, HELCOM Monitoring programmes, Monitoring programme targeting at national legislation			
Monitoring details	Phytoplankton samples are collected with a bathometer at water depths of 1, 5 and 10 m together with samples of seawater chlorophyll a. An integrated sample is made pooling equal amounts of water collected from fixed depths. When the integrated sample is thoroughly mixed, a portion is poured into a clear glass bottle and fixed with preservation chemical for further transport, storage and analysis of the phytoplankton sample. As part of the Ferrybox monitoring, samples are collected with an automatic sampler from depths of 4-5 m from a predefined location on the route of the liner. Phytoplankton is analysed according to the relevant international standard methods (EN 16695: 2015, HELCOM Monitoring Manual). In 3 coastal water bodies sampling is carried out annually 10-12 times per year (from April to October), Haapsalu coastal waterbody - 10-12 times every third year. Other coastal water bodies are monitored in rotation 6 times per year (from June to September) at least once during a 6-year period. In the off-shore areas the research vessel-based monitoring is conducted 5 times per year (from April to October) and 12 times every year in frames of Ferrybox monitoring.			
Ecosystem components, anthropogenic pressures and activities monitored	HabPelOther			
	Elements monitored	Phytoplankton communities		
		GES criteria addressed	D1C6 Pelagic habitat condition	
			Parameters monitored	Species composition; Abundance (number of individuals); Biomass
	Coastal ecosystem			
	Elements monitored	Primary producers		
		GES criteria addressed	D4C1 Trophic guild species diversity	
			Parameters monitored	Species composition

			D4C2 Abundance across trophic guilds	
			Parameters monitored	Abundance (number of individuals), Biomass
Spatial zones monitored	Coastal waters (WFD), Territorial waters, EEZ (or similar)			
Start(and end) date of the programme	1993-9999			
Frequency of the monitoring	Yearly			
Type of monitoring	In-situ sampling coastal, In-situ sampling offshore			
Data management and access	Data are yearly reported to the national environmental monitoring database KESE (by 1 March) and ICES (HELCOM Combine).			
Indicators to which the programme contributes	BALEED5C2.2 - Summer phytoplankton wet weight biomass, BALEED1C6.1 - Seasonal succession of dominating phytoplankton groups			
Contact	Estonian Environment Agency: Anastasiia Kovtun-Kante, anastasiia.kovtun-kante@envir.ee; Arthur Kivi, arthur.kivi@envir.ee			
References	The monitoring programme is approved by the minister of the environment and available at https://www.envir.ee/et/eesmargid-tegevused/merekeskkonna-kaitse/meres trateegia (https://www.envir.ee/sites/default/files/mereala_seireprogramm_2021_2026.pdf) (in Estonian).			

MONITORING PROGRAMME	BALEE-D010405-11_Zoopl - Zooplankton species composition, abundance and biomass			
Introduction/overview of programme	The aim of the programme is to monitor species composition, abundance and biomass of mesozooplankton. It provides data to monitoring strategy "SD1.6 Biodiversity – pelagic habitats", as well as "SD2-Non-indigenous species" and "SD4/SD1 Food webs / Biodiversity – ecosystems". The programme is related to GES Descriptors D1, Criterion D1C6, Description D2 Criterions D2C1 and D2C2 and Descriptor D4 Criterion D4C2. Data are gathered to assess the state of the marine environment and environmental status in three coastal water bodies and all off-shore sub-basins of the Baltic Sea (HELCOM sub-divisions) as well as pressures from/by non-indigenous species. Monitoring is conducted yearly with a frequency 10 times a year at the designated coastal monitoring stations (3 stations in each coastal water body) and with frequency twice a year for 16 stations in the Estonian off-shore areas. The program is regionally coordinated via HELCOM and the HELCOM guidelines are followed. Data are yearly reported to the national environmental monitoring database KESE (by 1 March) and ICES (HELCOM Combine). Mesozooplankton Mean Size Total Stock indicator is developed by HELCOM on the basis of mesozooplankton data. The threshold values for the indicator have been internationally agreed for some sub-basins, but not for the Gulf of Riga yet. The programme is essentially the same as in 2014, only minor changes in some monitoring stations and frequencies were undertaken. The programme corresponds to the following monitoring programmes in the indicative list: Pelagic habitats – community characteristics.			
Purpose of programme	Environmental state and impacts, Pressures in the marine environment			
Other EU or international policies to which programme contributes	Habitats Directive, HELCOM Monitoring programmes, Monitoring programme targeting at national legislation			
Monitoring details	The samples are collected by means of vertical hauls using a Juday or WP-2 net with 0,1 mm mesh size. The collected samples are preserved in a formaldehyde solution to microscopic analysis to be performed in a laboratory.			
Ecosystem components, anthropogenic pressures and activities monitored	HabPelOther			
	Elements monitored	Zooplankton communities		
		GES criteria addressed	D1C6 Pelagic habitat condition	
			Parameters monitored	Species composition; Abundance (number of individuals); Biomass
	Coastal ecosystem			
	Elements monitored	All trophic guilds		
		GES criteria addressed	D4C1 Trophic guild species diversity	
			Parameters monitored	Species composition
			D4C2 Abundance across trophic guilds	
			Parameters monitored	Abundance (number of individuals), Biomass
		Secondary producers		
		GES criteria addressed	D4C1 Trophic guild species diversity	
			Parameters monitored	Species composition
			D4C2 Abundance across trophic guilds	
			Parameters monitored	Abundance (number of individuals), Biomass

Spatial zones monitored	Territorial waters, Coastal waters (WFD), EEZ (or similar)
Start(and end) date of the programme	1993-9999
Frequency of the monitoring	Yearly
Type of monitoring	In-situ sampling coastal, In-situ sampling offshore
Data management and access	Data are yearly reported to the national environmental monitoring database KESE (by 1 March) and ICES (HELCOM Combine).
Indicators to which the programme contributes	BALEED1C6.2 - Zooplankton mean size and total stock
Contact	Estonian Environment Agency: Anastasiia Kovtun-Kante, anastasiia.kovtun-kante@envir.ee; Arthur Kivi, arthur.kivi@envir.ee
References	The monitoring programme is approved by the minister of the environment and available at https://www.envir.ee/et/eesmargid-tegevused/merekeskkonna-kaitse/meres trateegia (https://www.envir.ee/sites/default/files/mereala_seireprogramm_2021_2026.pdf) (in Estonian).

MONITORING PROGRAMME	BALEE-D010406-12_SeabedHabitat - Seabed habitats – community characteristics			
Introduction/overview of programme	The aim of the programme is to monitor the status of benthic habitats (presence, distribution, abundance, biomass of the species; characteristics of the sediment and near-bottom water layer; distribution characteristics of loose Furcellaria lumbricalis community). It provides data to monitoring strategy „SD6/SD1 Sea-floor integrity/Biological diversity – benthic habitats“ as well as “SD5 – Eutrophication”. The programme is related to GES Descriptor D6, Criterion D6C5; Descriptor D5 Criterions D5C5, D5C7 and D5C8. Data are gathered to assess spatial variability, temporal trends and environmental status in coastal water bodies and off-shore sub-basins of the Baltic Sea (HELCOM sub-divisions) in response to pressure levels. Monitoring is conducted yearly, bi-annually or at least once in six years with a frequency of once a year at the designated monitoring stations. The program is partly regionally coordinated via HELCOM (soft-bottom habitats) and the HELCOM monitoring manual is followed conducting certain elements of the programme. Data are reported to the national environmental monitoring database KESE and ICES (HELCOM Combine). The programme has been changed since 2014 by adding the part about the commercial stock of Furcellaria lumbricalis (former sub-programme BALEE-D010406-17_ComStockFurcellaria). The programme corresponds to the following monitoring programmes in the indicative list: Seabed habitats – community characteristics; Benthic species – abundance and/or biomass; Seabed habitats - distribution and extent.			
Purpose of programme	Environmental state and impacts			
Other EU or international policies to which programme contributes	Water Framework Directive, Habitats Directive			
Monitoring details	Seabed habitats monitoring combines different monitoring methodologies of monitoring of phyto- and zoobenthos. The monitoring for assessment of the Habitat Directive habitat types includes both, visual observations within ecological belts and in-situ sampling in representative sites. The total coverage, species abundance and coverage are registered as well as bottom sediment type. Biomass samples are collected by divers or grab samplers (soft bottom). Within the monitoring of commercial stock of Furcellaria lumbricalis, the thickness of algae layer, Secchi depth, temperature and dissolved oxygen in the near-bottom layer are also measured. The methodology for monitoring and assessment of habitat types 1130, 1150 and 1160 is still under development. Monitoring of seabed habitats of coastal water bodies includes determination of the presence and abundance of all species, coverage, sediment type and distribution depth limit within a transect. The observations are carried out at different transect depths up to macrophyte depth limit both by visual observation or using underwater video remote observation method once a year (from July to August). Quantitative samples are collected with the 20x20 metal frame and deep-freezed for laboratory analysis (excluding Furcellaria lumbricalis stock samples). In the laboratory, the species composition and species wet weight (red algae stock) or dry weight (seabed habitats and habitat types) per 1m2 are determined. The monitoring and data collection is partly coordinated by HELCOM and for softbottom habitats only.			
Ecosystem components, anthropogenic pressures and activities monitored	Litter in the environment			
	Elements monitored	Macrolitter (all)		
		GES criteria addressed	D10C1 Litter (excluding micro-litter)	
			Parameters monitored	Amount on seabed
	Benthic broad habitats			

	Elements monitored	Benthic habitats		
		GES criteria addressed	D6C5 Benthic habitat condition	
			Parameters monitored	Extent, Species composition; Presence; Biomass; Maximum depth; Relative abundance within community
	Benthic broad habitats			
	Elements monitored	Infralittoral rock and biogenic reef		
		GES criteria addressed	D6C5 Benthic habitat condition	
			Parameters monitored	Species composition; Presence; Biomass; Maximum depth; Relative abundance within community
		Infralittoral sand		
		GES criteria addressed	D6C5 Benthic habitat condition	
			Parameters monitored	Species composition; Presence; Biomass; Maximum depth; Relative abundance within community
		Infralittoral mud		
		GES criteria addressed	D6C5 Benthic habitat condition	
			Parameters monitored	Species composition; Presence; Biomass; Maximum depth; Relative abundance within community
		Infralittoral mixed sediment		
		GES criteria addressed	D6C5 Benthic habitat condition	
			Parameters monitored	Species composition; Presence; Biomass; Maximum depth; Relative abundance within community
		Infralittoral coarse sediment		
		GES criteria addressed	D6C5 Benthic habitat condition	
			Parameters monitored	Species composition; Presence; Biomass; Maximum depth; Relative abundance within community
		Circalittoral rock and biogenic reef		
		GES criteria addressed	D6C5 Benthic habitat condition	
			Parameters monitored	Species composition; Presence; Biomass; Maximum depth; Relative abundance within community
		Circalittoral sand		
		GES criteria	D6C5 Benthic habitat condition	

		addressed	Parameters monitored	Species composition; Presence; Biomass; Maximum depth; Relative abundance within community
		Circalittoral mud		
		GES criteria addressed	D6C5 Benthic habitat condition	
			Parameters monitored	Species composition; Presence; Biomass; Maximum depth; Relative abundance within community
		Circalittoral mixed sediment		
		GES criteria addressed	D6C5 Benthic habitat condition	
			Parameters monitored	Species composition; Presence; Biomass; Maximum depth; Relative abundance within community
		Circalittoral coarse sediment		
		GES criteria addressed	D6C5 Benthic habitat condition	
			Parameters monitored	Species composition; Presence; Biomass; Maximum depth; Relative abundance within community
Spatial zones monitored	Coastal waters (WFD), Territorial waters, EEZ (or similar)			
Start(and end) date of the programme	1974-9999			
Frequency of the monitoring	Other (specify)			
Type of monitoring	In-situ sampling coastal, In-situ sampling offshore, Visual observation, Remote surveillance			
Data management and access	Gathered data are submitted to the national environmental monitoring database KESE.			

Indicators to which the programme contributes	BALEED6C5.1 - Quality of habitat type reefs (code 1170), BALEED6C5.2 - Quality of habitat type mudflats and sandflats (code 1140), BALEED6C5.3 - Quality of habitat type sandbanks (code 1110), BALEED6C5.4 - Quality of habitat type estuaries (code 1130), BALEED6C5.5 - Quality of habitat type large shallow inlets and bays (code 1160), BALEED6C5.6 - Quality of habitat type coastal lagoons (1150), BALEED6C5.7 - The extent of adverse effects from anthropogenic pressures on the condition of the habitat type infralittoral rock and biogenic reef., BALEED6C5.8 - The extent of adverse effects from anthropogenic pressures on the condition of the habitat type infralittoral sand., BALEED6C5.9 - The extent of adverse effects from anthropogenic pressures on the condition of the habitat type infralittoral mud., BALEED6C5.10 - The extent of adverse effects from anthropogenic pressures on the condition of the habitat type infralittoral mixed sediment., BALEED6C5.11 - The extent of adverse effects from anthropogenic pressures on the condition of the habitat type infralittoral coarse sediment., BALEED6C5.12 - The extent of adverse effects from anthropogenic pressures on the condition of the habitat type circalittoral rock and biogenic reef., BALEED6C5.13 - The extent of adverse effects from anthropogenic pressures on the condition of the habitat type circalittoral sand., BALEED6C5.14 - The extent of adverse effects from anthropogenic pressures on the condition of the habitat type circalittoral mud., BALEED6C5.15 - The extent of adverse effects from anthropogenic pressures on the condition of the habitat type circalittoral mixed sediment., BALEED6C5.16 - The extent of adverse effects from anthropogenic pressures on the condition of the habitat type circalittoral coarse sediment., BALEED6C5.18 - The state of loose-lying red algae community in Kassari Bay.
Contact	Estonian Environment Agency: Anastasiia Kovtun-Kante, anastasiia.kovtun-kante@envir.ee; Arthur Kivi, arthur.kivi@envir.ee
References	The monitoring programme is approved by the minister of the environment and available at https://www.envir.ee/et/eesmargid-tegevused/merekeskkonna-kaitse/meres trateegia (https://www.envir.ee/sites/default/files/mereala_seireprogramm_2021_2026.pdf) (in Estonian).

MONITORING PROGRAMME	BALEE-D01040605-13_SeabedVegetationZone - Phytobenthic communities				
Introduction/overview of programme	The aim of the programme is to monitor phytobenthic communities (species composition, coverage, abundance, biomass, depth distribution) along the depth gradient. It provides data to monitoring strategy "SD5 – Eutrophication", as well as "SD6/SD1 Sea-floor integrity/Biological diversity – benthic habitats" and "SD2– Non-indigenous species". The programme is related to GES Descriptor D5, Criterion D5C6 and Criterion D5C7, Descriptor D6, Criterion D6C5. Data are gathered to assess spatial variability, temporal trends and environmental status in coastal water bodies and off-shore sub-basins of the Baltic Sea (HELCOM sub-divisions) in response to pressure levels. Monitoring is conducted in coastal waters yearly or at least once per six years with a frequency once a year at the designated monitoring stations (at least 3 stations in each coastal water body). The program is regionally partly coordinated via HELCOM and the HELCOM monitoring manual is followed (soft-bottom habitats). Data are yearly reported to the national environmental monitoring database KESE (by 1 March). The programme corresponds to the following monitoring programmes in the indicative list: Seabed habitats – community characteristics; Benthic species – abundance and/or biomass.				
Purpose of programme	Environmental state and impacts, Pressures in the marine environment				
Other EU or international policies to which programme contributes	Water Framework Directive, Habitats Directive, Monitoring programme targeting at national legislation				
Monitoring details	The presence of species, total coverage and maximum distribution depth are registered during visual observations or using underwater video remote observation method. In the monitoring site, the total coverage of phytobenthos, species presence and their coverage, as well as sediment type are observed. Quantitative samples are collected by a diver with the 20x20 metal frame (in triplicate) and deep-freezed for laboratory analysis. In the laboratory, the species composition and dry weight of each species per 1m2 are determined. In frames of coastal waters monitoring, the total nitrogen, total phosphorus (6x per year) and PAR and water temperature are also registered (continuous measurements during 3-month period) in each monitoring area as supplementary information.				
Ecosystem components, anthropogenic pressures and activities monitored	Input or spread of non-indigenous species				
	Elements monitored	Not Applicable			
		GES criteria addressed	D2C1 Newly-introduced NIS		
			Parameters monitored	Presence, Abundance (number of individuals); Biomass	
			D2C2 Established NIS		
			Parameters monitored	Abundance (number of individuals), Biomass	
	Litter in the environment				
	Elements monitored	Macrolitter (all)			
		GES criteria addressed	D10C1 Litter (excluding micro-litter)		
			Parameters monitored	Amount on seabed	
	Eutrophication				
	Elements monitored	Benthic habitats - macrophyte communities			
		GES criteria addressed	D5C7 Macrophyte communities of benthic habitats		

			Parameters monitored	Species composition; Presence; Relative abundance within community; Biomass; Maximum depth
		Benthic habitats - opportunistic macroalgae		
		GES criteria addressed	D5C6 Opportunistic macroalgae of benthic habitats	
			Parameters monitored	Species composition; Presence; Relative abundance within community; Biomass; Maximum depth
	Benthic broad habitats			
	Elements monitored	Infralittoral rock and biogenic reef		
		GES criteria addressed	D6C5 Benthic habitat condition	
			Parameters monitored	Species composition; Presence; Relative abundance within community; Biomass; Maximum depth
		Infralittoral sand		
		GES criteria addressed	D6C5 Benthic habitat condition	
			Parameters monitored	Species composition; Presence; Relative abundance within community; Biomass; Maximum depth
		Infralittoral mud		
		GES criteria addressed	D6C5 Benthic habitat condition	
			Parameters monitored	Species composition; Presence; Relative abundance within community; Biomass; Maximum depth
		Infralittoral mixed sediment		
		GES criteria addressed	D6C5 Benthic habitat condition	
			Parameters monitored	Species composition; Presence; Relative abundance within community; Biomass; Maximum depth
		Infralittoral coarse sediment		
		GES criteria addressed	D6C5 Benthic habitat condition	
			Parameters monitored	Species composition; Presence; Relative abundance within community; Biomass; Maximum depth
		Circalittoral rock and biogenic reef		
		GES criteria addressed	D6C5 Benthic habitat condition	
			Parameters monitored	Species composition; Presence; Relative abundance within community; Biomass; Maximum depth
		Circalittoral sand		

		GES criteria addressed	D6C5 Benthic habitat condition	
			Parameters monitored	Species composition; Presence; Relative abundance within community; Biomass; Maximum depth
		Circalittoral mud		
		GES criteria addressed	D6C5 Benthic habitat condition	
			Parameters monitored	Species composition; Presence; Relative abundance within community; Biomass; Maximum depth
		Circalittoral mixed sediment		
		GES criteria addressed	D6C5 Benthic habitat condition	
			Parameters monitored	Species composition; Presence; Relative abundance within community; Biomass; Maximum depth
		Circalittoral coarse sediment		
		GES criteria addressed	D6C5 Benthic habitat condition	
			Parameters monitored	Species composition; Presence; Relative abundance within community; Biomass; Maximum depth
		Benthic habitats		
		GES criteria addressed	D6C5 Benthic habitat condition	
			Parameters monitored	Species composition; Presence; Relative abundance within community; Biomass; Maximum depth
Spatial zones monitored	Coastal waters (WFD)			
Start(and end) date of the programme	1995-9999			
Frequency of the monitoring	Yearly			
Type of monitoring	In-situ sampling coastal, Visual observation, Remote surveillance			
Data management and access	Gathered data are reported to the national environmental monitoring database KESE.			
Indicators to which the programme contributes	BALEED5C6.1 - Proportion of opportunistic species, BALEED5C7.4 - Estonian coastal water phytobenthos index (EPI1, EPI2, EPI_HPO, EPI_PCF), BALEED10C1.2.1 - Macrolitter on seafloor in coastal sea [natural areas], BALEED2C1.1 - Number of new non-indigenous species, BALEED2C2.2 - Biomass of alien benthic invertebrate species			
Contact	Estonian Environment Agency: Anastasiia Kovtun-Kante, anastasiia.kovtun-kante@envir.ee; Arthur Kivi, arthur.kivi@envir.ee			
References	The monitoring programme is approved by the minister of the environment and available at https://www.envir.ee/et/eesmargid-tegevused/merekeskkonna-kaitse/meres trateegia (https://www.envir.ee/sites/default/files/mereala_seireprogramm_2021_2026.pdf) (in Estonian).			

MONITORING PROGRAMME	BALEE-D01040605-14_Macrozoobenthos - Macrozoobenthos			
Introduction/overview of programme	The aim of the programme is to monitor macrozoobenthos communities (species composition, abundance and biomass) on the seafloor. It provides data to monitoring strategy "SD5 – Eutrophication", as well as "SD6/SD1 Sea-floor integrity/Biological diversity – benthic habitats", "SD2– Non-indigenous species" and "SD4/SD1 Food webs / Biodiversity – ecosystems". The programme is related to GES Descriptor D5, Criterion D5C8, Descriptor D2, Criteria D2C1, D2C2 and D2C3, Descriptor D4, Criterion D4C2 and Descriptor D6, Criterion D6C5. Data are gathered to assess spatial variability, temporal trends and environmental status in coastal water bodies and off-shore sub-basins of the Baltic Sea (HELCOM division) in response to pressure levels. Monitoring is conducted yearly or at least once in six years with a frequency once a year at the designated monitoring stations (at least 3 stations in each coastal water body and 11 in the Estonian off-shore areas). The program is regionally coordinated via HELCOM and the HELCOM monitoring manual is followed. The data are yearly reported to the national environmental monitoring database KESE (by 1 March) and ICES (HELCOM Combine). The programme is essentially the same as in 2014, only minor changes in some monitoring stations and frequencies were undertaken. The programme corresponds to the following monitoring programmes in the indicative list: Seabed habitats – community characteristics; Benthic species – abundance and/or biomass.			
Purpose of programme	Environmental state and impacts, Pressures in the marine environment			
Other EU or international policies to which programme contributes	Water Framework Directive, Habitats Directive, Monitoring programme targeting at national legislation			
Monitoring details	Macrozoobenthos samples are collected once a year in off-shore areas and designated coastal waters and in rotation at least once in a 6-year period from other coastal waters. Van Veen or Ekman type grab samplers are used for sampling. The sediment type, concentration of dissolved oxygen in the near-bottom layer, concentration of H2S, water temperature and salinity are registered as supplementary information at the sampling site. Every sample is collected in triplicate and frozen for laboratory analyse. In the laboratory, the species composition, abundance of species and dry weight of every species (per 1 m2) is determined. For observation of maximum depth distribution of Limecola balthica, three designated transects are monitored in the open-sea area; samples (one sample per each depth point) are taken in accordance with the transect depth gradient.			
Ecosystem components, anthropogenic pressures and activities monitored	Eutrophication			
	Elements monitored	Benthic habitats - macrobenthic communities		
		GES criteria addressed	D5C8 Macrofaunal communities of benthic habitats	
			Parameters monitored	Abundance (number of individuals), Extent, Species composition; Biomass
	Benthic broad habitats			
	Elements monitored	Benthic habitats		
		GES criteria addressed	D6C4 Benthic habitat extent	
			Parameters monitored	Extent
			D6C5 Benthic habitat condition	

			Parameters monitored	Species composition; Abundance; Biomass
		Infralittoral rock and biogenic reef		
		GES criteria addressed	D6C4 Benthic habitat extent	
			Parameters monitored	Extent
			D6C5 Benthic habitat condition	
			Parameters monitored	Species composition; Abundance; Biomass
		Infralittoral sand		
		GES criteria addressed	D6C4 Benthic habitat extent	
			Parameters monitored	Extent
			D6C5 Benthic habitat condition	
			Parameters monitored	Species composition; Abundance; Biomass
		Infralittoral mud		
		GES criteria addressed	D6C4 Benthic habitat extent	
			Parameters monitored	Extent
			D6C5 Benthic habitat condition	
			Parameters monitored	Species composition; Abundance; Biomass
		Infralittoral mixed sediment		
		GES criteria addressed	D6C4 Benthic habitat extent	
			Parameters monitored	Extent
			D6C5 Benthic habitat condition	
			Parameters monitored	Species composition; Abundance; Biomass
		Infralittoral coarse sediment		
		GES criteria addressed	D6C4 Benthic habitat extent	
			Parameters monitored	Extent
			D6C5 Benthic habitat condition	
			Parameters monitored	Species composition; Abundance; Biomass
		Circalittoral rock and biogenic reef		
		GES criteria addressed	D6C4 Benthic habitat extent	
			Parameters monitored	Extent
			D6C5 Benthic habitat condition	
			Parameters monitored	Species composition; Abundance; Biomass
		Circalittoral sand		
		GES criteria addressed	D6C4 Benthic habitat extent	
			Parameters monitored	Extent
			D6C5 Benthic habitat condition	
			Parameters monitored	Species composition; Abundance; Biomass
		Circalittoral mud		
		GES criteria addressed	D6C4 Benthic habitat extent	
			Parameters monitored	Extent
			D6C5 Benthic habitat condition	

			Parameters monitored	Species composition; Abundance; Biomass
		Circalittoral mixed sediment		
		GES criteria addressed	D6C4 Benthic habitat extent	
			Parameters monitored	Extent
			D6C5 Benthic habitat condition	
			Parameters monitored	Species composition; Abundance; Biomass
		Circalittoral coarse sediment		
		GES criteria addressed	D6C4 Benthic habitat extent	
			Parameters monitored	Extent
			D6C5 Benthic habitat condition	
			Parameters monitored	Species composition; Abundance; Biomass
	Coastal ecosystem			
	Elements monitored	Sub-apex demersal predators		
		GES criteria addressed	D4C2 Abundance across trophic guilds	
			Parameters monitored	Abundance (number of individuals), Biomass
			D4C1 Trophic guild species diversity	
			Parameters monitored	Species composition
		Deposit-feeders		
		GES criteria addressed	D4C2 Abundance across trophic guilds	
			Parameters monitored	Abundance (number of individuals), Biomass, Extent
			D4C1 Trophic guild species diversity	
			Parameters monitored	Species composition
	Input or spread of non-indigenous species			
	Elements monitored	Not Applicable		
		GES criteria addressed	D2C1 Newly-introduced NIS	
			Parameters monitored	Presence, Abundance (number of individuals); Biomass
			D2C2 Established NIS	
			Parameters monitored	Abundance (number of individuals), Biomass
			D2C3 Adverse effects of NIS	
			Parameters monitored	Abundance (number of individuals); Biomass
Spatial zones monitored	Coastal waters (WFD), Territorial waters, EEZ (or similar)			
Start(and end) date of the programme	1991-9999			
Frequency of the monitoring	Yearly			
Type of monitoring	In-situ sampling coastal, In-situ sampling offshore			

Data management and access	Data are yearly reported to the national environmental monitoring database KESE (by 1 March) and ICES (HELCOM Combine).
Indicators to which the programme contributes	BALEED5C8.1 - Zoobenthos community index, BALEED5C8.3 - Depth limit of Baltic macoma (Limecola balthica), BALEED2C1.1 - Number of new non-indigenous species, BALEED2C2.2 - Biomass of alien benthic invertebrate species, BALEED2C3.2 - Contribution of non-indigenous species in macrozoobenthic community, BALEED2C3.3 - Biopollution level (BPL)
Contact	Estonian Environment Agency: Anastasiia Kovtun-Kante, anastasiia.kovtun-kante@envir.ee; Arthur Kivi, arthur.kivi@envir.ee
References	The monitoring programme is approved by the minister of the environment and available at https://www.envir.ee/et/eesmargid-tegevused/merekeskkonna-kaitse/meres trateegia (https://www.envir.ee/sites/default/files/mereala_seireprogramm_2021_2026.pdf) (in Estonian).

MONITORING PROGRAMME	BALEE-D01040607-15_SeabedPhysChemGeol - Seabed physical and chemical characteristics			
Introduction/overview of programme	The aim of the programme is to collect data on the physical and chemical characteristics of the seabed, such as bathymetry, seabed substrate and morphology, as well as organic matter content in the sediments. Hydrographic surveying is the task of the Hydrographic service and data are made available via Maritime Administration. The seabed mapping process is continuous and the whole sea area is planned to be covered by 2030. Data on the seabed substrate and morphology is collected by project-based activities, and the distributions of seabed substrate and morphology in the Estonian waters are available at the Geological Survey and Land Board as well via the EMODnet Geology portal. Organic matter content is monitored at the macrozoobenthos stations and transects in the frames of the national environmental monitoring programme open sea monitoring programme. Data on organic matter are reported every year by 1 March and are made available via environmental database KESE. Monitoring is not HELCOM regionally coordinated, partly coordinated in collaboration with EMODnet Geology. The programme corresponds to the following monitoring programmes in the indicative list: Seabed habitats – physical and chemical characteristics.			
Purpose of programme	Environmental state and impacts, Pressures in the marine environment			
Other EU or international policies to which programme contributes	Water Framework Directive, Habitats Directive, Monitoring programme targeting at national legislation			
Monitoring details	Monitoring is performed by the Maritime Administration and the Geological Survey of Estonia as fulfilment of state obligations and project-based activities. The organic matter content of bottom sediments is determined within the national environmental monitoring programme. Bathymetry surveys are performed with sonar. The seabed mapping is done using geophysical equipment – a seismic-acoustic profiler (operating frequency 0-450 Hz), a low-frequency acoustic profiler (24 kHz), an echo-sounder, side-scan sonar and probe tools. For determination of the organic matter content in sediment samples, loss on ignition method is used. The bathymetric measurements are being performed continually unless the entire Estonian marine area is covered. The data on the seabed substrate and morphology is also collected by project-based activities. Organic matter sampling is performed annually once a year.			
Ecosystem components, anthropogenic pressures and activities monitored	Benthic broad habitats			
	Elements monitored	Benthic habitats		
		GES criteria addressed	D6C5 Benthic habitat condition	
			Parameters monitored	Organic matter concentration in sediment (total)
		Infralittoral rock and biogenic reef		
		GES criteria addressed	D6C5 Benthic habitat condition	
			Parameters monitored	Organic matter concentration in sediment (total)
		Infralittoral sand		
		GES criteria addressed	D6C5 Benthic habitat condition	
			Parameters monitored	Organic matter concentration in sediment (total)
		Infralittoral mud		
		GES criteria	D6C5 Benthic habitat condition	

		addressed	Parameters monitored	Organic matter concentration in sediment (total)
		Infralittoral mixed sediment		
		GES criteria addressed	D6C5 Benthic habitat condition	
			Parameters monitored	Organic matter concentration in sediment (total)
		Infralittoral coarse sediment		
		GES criteria addressed	D6C5 Benthic habitat condition	
			Parameters monitored	Organic matter concentration in sediment (total)
		Circalittoral rock and biogenic reef		
		GES criteria addressed	D6C5 Benthic habitat condition	
			Parameters monitored	Organic matter concentration in sediment (total)
		Circalittoral sand		
		GES criteria addressed	D6C5 Benthic habitat condition	
			Parameters monitored	Organic matter concentration in sediment (total)
		Circalittoral mud		
		GES criteria addressed	D6C5 Benthic habitat condition	
			Parameters monitored	Organic matter concentration in sediment (total)
		Circalittoral mixed sediment		
		GES criteria addressed	D6C5 Benthic habitat condition	
			Parameters monitored	Organic matter concentration in sediment (total)
		Circalittoral coarse sediment		
		GES criteria addressed	D6C5 Benthic habitat condition	
			Parameters monitored	Organic matter concentration in sediment (total)
	Hydrographical changes			
	Elements monitored	Bathymetry		
		GES criteria addressed	D7C1 Alteration of hydrographical conditions	
			Parameters monitored	Bathymetric depth
		Seabed substrate and morphology		
		GES criteria addressed	D7C1 Alteration of hydrographical conditions	
			Parameters monitored	Physical structure of habitat (e.g. sediment characteristics, topographic structure)
	Physical loss of the seabed			
	Elements monitored	Not Applicable		
		GES criteria	D6C1 Physical loss of the seabed	

		addressed	Parameters monitored	Bathymetric depth; Physical structure of habitat (e.g. sediment characteristics, topographic structure)
Spatial zones monitored	Coastal waters (WFD), Territorial waters, EEZ (or similar)			
Start(and end) date of the programme	1981-9999			
Frequency of the monitoring	Continually			
Type of monitoring	In-situ sampling coastal, In-situ sampling offshore, Remote surveillance			
Data management and access	The data of the distribution of seabed substrate and morphology in the Estonian waters are available at the Geological Survey and Land Board and uploaded to the EMODnet Geology portal. Data on organic matter are reported every year by 1 March and are made available via national environmental database KESE. Spatial data (processed data) is created and made available based on measurements of raw data.			
Indicators to which the programme contributes	BALEED6C5.17 - Organic matter content in sediment			
Contact	Estonian Maritime Administration, Hydrography Department: Peeter Väling, peeter.valing@vta.ee; Peeter Ingerma, peeter.ingerma@vta.ee; The Geological Survey of Estonia, Department of Marine Geology and Geophysics: Sten Suuroja, sten.suuroja@egt.ee; Land Board, Geology: Ivo Sibul, ivo.sibul@maaamet.ee.			
References	The monitoring programme is approved by the minister of the environment and available at https://www.envir.ee/et/eesmargid-tegevused/merekeskkonna-kaitse/meres trateegia (https://www.envir.ee/sites/default/files/mereala_seireprogramm_2021_2026.pdf) (in Estonian).			

MONITORING PROGRAMME	BALEE-D01040607-16_PhysDisturb - Physical loss and disturbance – from different human activities			
Introduction/overview of programme	The aim of the programme is to assess physical loss and disturbance of seabed caused by human activities. It provides data to monitoring strategies „ SD6/SD1 Sea-floor integrity/Biological diversity – benthic habitats“ and “SD7 – Changes in hydrographic conditions”. The programme is related to GES Descriptor D6, Criteria D6C1, D6C2, D6C3 and D6C4; Descriptor D7, Criteria D7C1 and D7C2. Data are gathered through permitting database KOTKAS as well as project-based research. The program data collection is regionally coordinated (data delivered separately by each country) via HELCOM. There have been some updates, changes in programme structure and indicator developments since 2014. The programme corresponds to the following monitoring programmes in the indicative list: Physical loss - distribution and extent (from e.g. infrastructure, coastal protection); Physical disturbance - from dredging and disposal of dredged material; Physical disturbance - from sand and gravel extraction.			
Purpose of programme	Pressures in the marine environment, Human activities causing the pressures, Effectiveness of measures			
Other EU or international policies to which programme contributes	Habitats Directive, Water Framework Directive, Monitoring programme targeting at national legislation			
Monitoring details	The extent of adverse effects from anthropogenic pressures on the seabed is determined using the information on the following human activities: dredging, dumping, bottom trawling, mining, construction of facilities at sea, etc. A proportion (percentage) of the total extent of the habitat type directly affected by human activities is assessed using overlay analysis performed in the geographical information system. The precondition for the analysis is the existence of georeferenced spatial data layers with updated information on human activities (dredging, dumping, bottom trawling, etc). The extent of hydrographical changes is assessed with mathematical modelling. For dredging and dumping works monitoring, in addition to volume and area measurements suspended matter and turbidity are measured in-situ (standard EVS-EN 872). The monitoring frequency is irregular and/or as regulated by environmental permits. The data are both raw data and based on it spatial (processed) data with no common place yet, where it could be accessed.			
Ecosystem components, anthropogenic pressures and activities monitored	Physical disturbance to seabed			
	Elements monitored	Not Applicable		
		GES criteria addressed	D6C2 Physical disturbance to the seabed	
			Parameters monitored	Extent, Turbidity
	Physical loss of the seabed			
	Elements monitored	Not Applicable		
		GES criteria addressed	D6C1 Physical loss of the seabed	
			Parameters monitored	Extent
	Benthic broad habitats			
	Elements monitored	Benthic habitats		
		GES criteria addressed	D6C3 Adverse effects from physical disturbance	
			Parameters monitored	Extent
			D6C4 Benthic habitat extent	

			Parameters monitored	Extent
		Infralittoral rock and biogenic reef		
		GES criteria addressed	D6C3 Adverse effects from physical disturbance	
			Parameters monitored	Extent
			D6C4 Benthic habitat extent	
			Parameters monitored	Extent
			D7C2 Adverse effects from alteration of hydrographical conditions	
			Parameters monitored	Extent
		Infralittoral sand		
		GES criteria addressed	D6C3 Adverse effects from physical disturbance	
			Parameters monitored	Extent
			D6C4 Benthic habitat extent	
			Parameters monitored	Extent
			D7C2 Adverse effects from alteration of hydrographical conditions	
			Parameters monitored	Extent
		Infralittoral mud		
		GES criteria addressed	D6C3 Adverse effects from physical disturbance	
			Parameters monitored	Extent
			D6C4 Benthic habitat extent	
			Parameters monitored	Extent
			D7C2 Adverse effects from alteration of hydrographical conditions	
			Parameters monitored	Extent
		Infralittoral mixed sediment		
		GES criteria addressed	D6C3 Adverse effects from physical disturbance	
			Parameters monitored	Extent
			D6C4 Benthic habitat extent	
			Parameters monitored	Extent
			D7C2 Adverse effects from alteration of hydrographical conditions	
			Parameters monitored	Extent
		Infralittoral coarse sediment		
		GES criteria addressed	D6C3 Adverse effects from physical disturbance	
			Parameters monitored	Extent
			D6C4 Benthic habitat extent	

			Parameters monitored	Extent
			D7C2 Adverse effects from alteration of hydrographical conditions	
			Parameters monitored	Extent
		Circalittoral rock and biogenic reef		
		GES criteria addressed	D6C3 Adverse effects from physical disturbance	
			Parameters monitored	Extent
			D6C4 Benthic habitat extent	
			Parameters monitored	Extent
			D7C2 Adverse effects from alteration of hydrographical conditions	
			Parameters monitored	Extent
		Circalittoral sand		
		GES criteria addressed	D6C3 Adverse effects from physical disturbance	
			Parameters monitored	Extent
			D6C4 Benthic habitat extent	
			Parameters monitored	Extent
			D7C2 Adverse effects from alteration of hydrographical conditions	
			Parameters monitored	Extent
		Circalittoral mud		
		GES criteria addressed	D6C3 Adverse effects from physical disturbance	
			Parameters monitored	Extent
			D6C4 Benthic habitat extent	
			Parameters monitored	Extent
			D7C2 Adverse effects from alteration of hydrographical conditions	
			Parameters monitored	Extent
		Circalittoral mixed sediment		
		GES criteria addressed	D6C3 Adverse effects from physical disturbance	
			Parameters monitored	Extent
			D6C4 Benthic habitat extent	
			Parameters monitored	Extent
			D7C2 Adverse effects from alteration of hydrographical conditions	
			Parameters monitored	Extent
		Circalittoral coarse sediment		
		GES criteria addressed	D6C3 Adverse effects from physical disturbance	

			Parameters monitored	Extent
			D6C4 Benthic habitat extent	
			Parameters monitored	Extent
			D7C2 Adverse effects from alteration of hydrographical conditions	
			Parameters monitored	Extent
Spatial zones monitored	Coastal waters (WFD), Territorial waters, EEZ (or similar)			
Start(and end) date of the programme	1992-9999			
Frequency of the monitoring	Other (specify)			
Type of monitoring	In-situ sampling coastal, In-situ sampling offshore, Administrative data collection, Ecological modelling, Numerical modelling, Other			
Data management and access	The data is compiled and updated at least once in the 6-year period. The common place, where the data access could be provided is still under development.			

Indicators to which the programme contributes	BALEED6C1.1 - Spatial distibution and area of physical loss of the natural seabed, BALEED6C2.1 - Spatial distibution and area of physical disturbance to the seabed., BALEED6C3.1 - The spatial area of physical disturbance to the habitat type sandbanks (code 1110), BALEED6C3.2 - The spatial area of physical disturbance to the habitat type estuaries (code 1130), BALEED6C3.3 - The spatial area of physical disturbance to the habitat type mudflats and sandflats (code 1140), BALEED6C3.4 - The spatial area of physical disturbance to the habitat type large shallow inlets and bays (code 1160), BALEED6C3.5 - The spatial area of physical disturbance to the habitat type reefs (code 1170), BALEED6C3.6 - The spatial area of physical disturbance to the habitat type infralittoral rock and biogenic reef, BALEED6C3.7 - The spatial area of physical disturbance to the habitat type infralittoral sand, BALEED6C3.8 - The spatial area of physical disturbance to the habitat type infralittoral mud, BALEED6C3.9 - The spatial area of physical disturbance to the habitat type infralittoral mixed sediment, BALEED6C3.10 - The spatial area of physical disturbance to the habitat type infralittoral coarse sediment, BALEED6C3.11 - The spatial area of physical disturbance to the habitat type circalittoral rock and biogenic reef, BALEED6C3.12 - The spatial area of physical disturbance to the habitat type circalittoral sand, BALEED6C3.13 - The spatial area of physical disturbance to the habitat type circalittoral mud, BALEED6C3.14 - The spatial area of physical disturbance to the habitat type circalittoral mixed sediment, BALEED6C3.15 - The spatial area of physical disturbance to the habitat type circalittoral coarse sediment, BALEED6C4.1 - The spatial area of loss of the habitat type sandbanks (code 1110) resulting from anthropogenic loss of the natural seabed, BALEED6C4.2 - The spatial area of loss of the habitat type estuaries (code 1130) resulting from anthropogenic loss of the natural seabed, BALEED6C4.3 - The spatial area of loss of the habitat type mudflats and sandflats (code 1140) resulting from anthropogenic loss of the natural seabed, BALEED6C4.4 - The spatial area of loss of the habitat type large shallow inlets and bays (code 1160) resulting from anthropogenic loss of the natural seabed, BALEED6C4.5 - The spatial area of loss of the habitat type reefs (code 1170) resulting from anthropogenic loss of the natural seabed, BALEED6C4.6 - The spatial area of loss of the habitat type infralittoral rock and biogenic reef resulting from anthropogenic loss of the natural seabed, BALEED6C4.7 - The spatial area of loss of the habitat type infralittoral sand resulting from anthropogenic loss of the natural seabed, BALEED6C4.8 - The spatial area of loss of the habitat type infralittoral mud resulting from anthropogenic loss of the natural seabed, BALEED6C4.9 - The spatial area of loss of the habitat type infralittoral mixed sediment resulting from anthropogenic loss of the natural seabed, BALEED6C4.10 - The spatial area of loss of the habitat type infralittoral coarse sediment resulting from anthropogenic loss of the natural seabed, BALEED6C4.11 - The spatial area of loss of the habitat type circalittoral rock and biogenic reef resulting from anthropogenic loss of the natural seabed, BALEED6C4.12 - The spatial area of loss of the habitat type circalittoral sand resulting from anthropogenic loss of the natural seabed, BALEED6C4.13 - The spatial area of loss of the habitat type circalittoral mud resulting from anthropogenic loss of the natural seabed, BALEED6C4.14 - The spatial area of loss of the habitat type circalittoral mixed sediment resulting from anthropogenic loss of the natural seabed, BALEED6C4.15 - The spatial area of loss of the habitat type circalittoral coarse

Contact	The Ministry of the Environment: Kaspar Anderson, kaspar.anderson@envir.ee; Eda Andresmaa, eda.andresmaa@envir.ee); Estonian Environment Agency: Anastasiia Kovtun-Kante, anastasiia.kovtun-kante@envir.ee.
References	The monitoring programme is approved by the minister of the environment and available at https://www.envir.ee/et/eesmargid-tegevused/merekeskkonna-kaitse/meres trateegia (https://www.envir.ee/sites/default/files/mereala_seireprogramm_2021_2026.pdf) (in Estonian).

MONITORING PROGRAMME	BALEE-D010406-17_ComStockFurcellaria - Commerical stock of Furcellaria lumbricalis
Introduction/overview of programme	The programme was merged with the programme Seabed habitats – community characteristics (BALEE-D010406-12_SeabedHabitat) and is no longer in place as a separate programme.

MONITORING PROGRAMME	BALEE-D02-18_NISRiskAreas - Non-indigenous species – harbours and adjacent regions			
Introduction/overview of programme	The aim of the programme is to monitor the occurrence and abundance/biomass of non-indigenous phytoplankton, zooplankton, macrozoobenthos and fish in harbours and adjacent areas. Port NIS monitoring is carried out in one port (Muuga) with the identified highest risk for introduction of new non-indigenous species, while monitoring of adjacent areas is performed for three harbours. In addition, species-specific monitoring covers a few most invasive non-indigenous species: the round goby Neogobius melanostomus, Chinese mitten crab Eriocheir sinensis and Harris mud crab Rhithropanopeus harrisii. The programme provides data to monitoring strategy "SD2 – Non-indigenous species ". The programme is primarily related to GES Descriptor D2, Criteria D2C1, D2C2 and D2C3; but also contributes to D1, D4 and D6. Monitoring is conducted annually at the designated monitoring stations with organism-group specific monitoring designs. The monitoring, data collection and assessment quality are assured by regional coordination via HELCOM, including following the OSPAR/HELCOM port biological monitoring guidelines. The data are yearly reported to the environmental monitoring database KESE (by 1 March). The programme has been modified since 2014 by adding species-specific monitoring. The programme corresponds to the following monitoring programmes in the indicative list: Non-indigenous species inputs - from specific sources; Non-indigenous species - abundance and/or biomass.			
Purpose of programme	Environmental state and impacts, Pressures in the marine environment			
Other EU or international policies to which programme contributes	Invasive Alien Species Regulation, Habitats Directive, Monitoring programme targeting at national legislation, International Convention for the Control and Management of Ships' Ballast Water and Sediments			
Monitoring details	The phytoplankton, mesozooplankton, zoobenthos, fouling, mobile epifauna and fish monitoring samples are collected in accordance with HELCOM and HELCOM/OSPAR guidelines from two ports and three adjacent areas. Information on NIS occurrence is also gathered from all biological monitoring stations.			
Ecosystem components, anthropogenic pressures and activities monitored	Newly-introduced non-indigenous species			
	Elements monitored	Not Applicable		
		GES criteria addressed	D2C1 Newly-introduced NIS	
			Parameters monitored	Species composition; Abundance (number of individuals); Biomass; Relative biomass in community
	Established non-indigenous species			
	Elements monitored	Rhithropanopeus harrisii		
		GES criteria addressed	D2C2 Established NIS	
			Parameters monitored	Abundance (number of individuals), Biomass
		Eriocheir sinensis		
		GES criteria addressed	D2C2 Established NIS	
			Parameters monitored	Abundance (number of individuals), Biomass
		Neogobius melanostomus		
		GES criteria	D2C2 Established NIS	

		addressed	Parameters monitored	Abundance (number of individuals), Biomass
		Zooplankton communities		
		GES criteria addressed	D2C2 Established NIS	
			Parameters monitored	Abundance (number of individuals), Biomass, Species composition; Relative biomass in community
		Benthic habitats - macrobenthic communities		
		GES criteria addressed	D2C2 Established NIS	
			Parameters monitored	Abundance (number of individuals), Biomass, Species composition; Relative biomass in community
		Benthic habitats - macrophyte communities		
		GES criteria addressed	D2C2 Established NIS	
			Parameters monitored	Abundance (number of individuals), Biomass, Species composition; Relative biomass in community
		Mobile epifauna		
		GES criteria addressed	D2C2 Established NIS	
			Parameters monitored	Abundance (number of individuals), Biomass, Species composition
		Fouling		
		GES criteria addressed	D2C2 Established NIS	
			Parameters monitored	Abundance (number of individuals), Biomass, Species composition
		Phytoplankton communities		
		GES criteria addressed	D2C2 Established NIS	
			Parameters monitored	Abundance (number of individuals), Biomass, Species composition
Spatial zones monitored	Coastal waters (WFD)			
Start(and end) date of the programme	2010-9999			
Frequency of the monitoring	Yearly			
Type of monitoring	In-situ sampling coastal			
Data management and access	Data are yearly reported to the national environmental monitoring database KESE (by 1 March).			

Indicators to which the programme contributes	BALEED2C1.1 - Number of new non-indigenous species, BALEED2C2.1 - Abundance of alien pelagic invertebrate species, BALEED2C3.1 - Contribution of non-indigenous species in zooplankton community, BALEED2C2.2 - Biomass of alien benthic invertebrate species, BALEED2C3.2 - Contribution of non-indigenous species in macrozoobenthic community, BALEED2C2.3 - Catch per unit effort of mobile non-indigenous species
Contact	Estonian Environment Agency: Anastasiia Kovtun-Kante, anastasiia.kovtun-kante@envir.ee; Arthur Kivi, arthur.kivi@envir.ee
References	The monitoring programme is approved by the minister of the environment and available at https://www.envir.ee/et/eesmargid-tegevused/merekeskkonna-kaitse/meres trateegia (https://www.envir.ee/sites/default/files/mereala_seireprogramm_2021_2026.pdf) (in Estonian).

MONITORING PROGRAMME	BALEE-D02-19_NISDynImpact - Non-indigenous species – abundance and biomass			
Introduction/overview of programme	The aim of the programme is to cover all major organism groups (phyto/zooplankton, phyto/zoobenthos, fish) and monitor both, pelagic and benthic communities (abundance/biomass and proportion of non-indigenous species in zooplankton and macrozoobenthos communities, abundance/biomass of mobile species, and biopollution level index). Most of the data and information used originate from other monitoring strategies and programmes. The programme provides data to monitoring strategy "SD2 – Non-indigenous species ". The programme is primarily related to GES Descriptor D2, Criteria D2C1, D2C2 and D2C3; but also contributes to D1, D4 and D6. Monitoring is conducted annually at the designated monitoring stations with organism-group specific monitoring designs. The assessment unit is the whole Estonian marine area. The monitoring and assessment quality is assured by regional coordination via HELCOM and following the HELCOM monitoring guidelines. The data are yearly reported to the environmental monitoring database KESE (by 1 March). The threshold values for indicators required for MSFD assessments have been defined (nationally, except for the biopollution level). The programme corresponds to the following monitoring programmes in the indicative list: Non-indigenous species - abundance and/or biomass.			
Purpose of programme	Environmental state and impacts, Pressures in the marine environment			
Other EU or international policies to which programme contributes	Invasive Alien Species Regulation, Habitats Directive, Monitoring programme targeting at national legislation, International Convention for the Control and Management of Ships' Ballast Water and Sediments			
Monitoring details	Most of the data and information used originate from other monitoring strategies and programmes. Information on NIS occurrence is gathered from all biological monitoring stations.			
Ecosystem components, anthropogenic pressures and activities monitored	Newly-introduced non-indigenous species			
	Elements monitored	Not Applicable		
		GES criteria addressed	D2C1 Newly-introduced NIS	
			Parameters monitored	Species composition; Abundance (number of individuals); Biomass
	Established non-indigenous species			
	Elements monitored	Neogobius melanostomus		
		GES criteria addressed	D2C2 Established NIS	
			Parameters monitored	Abundance (number of individuals), Biomass
		Eriocheir sinensis		
		GES criteria addressed	D2C2 Established NIS	
			Parameters monitored	Abundance (number of individuals), Biomass
		Rhithropanopeus harrisii		
		GES criteria addressed	D2C2 Established NIS	
			Parameters monitored	Abundance (number of individuals), Biomass
Spatial zones monitored	Coastal waters (WFD), Territorial waters, EEZ (or similar)			

Start(and end) date of the programme	2010-9999
Frequency of the monitoring	Yearly
Type of monitoring	In-situ sampling coastal, Numerical modelling
Data management and access	The data are yearly reported to the national environmental monitoring database KESE (by 1 March).
Indicators to which the programme contributes	BALEED2C1.1 - Number of new non-indigenous species, BALEED2C2.3 - Catch per unit effort of mobile non-indigenous species, BALEED2C2.1 - Abundance of alien pelagic invertebrate species, BALEED2C3.1 - Contribution of non-indigenous species in zooplankton community, BALEED2C2.2 - Biomass of alien benthic invertebrate species, BALEED2C3.2 - Contribution of non-indigenous species in macrozoobenthic community, BALEED2C3.3 - Biopollution level (BPL)
Contact	Estonian Environment Agency: Anastasiia Kovtun-Kante, anastasiia.kovtun-kante@envir.ee; Arthur Kivi, arthur.kivi@envir.ee
References	The monitoring programme is approved by the minister of the environment and available at https://www.envir.ee/et/eesmargid-tegevused/merekeskkonna-kaitse/meres trateegia (https://www.envir.ee/sites/default/files/mereala_seireprogramm_2021_2026.pdf) (in Estonian).

MONITORING PROGRAMME	BALEE-D05-20_PhytopChla - Chlorophyll-a			
Introduction/overview of programme	The aim of the programme is to monitor chlorophyll-a levels in the water column (including surface layer) to assess phytoplankton biomass and productivity. It provides data to monitoring strategy "SD5 – Eutrophication" and is related to GES Descriptor D5, Criterion D5C2, and strategy SD4/SD1, Criterion D4C2. Data are gathered to assess the environmental status in coastal water bodies and off-shore sub-basins of the Baltic Sea (HELCOM sub-divisions). Monitoring is conducted yearly or at least once in six years with a frequency of 6 to 12 times a year at the designated monitoring stations (at least 3 stations in each coastal water body and 18 in the Estonian off-shore areas). The programme data collection is regionally coordinated via HELCOM and the HELCOM guidelines are followed, data are delivered separately by each country. The data are yearly reported to the national environmental monitoring database KESE (by 1 March) and HELCOM ICES database (by 1 September). Algorithms for chlorophyll-a concentration estimates based on remote sensing data are under development. The programme is essentially the same as in 2014, only minor changes in some monitoring stations and frequencies were undertaken. The programme corresponds to the following monitoring programmes in the indicative list: Plankton blooms (biomass, frequency).			
Purpose of programme	Environmental state and impacts			
Other EU or international policies to which programme contributes	Water Framework Directive, Monitoring programme targeting at national legislation, HELCOM Monitoring programmes			
Monitoring details	Chlorophyll-a concentration determination samples are collected from certain monitoring stations with a bathometer at depths of 1, 5 and 10 m (if maxima concentration is fixed in the water column, then from this depth also). An integrated sample is made pooling equal amounts of water collected from fixed depths. As part of the Ferrybox monitoring, samples for later laboratory Chl-a analysis are collected with an automatic sampler from depths of 4-5 m from a predefined location on the route of the liner and chlorophyll-a fluorescence is analysed. In addition, chlorophyll-a fluorescence measurements are done at buoy-stations and by sonar equipment with fluorometers. Surface layer pigment concentration monitoring is done with a remote method (satellite). Monitoring is conducted yearly or at least once in six years with a frequency of 6 to 12 times a year at the designated monitoring stations (at least 3 stations in each coastal water body and 18 in the Estonian off-shore areas).			
Ecosystem components, anthropogenic pressures and activities monitored	Eutrophication			
	Elements monitored	Chlorophyll-a		
		GES criteria addressed	D5C2 Chlorophyll-a concentration	
			Parameters monitored	Concentration in water
	Coastal ecosystem			
	Elements monitored	Primary producers		
		GES criteria addressed	D4C2 Abundance across trophic guilds	
			Parameters monitored	Concentration in water
Spatial zones monitored	Coastal waters (WFD), Territorial waters, EEZ (or similar)			
Start(and end) date of the programme	1993-9999			
Frequency of the monitoring	Yearly			

Type of monitoring	In-situ sampling coastal, In-situ sampling offshore
Data management and access	The data are yearly reported to the national environmental monitoring database KESE (by 1 March) and ICES (HELCOM Combine).
Indicators to which the programme contributes	BALEED5C2.1 - Summer chlorophyll a concentration in seawater
Contact	Estonian Environment Agency: Anastasiia Kovtun-Kante, anastasiia.kovtun-kante@envir.ee; Arthur Kivi, arthur.kivi@envir.ee
References	The monitoring programme is approved by the minister of the environment and available at https://www.envir.ee/et/eesmargid-tegevused/merekeskkonna-kaitse/meres trateegia (https://www.envir.ee/sites/default/files/mereala_seireprogramm_2021_2026.pdf) (in Estonian).

MONITORING PROGRAMME	BALEE-D05-21_AlgalBlooms - Harmful blooms (remote sensing)			
Introduction/overview of programme	The aim of the programme is to monitor the surface accumulation of phytoplankton using remote sensing data. It provides data to monitoring strategy "SD5 – Eutrophication" and is related to GES Descriptor D5, Criterion D5C3. The status of mostly off-shore sub-basins of the Baltic Sea (HELCOM sub-divisions) is assessed. Monitoring is conducted continuously. The program is regionally coordinated via HELCOM, and commonly developed and agreed algorithms are used. Algorithms and assessment methods (thresholds) are under development. The programme is essentially the same as in 2014, only minor changes: the satellites in use have been changed. The programme corresponds to the following monitoring programmes in the indicative list: Plankton blooms (biomass, frequency).			
Purpose of programme	Environmental state and impacts, Pressures in the marine environment			
Other EU or international policies to which programme contributes	Water Framework Directive, Bathing Water Directive, Monitoring programme targeting at national legislation			
Monitoring details	The monitoring and related indicator(s) are under development. Local applicable algorithms for Sentinel satellites data need to be developed.			
Ecosystem components, anthropogenic pressures and activities monitored	Eutrophication			
	Elements monitored	Maximum concentration of blooming species		
		GES criteria addressed	D5C3 Harmful algal blooms	
			Parameters monitored	Extent, Duration, Frequency
		Cyanobacteria		
		GES criteria addressed	D5C3 Harmful algal blooms	
			Parameters monitored	Extent, Duration, Frequency
	Pelagic broad habitats			
	Elements monitored	Coastal pelagic habitat		
		GES criteria addressed	D1C6 Pelagic habitat condition	
			Parameters monitored	Extent, Number of bloom events and duration
Spatial zones monitored	Coastal waters (WFD), Territorial waters, EEZ (or similar)			
Start(and end) date of the programme	2006-9999			
Frequency of the monitoring	Other (specify)			
Type of monitoring	Remote satellite imagery			
Data management and access	Raw data (excl satellite images) are stored at the national environmental monitoring database KESE.			
Contact	Estonian Environment Agency: Anastasiia Kovtun-Kante, anastasiia.kovtun-kante@envir.ee; Arthur Kivi, arthur.kivi@envir.ee			
References	The monitoring programme is approved by the minister of the environment and available at https://www.envir.ee/et/eesmargid-tegevused/merekeskkonna-kaitse/meres trateegia (https://www.envir.ee/sites/default/files/mereala_seireprogramm_2021_2026.pdf) (in Estonian).			

<table>
<tr><td>MONITORING PROGRAMME</td><td colspan="4">BALEE-D0508-22_NutContLandSource - Inputs of nutrients and contaminants – land-based sources</td></tr>
<tr><td>Introduction/overview of programme</td><td colspan="4">The aim of the programme is to monitor and estimate the load of nutrients and contaminants from the land-based sources via rivers and direct discharges. It provides data to monitoring strategies “SD5 – Eutrophication” and “SD8 - Contaminants”. The programme is related to anthropogenic pressure “Input of nutrients” and “Inputs of other substances” (MSFD Annex III). Monitoring is conducted yearly. The program is regionally coordinated via HELCOM and the HELCOM PLC guidelines are followed.
The programme corresponds to the following monitoring programmes in the indicative list: Nutrient inputs - land-based sources; Contaminant inputs - land-based sources.</td></tr>
<tr><td>Purpose of programme</td><td colspan="4">Pressures at source,
Effectiveness of measures</td></tr>
<tr><td>Other EU or international policies to which programme contributes</td><td colspan="4">Water Framework Directive,
Minamata Convention on Mercury,
Urban Waste Water Treatment Directive,
Nitrates Directive,
Monitoring programme targeting at national legislation</td></tr>
<tr><td>Monitoring details</td><td colspan="4">Based on the data from hydrometric stations, the discharges of the monitored rivers are determined. The flows of rivers and areas that not covered by the monitoring are estimated using the corresponding transfer coefficients and model (ESTMODEL). In frames of hydrochemical monitoring of watercourses, the contents of nutrients and hazardous substances in water are determined at designated monitoring stations. The pollution loads are assessed by the Estonian Environment Agency according to the methodology agreed within the HELCOM cooperation (PLC-Water Guidelines; https://helcom.fi/action-areas/monitoring-and-assessment/monitoring-guidelines/plc-water-guidelines/).
The hydrochemical sampling is performed yearly, 4-12 times a year; river flows are measured continuously.
The data are used for assessment of achievement of environmental targets (targets 16 and 23) on the basis of associated indicators.</td></tr>
<tr><td rowspan="6">Ecosystem components, anthropogenic pressures and activities monitored</td><td colspan="4">Input of nutrients – diffuse sources, point sources, atmospheric deposition</td></tr>
<tr><td rowspan="3">Elements monitored</td><td colspan="3">Not Applicable</td></tr>
<tr><td rowspan="2">GES criteria addressed</td><td colspan="2">D5C1 Nutrient concentrations</td></tr>
<tr><td>Parameters monitored</td><td>Concentration in water, Water level; Temperature; Freshwater input rates from rivers; Input loads of nutrients</td></tr>
<tr><td colspan="4">Input of other substances (e.g. synthetic substances, non-synthetic substances, radionuclides) – diffuse sources, point sources, atmospheric deposition, acute events</td></tr>
<tr><td rowspan="3">Elements monitored</td><td colspan="3">Not Applicable</td></tr>
<tr><td rowspan="2">GES criteria addressed</td><td colspan="2">D8C1 Contaminant in environment</td></tr>
<tr><td>Parameters monitored</td><td>Concentration in water, Load of contaminant</td></tr>
<tr><td>Spatial zones monitored</td><td colspan="4">Coastal waters (WFD)</td></tr>
<tr><td>Start(and end) date of the programme</td><td colspan="4">1924-9999</td></tr>
<tr><td>Frequency of the monitoring</td><td colspan="4">Other (specify)</td></tr>
<tr><td>Type of monitoring</td><td colspan="4">In-situ sampling land/beach,
Numerical modelling</td></tr>
</table>

Data management and access	The hydrochemical data are yearly reported to the national environmental monitoring database KESE. The hydrological data are uploaded quarterly to the database WISKI. Water-borne pollution loads are reported to HELCOM PLC database annually.
Contact	Estonian Environment Agency: Anastasiia Kovtun-Kante, anastasiia.kovtun-kante@envir.ee; Arthur Kivi, arthur.kivi@envir.ee
References	The monitoring programme is approved by the minister of the environment and available at https://www.envir.ee/et/eesmargid-tegevused/merekeskkonna-kaitse/meres trateegia (https://www.envir.ee/sites/default/files/mereala_seireprogramm_2021_2026.pdf) (in Estonian).

MONITORING PROGRAMME	BALEE-D05-23_NutrientWaterColumn - Nutrient levels in water column			
Introduction/overview of programme	The aim of the programme is to monitor nutrient levels (total nitrogen, total phosphorus, NO3+NO2-N, NH4-N, PO4-P, SiO4-Si) in the water column. It provides data to monitoring strategy "SD5 – Eutrophication", as well as "SD1.6 Biodiversity – pelagic habitats". The programme is related to GES Descriptor D5, Criterion D5C1 and anthropogenic pressure "Input of nutrients" (MSFD Annex III). Data are gathered to assess the pressure levels in the marine environment and environmental status in coastal water bodies and off-shore sub-basins of the Baltic Sea (HELCOM sub-divisions). Monitoring is conducted yearly or at least once in six years with a frequency of 6 to 12 times a year at the designated monitoring stations (at least 3 stations in each coastal water body and 18 in the Estonian off-shore areas). The programme data collection is regionally coordinated via HELCOM and the HELCOM guidelines are followed. The data are yearly reported to the national environmental monitoring database KESE (by 1 March) and HELCOM ICES database (by 1 May). The threshold values for the indicators of concentrations of inorganic nitrogen and phosphorus in coastal waters have still to be developed. The programme is not designed to assess the internal and transboundary loads of nutrients. The programme is essentially the same as in 2014, only minor changes in some monitoring stations and frequencies were undertaken. The programme corresponds to the following monitoring programmes in the indicative list: Water column – chemical characteristics.			
Purpose of programme	Effectiveness of measures, Pressures in the marine environment			
Other EU or international policies to which programme contributes	Nitrates Directive, Water Framework Directive, Monitoring programme targeting at national legislation			
Monitoring details	Samples are collected from designated monitoring stations with a bathometer at depths of 1, 5 and 10 m and near-bottom layer. As part of the Ferrybox monitoring, samples are collected with an automatic sampler from depths of 4-5 m from a predefined location on the route of the liner with installed equipment. Sampling is carried out annually up to 12 times per year (from June to September) at certain monitoring stations, and in rotation 6 times per year at least once in 6-year period at other monitoring stations. In the off-shore areas the monitoring is conducted 6 times per year and during winter cruise. In addition, samples are collected in frames of Ferrybox monitoring, 12 times every year in the period from April to October.			
Ecosystem components, anthropogenic pressures and activities monitored	Eutrophication			
	Elements monitored	TN		
		GES criteria addressed	D5C1 Nutrient concentrations	
			Parameters monitored	Concentration in water
		TP		
		GES criteria addressed	D5C1 Nutrient concentrations	
			Parameters monitored	Concentration in water
		NO2-N		
		GES criteria addressed	D5C1 Nutrient concentrations	
			Parameters monitored	Concentration in water
		NO3-N		
		GES criteria addressed	D5C1 Nutrient concentrations	
			Parameters monitored	Concentration in water

		NH4+		
		GES criteria addressed	D5C1 Nutrient concentrations	
			Parameters monitored	Concentration in water
		DIP		
		GES criteria addressed	D5C1 Nutrient concentrations	
			Parameters monitored	Concentration in water
		Silicate (SiO4)		
		GES criteria addressed	D5C1 Nutrient concentrations	
			Parameters monitored	Concentration in water
	Chemical characteristics			
	Elements monitored	TN		
		GES criteria addressed	GES component not relevant	
			Parameters monitored	Concentration in water
		TP		
		GES criteria addressed	GES component not relevant	
			Parameters monitored	Concentration in water
		NO2-N		
		GES criteria addressed	GES component not relevant	
			Parameters monitored	Concentration in water
		NO3-N		
		GES criteria addressed	GES component not relevant	
			Parameters monitored	Concentration in water
		NH4+		
		GES criteria addressed	GES component not relevant	
			Parameters monitored	Concentration in water
		DIP		
		GES criteria addressed	GES component not relevant	
			Parameters monitored	Concentration in water
		Silicate (SiO4)		
		GES criteria addressed	GES component not relevant	
			Parameters monitored	Concentration in water
Spatial zones monitored	Coastal waters (WFD), Territorial waters, EEZ (or similar)			
Start(and end) date of the programme	1993-9999			
Frequency of the monitoring	Yearly			
Type of monitoring	In-situ sampling coastal, In-situ sampling offshore			
Data management and access	The data are yearly reported to the national environmental monitoring database KESE (by 1 March) and ICES (HELCOM Combine).			
Indicators to which the programme contributes	BALEED5C1.1 - Summer concentration of total nitrogen in seawater, BALEED5C1.2 - Summer concentration of total phosphorus in seawater, BALEED5C1.3 - Winter-time concentration of inorganic nitrogen (NO3+NO2–N) in seawater, BALEED5C1.4 - Winter-time concentration of phosphates (PO4-P) in seawater			

Contact	Estonian Environment Agency: Anastasiia Kovtun-Kante, anastasiia.kovtun-kante@envir.ee; Arthur Kivi, arthur.kivi@envir.ee
References	The monitoring programme is approved by the minister of the environment and available at https://www.envir.ee/et/eesmargid-tegevused/merekeskkonna-kaitse/meres trateegia (https://www.envir.ee/sites/default/files/mereala_seireprogramm_2021_202 6.pdf) (in Estonian).

MONITORING PROGRAMME	BALEE-D05-24_WaterColumnChem - Water column – chemical characteristics			
Introduction/overview of programme	The aim of the programme is to monitor chemical characteristics in the water column (including near-bottom layer) to assess the indirect effects of eutrophication and describe conditions of the pelagic and benthic habitats. It provides data to monitoring strategy "SD5 – Eutrophication" and is related to GES Descriptor D5, Criterion D5C5. Data are gathered to assess the environmental status in coastal water bodies and off-shore sub-basins of the Baltic Sea (HELCOM sub-divisions). Monitoring is conducted yearly or at least once in six years with a frequency of 6 to 12 times a year at the designated monitoring stations (at least three stations in each coastal water body and 18 in the Estonian off-shore areas). The program data collection is regionally coordinated via HELCOM and the HELCOM guidelines are followed, but data are delivered separately by each country. Data are yearly reported to the environmental monitoring database KESE (by 1 March) and HELCOM ICES database (by 1 May). Monitoring of pCO2 is not continuous yet. The programme is essentially the same as in 2014, only minor changes in some monitoring stations and frequencies were undertaken. The programme corresponds to the following monitoring programmes in the indicative list: Water column – chemical characteristics.			
Purpose of programme	Environmental state and impacts, Pressures in the marine environment			
Other EU or international policies to which programme contributes	Water Framework Directive, Monitoring programme targeting at national legislation			
Monitoring details	Dissolved oxygen concentration is measured at designated monitoring stations either in situ with CTD sonde oxygen sensors or in a laboratory from samples collected with a bathometer (surface layer and near-bottom layer). International guidelines are followed measuring H2S, pH and dissolved oxygen concentrations. H2S is measured at deepest monitoring stations in particular. Sampling is carried out annually up to 12 times per year (from June to September) at certain monitoring stations, and in rotation 6 times per year at least once in 6-year period at other monitoring stations. In the off-shore areas monitoring is conducted 6 times per year.			
Ecosystem components, anthropogenic pressures and activities monitored	Eutrophication			
	Elements monitored	Dissolved oxygen (O2)		
		GES criteria addressed	D5C5 Dissolved oxygen concentration	
			Parameters monitored	Concentration in water
		Hydrogen sulfide (H2S)		
		GES criteria addressed	D5C1 Nutrient concentrations	
			Parameters monitored	Concentration in water
	Chemical characteristics			
	Elements monitored	Dissolved oxygen (O2)		
		GES criteria addressed	GES component not relevant	
			Parameters monitored	Concentration in water
		pH		
		GES criteria addressed	GES component not relevant	
			Parameters monitored	Concentration in water
		H2S		
		GES criteria addressed	GES component not relevant	
			Parameters monitored	Concentration in water

Spatial zones monitored	Coastal waters (WFD), Territorial waters, EEZ (or similar)
Start(and end) date of the programme	1993-9999
Frequency of the monitoring	Yearly
Type of monitoring	In-situ sampling coastal, In-situ sampling offshore
Data management and access	The data are yearly reported to the national environmental monitoring database KESE (by 1 March) and ICES (HELCOM Combine).
Indicators to which the programme contributes	BALEED5C5.1 - Oxygen debt, BALEED5C5.2 - Shallow water near-bottom oxygen conditions, BALEED5C5.3 - Oxygen consumption
Contact	Estonian Environment Agency: Anastasiia Kovtun-Kante, anastasiia.kovtun-kante@envir.ee; Arthur Kivi, arthur.kivi@envir.ee
References	The monitoring programme is approved by the minister of the environment and available at https://www.envir.ee/et/eesmargid-tegevused/merekeskkonna-kaitse/meres trateegia (https://www.envir.ee/sites/default/files/mereala_seireprogramm_2021_2026.pdf) (in Estonian).

MONITORING PROGRAMME	BALEE-D0507-25_WaterColumnPhys - Water column – physical characteristics			
Introduction/overview of programme	The aim of the programme is to monitor physical characteristics (water temperature, salinity, transparency) in the water column to assess the indirect effects of eutrophication and describe the physical conditions of the pelagic habitats. It provides data to monitoring strategy "SD5 – Eutrophication" and is related to GES Descriptor D5, Criterion D5C4. Data are gathered to assess the environmental status in the coastal water bodies and off-shore sub-basins of the Baltic Sea (HELCOM sub-divisions). Monitoring is conducted yearly or at least once in six years with a frequency of 6 to 12 times a year at the designated monitoring stations (at least three stations in each coastal water body and 18 in the Estonian off-shore areas). The program data collection is regionally coordinated via HELCOM and the HELCOM guidelines are followed, but data are delivered separately by each country (except CMEMS/BOOS monitoring with joint data collection). The data are yearly reported to the environmental monitoring database KESE (by 1 March), HELCOM ICES database (by 1 May) and online data delivery into CMEMS/BOOS databases. The programme is essentially the same as in 2014, only minor changes in some monitoring stations and frequencies were undertaken. The programme corresponds to the following monitoring programmes in the indicative list: Water column – physical characteristics.			
Purpose of programme	Environmental state and impacts, Pressures in the marine environment			
Other EU or international policies to which programme contributes	Habitats Directive, Maritime Spatial Planning Directive			
Monitoring details	The temperature is measured within water column from surface to bottom with CTD sondes. Transparency is assessed with 30 cm diameter white Secchi disk. As part of the Ferrybox monitoring, the temperature and salinity are registered at depths of 4-5 m from a predefined location on the route of the liner with automatic equipment. CTD water column measurements of temperature and salinity are also being performed at autonomous monitoring buoys. Sampling is carried out annually up to 12 times per year (from June to September) at certain monitoring stations, and in rotation 6 times per year at least once in 6-year period at other monitoring stations. In the off-shore areas monitoring is conducted 6 times per year. Ferrybox, remote (satellite) measurements and measurements at autonomous buoys are being conducted continuously.			
Ecosystem components, anthropogenic pressures and activities monitored	Eutrophication			
	Elements monitored	Transparency		
		GES criteria addressed	D5C4 Photic limit	
			Parameters monitored	Transparency of water
	Physical and hydrological characteristics			
	Elements monitored	Transparency		
		GES criteria addressed	GES component not relevant	
			Parameters monitored	Transparency of water
		Temperature		
		GES criteria addressed	GES component not relevant	
			Parameters monitored	Temperature
		Salinity		
		GES criteria addressed	GES component not relevant	
			Parameters monitored	Salinity

	Hydrographical changes			
	Elements monitored	Transparency		
		GES criteria addressed	GES component not relevant	
			Parameters monitored	Transparency of water
		Temperature		
		GES criteria addressed	GES component not relevant	
			Parameters monitored	Temperature
		Salinity		
		GES criteria addressed	GES component not relevant	
			Parameters monitored	Salinity
Spatial zones monitored	Coastal waters (WFD), Territorial waters, EEZ (or similar)			
Start(and end) date of the programme	1993-9999			
Frequency of the monitoring	Yearly			
Type of monitoring	In-situ sampling coastal, In-situ sampling offshore, Remote surveillance, Remote satellite imagery			
Data management and access	The data are yearly reported to the national environmental monitoring database KESE (by 1 March). The data on autonomous buoys measurements are stored at CMEMS/EMODnet Physics.			
Indicators to which the programme contributes	BALEED5C4.1 - Summer-time Secchi depth transparency			
Contact	Estonian Environment Agency: Anastasiia Kovtun-Kante, anastasiia.kovtun-kante@envir.ee; Arthur Kivi, arthur.kivi@envir.ee			
References	The monitoring programme is approved by the minister of the environment and available at https://www.envir.ee/et/eesmargid-tegevused/merekeskkonna-kaitse/meres trateegia (https://www.envir.ee/sites/default/files/mereala_seireprogramm_2021_2026.pdf) (in Estonian).			

MONITORING PROGRAMME	BALEE-D07-26_PhysCharWaves - Hydrological characteristics			
Introduction/overview of programme	The aim of the programme is to monitor hydrological characteristics in the marine areas to describe the physical/hydrological conditions of the benthic and pelagic habitats. Data on sea level, waves, and currents are acquired at sea, mostly using autonomous devices and numerical models. Both, coastal water bodies and the off-shore sub-basins of the Baltic Sea (HELCOM division) are monitored. Monitoring is conducted continuously. The program is regionally coordinated via BOOS and Baltic CMEMS (joint data collection). The data are delivered near real-time. The programme is essentially the same as in 2014, only minor changes in some monitoring stations and frequencies were undertaken. The programme corresponds to the following monitoring programmes in the indicative list: Water column – hydrological characteristics.			
Purpose of programme	Environmental state and impacts, Pressures in the marine environment			
Other EU or international policies to which programme contributes	Habitats Directive, Water Framework Directive			
Monitoring details	Monitoring is conducted at stations with automatic measurement equipment installed (water level, waves and currents measurements).			
Ecosystem components, anthropogenic pressures and activities monitored	Hydrographical changes			
	Elements monitored	Sea level		
		GES criteria addressed	GES component not relevant	
			Parameters monitored	Water level
		Current regime		
		GES criteria addressed	GES component not relevant	
			Parameters monitored	Current velocity, Direction
		Wave regime		
		GES criteria addressed	GES component not relevant	
			Parameters monitored	Significant wave height; Period; Direction
	Physical and hydrological characteristics			
	Elements monitored	Wave regime		
		GES criteria addressed	GES component not relevant	
			Parameters monitored	Significant wave height; Period; Direction
		Current regime		
		GES criteria addressed	GES component not relevant	
			Parameters monitored	Current velocity, Direction
		Sea level		
		GES criteria addressed	GES component not relevant	
			Parameters monitored	Water level
Spatial zones monitored	Coastal waters (WFD), Territorial waters, EEZ (or similar)			
Start(and end) date of the programme	1993-9999			
Frequency of the monitoring	Continually			

Type of monitoring	Remote surveillance, Remote satellite imagery, Numerical modelling, In-situ sampling coastal
Data management and access	The data are stored at Estonian Environment Agency (Weather Service) in WISKI database, TalTech Marine Systems Institute (BOOS) and CMEMS in situ data. Automatic measurements and modelled data are available through Copernicus Marine Service and/or EMODnet Physics.
Contact	Estonian Environment Agency: Anastasiia Kovtun-Kante, anastasiia.kovtun-kante@envir.ee; Arthur Kivi, arthur.kivi@envir.ee
References	The monitoring programme is approved by the minister of the environment and available at https://www.envir.ee/et/eesmargid-tegevused/merekeskkonna-kaitse/meres trateegia (https://www.envir.ee/sites/default/files/mereala_seireprogramm_2021_2026.pdf) (in Estonian).

MONITORING PROGRAMME	BALEE-D07-27_Ice - Ice cover			
Introduction/overview of programme	The aim of the programme is to monitor characteristics of the ice cover. Data are collected by visual observations and remote sensing. Both, coastal water bodies and off-shore sub-basins of the Baltic Sea (HELCOM sub-divisions) are monitored. Monitoring is conducted continuously during winter. The program is regionally coordinated (joint data collection) via Baltic Sea Ice Services and a common product is produced. The data are delivered daily. The programme corresponds to the following monitoring programmes in the indicative list: Ice cover.			
Purpose of programme	Environmental state and impacts, Pressures in the marine environment			
Other EU or international policies to which programme contributes	Habitats Directive, Maritime Spatial Planning Directive			
Monitoring details	Ice monitoring is carried out as a part of national meteorological and hydrological monitoring (Estonian Environment Agency). Ice maps are produced in cooperation with Baltic Sea countries. TalTech Marine Systems Institute performs remote monitoring of ice on a project basis in cooperation with other Baltic Sea countries.			
Ecosystem components, anthropogenic pressures and activities monitored	Physical and hydrological characteristics			
	Elements monitored	Ice		
		GES criteria addressed	GES component not relevant	
			Parameters monitored	Extent; Thickness; Concentration; Ice type
Spatial zones monitored	Coastal waters (WFD), Territorial waters, EEZ (or similar)			
Start(and end) date of the programme	2007-9999			
Frequency of the monitoring	Continually			
Type of monitoring	Visual observation, Remote satellite imagery, Numerical modelling			
Data management and access	The data are stored at Estonian Environment Agency, TalTech Marine Systems Institute (http://sahm.ttu.ee/balticseapic/index.php?do=ice) and Baltic Sea Ice Services (http://www.bsis-ice.de/).			
Contact	Estonian Environment Agency: Anastasiia Kovtun-Kante, anastasiia.kovtun-kante@envir.ee; Arthur Kivi, arthur.kivi@envir.ee			
References	The monitoring programme is approved by the minister of the environment and available at https://www.envir.ee/et/eesmargid-tegevused/merekeskkonna-kaitse/meres trateegia (https://www.envir.ee/sites/default/files/mereala_seireprogramm_2021_2026.pdf) (in Estonian).			

MONITORING PROGRAMME	BALEE-D07-28_SeaCoast - Coasts			
Introduction/overview of programme	The aim of the programme is to collect data on coastal morphology and dynamics (including erosion processes). It assesses changes of coasts (incl erosion, etc.) due to natural processes (storms, wave activity) and human-induced pressures. The coastal profile on-shore and in near-shore water, as well as the characteristics of the substrate, are recorded. Data on the substrate and morphology are collected yearly at the selected monitoring sites along the Estonian coasts by the Geological Survey. Data are reported every year by 1 March and are made available via national environmental database KESE.			
Purpose of programme	Environmental state and impacts, Pressures in the marine environment, Human activities causing the pressures			
Other EU or international policies to which programme contributes	Habitats Directive, Maritime Spatial Planning Directive, Water Framework Directive			
Monitoring details	On-shore and near-shore measurements of coastal slope are conducted during the monitoring. For slope surveys geophysical equipment – profilers, echo-sounder and side-scan sonar are used. The sediment type, composition and its distribution and seabed morphology are recorded. The monitoring is carried out yearly with rotation at designated sites so that each site is monitored at least once in the 6-year period. Additionally, remote sensing (satellite images, orthophotos) are used to assess the changes in coastal areas.			
Ecosystem components, anthropogenic pressures and activities monitored	Hydrographical changes			
	Elements monitored	Bathymetry		
		GES criteria addressed	D7C1 Alteration of hydrographical conditions	
			Parameters monitored	Bathymetric depth
		Seabed substrate and morphology		
		GES criteria addressed	D7C1 Alteration of hydrographical conditions	
			Parameters monitored	Physical structure of habitat (e.g. sediment characteristics, topographic structure)
	Physical and hydrological characteristics			
	Elements monitored	Bathymetry		
		GES criteria addressed	GES component not relevant	
			Parameters monitored	Bathymetric depth
		Seabed substrate and morphology		
		GES criteria addressed	GES component not relevant	
			Parameters monitored	Physical structure of habitat (e.g. sediment characteristics, topographic structure)
Spatial zones monitored	Coastal waters (WFD)			
Start(and end) date of the programme	1994-9999			
Frequency of the monitoring	Yearly			
Type of monitoring	In-situ sampling coastal, Remote surveillance, Remote satellite imagery			

Data management and access	The processed data are yearly reported to the national environmental monitoring database KESE. The original raw data are stored at the Geological Survey. Orthophotos are stored in Land Board.
Contact	Estonian Environment Agency: Anastasiia Kovtun-Kante, anastasiia.kovtun-kante@envir.ee; Arthur Kivi, arthur.kivi@envir.ee
References	The monitoring programme is approved by the minister of the environment and available at https://www.envir.ee/et/eesmargid-tegevused/merekeskkonna-kaitse/meres trateegia (https://www.envir.ee/sites/default/files/mereala_seireprogramm_2021_2026.pdf) (in Estonian).

MONITORING PROGRAMME	BALEE-D0809-29_ContaminantBiota - Contaminant levels – in species
Introduction/overview of programme	The aim of the programme is to monitor the concentrations of contaminants in biota. It provides data to monitoring strategy "SD8 – Contaminants" and is related to GES Descriptor D8, Criterion D8C1. The pressure levels in the environment and the contamination of the species are assessed for the Estonian waters, both the coastal and the off-shore areas (HELCOM sub-divisions). Fish samples (perch in coastal waters and herring in open sea areas, either muscle or liver, depending on the substance) are analysed for the following harmful substances: PAHs, PBDEs and BDE209, DEHPs, HCHs, phenols, metals (Hg, Cd, Ni, Pb, Zn, Cu, Ba, Cr, As, Sn), TBT, pesticides, chlorobenzenes, PFOS, dioxins and dl-PCBs, HBCDDs, hydrocarbons (C10-C40). PAHs in coastal waters are monitored from Mytilus trossulus Gould. The programme is regionally coordinated via HELCOM, but also by EU WFD chemical monitoring guidelines. The data are yearly reported to the environmental monitoring database KESE (by 1 March), HELCOM ICES database (by 1 September) and European Environment Agency Eionet database. The programme corresponds to the following monitoring programmes in the indicative list: Contaminant levels - in species, including seafood. The programme has been modified since 2014: the list of monitoring substances was updated and sampling is performed from different matrixes. Food safety monitoring is no longer a part of the programme: the new separate programme was created (Contaminant level - in seafood).
Purpose of programme	Environmental state and impacts, Pressures in the marine environment, Effectiveness of measures
Other EU or international policies to which programme contributes	HELCOM Monitoring programmes, Water Framework Directive, Minamata Convention on Mercury, Monitoring programme targeting at national legislation

<table>
<tr><td>Monitoring details</td><td colspan="4">Sampling material (fish) is collected from commercial trawling and scientific fish monitoring and the biological analyse is performed (length, weight, age, sex and gonadal maturity). For chemical analyses as uniform as possible in age, size, sex and sexual maturity specimens are chosen. Chemical analyses should be performed in 3-5 replicates for each chemical class, therefore pooled fish samples are used to make up a sample large enough to provide sufficient material for analysis.
The target species for monitoring of contaminants in biota are perch (Perca fluviatilis) in coastal waters and herring (Clupea harengus) in territorial waters and off-shore areas. Samples are taken from female 10-15 perch specimens caught in July-September and female 12-15 herring specimens caught in August-September. Depending on substances that will be analysed, both liver samples (metals, excl. Hg) and muscle tissue (dorso-lateral muscle) samples are made. Although fish is predominantly used for monitoring, PAHs (excl anthracene, naphthalene, fluoranthene) should be determined separately from molluscs - Mytilus trossulus Gould, soft body is used for sample. Pooled sample should be made to provide sufficient material for analysis, which makes ca 100 specimens per sample. Adult specimens (70-90% of the maximum size) are collected. If there are not enough mussels in the coastal water body to collect a representative sample, or if sampling proves to be too expensive, the molluscs samples are replaced by fish samples and analyses are performed from fish muscle tissue.
Monitoring is carried out in frames of national marine monitoring - hazardous substances, which contributes to WFD RBMP and programme of measures. In addition, the data on contaminants concentration and impact in biota are gathered from different project-based studies that are ordered by the Ministry of the Environment.</td></tr>
<tr><td rowspan="19">Ecosystem components, anthropogenic pressures and activities monitored</td><td colspan="4">Contaminants - non UPBT substances</td></tr>
<tr><td rowspan="5">Elements monitored</td><td colspan="3">Cadmium and its compounds</td></tr>
<tr><td rowspan="2">GES criteria addressed</td><td colspan="2">D8C1 Contaminant in environment</td></tr>
<tr><td>Parameters monitored</td><td>Concentration in biota – liver,
Concentration in biota – liver - Perca fluviatilis;
Concentration in biota – liver - Clupea harengus</td></tr>
<tr><td colspan="3">Lead and its compounds</td></tr>
<tr><td rowspan="2">GES criteria addressed</td><td colspan="2">D8C1 Contaminant in environment</td></tr>
<tr><td>Parameters monitored</td><td>Concentration in biota – liver,
Concentration in biota – liver - Perca fluviatilis;
Concentration in biota – liver - Clupea harengus</td></tr>
<tr><td colspan="3">Nickel and its compounds</td></tr>
<tr><td rowspan="2">GES criteria addressed</td><td colspan="2">D8C1 Contaminant in environment</td></tr>
<tr><td>Parameters monitored</td><td>Concentration in biota – liver,
Concentration in biota – liver - Perca fluviatilis;
Concentration in biota – liver - Clupea harengus</td></tr>
<tr><td colspan="3">Arsenic and its compounds</td></tr>
<tr><td>GES criteria</td><td colspan="2">D8C1 Contaminant in environment</td></tr>
</table>

		addressed	Parameters monitored	Concentration in biota – liver, Concentration in biota – muscle - Perca fluviatilis; Concentration in biota – muscle - Clupea harengus
		Barium		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in biota – liver, Concentration in biota – muscle - Perca fluviatilis; Concentration in biota – muscle - Clupea harengus
		Chromium and its compounds		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in biota – liver, Concentration in biota – muscle - Perca fluviatilis; Concentration in biota – muscle - Clupea harengus
		Zinc and its compounds		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in biota – liver, Concentration in biota – liver - Perca fluviatilis; Concentration in biota – liver - Clupea harengus
		Copper and its compounds		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in biota – liver, Concentration in biota – liver - Perca fluviatilis; Concentration in biota – liver - Clupea harengus
		Tin and its compounds		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in biota – liver, Concentration in biota – liver - Perca fluviatilis; Concentration in biota – liver - Clupea harengus
		Anthracene		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in biota – muscle, Concentration in biota – muscle - Perca fluviatilis; Concentration in biota – muscle - Clupea harengus
		Fluoranthene		
		GES criteria	D8C1 Contaminant in environment	

		addressed	Parameters monitored	Concentration in biota – muscle, Concentration in biota – muscle - Perca fluviatilis; Concentration in biota – muscle - Clupea harengus
		Naphthalene		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in biota – muscle, Concentration in biota – muscle - Perca fluviatilis; Concentration in biota – muscle - Clupea harengus
		Brominated diphenylethers (congener numbers 28, 47, 66, 85, 99, 100, 153, 154, and 183)		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in biota – muscle, Concentration in biota – muscle - Perca fluviatilis; Concentration in biota – muscle - Clupea harengus
		Alachlor		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in biota – muscle, Concentration in biota – muscle - Perca fluviatilis; Concentration in biota – muscle - Clupea harengus
		Atrazine		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in biota – muscle, Concentration in biota – muscle - Perca fluviatilis; Concentration in biota – muscle - Clupea harengus
		Chlorfenvinphos		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in biota – muscle, Concentration in biota – muscle - Perca fluviatilis; Concentration in biota – muscle - Clupea harengus
		Chlorpyrifos		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in biota – muscle, Concentration in biota – muscle - Perca fluviatilis; Concentration in biota – muscle - Clupea harengus
		Total cyclodiene pesticides (aldrin + dieldrin + endrin + isodrin)		
		GES criteria	D8C1 Contaminant in environment	

		addressed	Parameters monitored	Concentration in biota – muscle, Concentration in biota – muscle - Perca fluviatilis; Concentration in biota – muscle - Clupea harengus
		Total DDT (DDT, p,p' + DDT, o,p' + DDE, p,p' + DDD, p,p')		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in biota – muscle, Concentration in biota – muscle - Perca fluviatilis; Concentration in biota – muscle - Clupea harengus
		DDT, p,p'		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in biota – muscle, Concentration in biota – muscle - Perca fluviatilis; Concentration in biota – muscle - Clupea harengus
		Diuron		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in biota – muscle, Concentration in biota – muscle - Perca fluviatilis; Concentration in biota – muscle - Clupea harengus
		Endosulfan		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in biota – muscle, Concentration in biota – muscle - Perca fluviatilis; Concentration in biota – muscle - Clupea harengus
		Isoproturon		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in biota – muscle, Concentration in biota – muscle - Perca fluviatilis; Concentration in biota – muscle - Clupea harengus
		Simazine		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in biota – muscle, Concentration in biota – muscle - Perca fluviatilis; Concentration in biota – muscle - Clupea harengus
		Trifluralin		
		GES criteria	D8C1 Contaminant in environment	

		addressed	Parameters monitored	Concentration in biota – muscle, Concentration in biota – muscle - Perca fluviatilis; Concentration in biota – muscle - Clupea harengus
		Di(2-ethylhexyl)phthalate (DEHP)		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in biota – muscle, Concentration in biota – muscle - Perca fluviatilis; Concentration in biota – muscle - Clupea harengus
		Hexachlorocyclohexane (α-, β-, γ-HCH)		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in biota – muscle, Concentration in biota – muscle - Perca fluviatilis; Concentration in biota – muscle - Clupea harengus
		Nonylphenol		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in biota – muscle, Concentration in biota – muscle - Perca fluviatilis
		Octylphenol		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in biota – muscle, Concentration in biota – muscle - Perca fluviatilis
		Pentachlorophenol		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in biota – muscle, Concentration in biota – muscle - Perca fluviatilis; Concentration in biota – muscle - Clupea harengus
		Phenol		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in biota – muscle, Concentration in biota – muscle - Perca fluviatilis; Concentration in biota – muscle - Clupea harengus
		2-methyl-phenol		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in biota – muscle, Concentration in biota – muscle - Perca fluviatilis; Concentration in biota – muscle - Clupea harengus

		m-/p-Cresol		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in biota – muscle, Concentration in biota – muscle - Perca fluviatilis; Concentration in biota – muscle - Clupea harengus
		2,3-dimethyl-phenol		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in biota – muscle, Concentration in biota – muscle - Perca fluviatilis; Concentration in biota – muscle - Clupea harengus
		2,6-Dimethyl phenol		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in biota – muscle, Concentration in biota – muscle - Perca fluviatilis; Concentration in biota – muscle - Clupea harengus
		3,4-dimethyl-phenol		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in biota – muscle, Concentration in biota – muscle - Perca fluviatilis; Concentration in biota – muscle - Clupea harengus
		3,5-Dimethyl phenol		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in biota – muscle, Concentration in biota – muscle - Perca fluviatilis; Concentration in biota – muscle - Clupea harengus
		Resorcinol		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in biota – muscle, Concentration in biota – muscle - Perca fluviatilis; Concentration in biota – muscle - Clupea harengus
		Pentachlorobenzene		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in biota – muscle, Concentration in biota – muscle - Perca fluviatilis; Concentration in biota – muscle - Clupea harengus
		Non-dioxin like PCB (sum of 6 PCB: 28, 52, 101, 138, 153 and 180)		

		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in biota – muscle, Concentration in biota – muscle - Perca fluviatilis; Concentration in biota – muscle - Clupea harengus
	Contaminants - UPBT substances			
	Elements monitored	Mercury and its compounds		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in biota – muscle, Concentration in biota – muscle - Perca fluviatilis; Concentration in biota – muscle - Clupea harengus
		Tributyltin-cation		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in biota – muscle, Concentration in biota – muscle - Perca fluviatilis; Concentration in biota – muscle - Clupea harengus
		Total PAHs (Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(ghi)perylene, Indeno(1,2,3-cd)pyrene)		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in biota – muscle, Concentration in biota – muscle - Perca fluviatilis; Concentration in biota – muscle - Clupea harengus; Concentration in biota – muscle - Mytilus trossulus
		Dioxins and dioxin-like compounds (7 PCDDs + 10 PCDFs + 12 PCB-DLs)		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in biota – muscle, Concentration in biota – muscle - Perca fluviatilis; Concentration in biota – muscle - Clupea harengus;
		Hexabromocyclododecanes (HBCDD)		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in biota – muscle, Concentration in biota – muscle - Perca fluviatilis; Concentration in biota – muscle - Clupea harengus;
		Perfluorooctane sulfonic acid (PFOS) and its derivatives		
		GES criteria	D8C1 Contaminant in environment	

		addressed	Parameters monitored	Concentration in biota – muscle, Concentration in biota – muscle - Perca fluviatilis; Concentration in biota – muscle - Clupea harengus;
Spatial zones monitored	Coastal waters (WFD), Territorial waters, EEZ (or similar)			
Start(and end) date of the programme	1994-9999			
Frequency of the monitoring	Yearly			
Type of monitoring	In-situ sampling coastal, In-situ sampling offshore			
Data management and access	Data are yearly reported to the national environmental monitoring database KESE (by 1 March), ICES (HELCOM Combine) and Eionet.			

Indicators to which the programme contributes	BALEED8C1.13 - Cadmium and its compounds, BALEED8C1.14 - Lead and its compounds, BALEED8C1.15 - Nickel and its compounds, BALEED8C1.16 - Arsenic and its compounds, BALEED8C1.17 - Barium, BALEED8C1.18 - Chromium and its compounds, BALEED8C1.19 - Zinc and its compounds, BALEED8C1.20 - Copper and its compounds, BALEED8C1.21 - Mercury and its compounds, BALEED8C1.22 - Tin and its compounds, BALEED8C1.44 - Anthracene, BALEED8C1.45 - Fluoranthene, BALEED8C1.46 - Naphthalene, BALEED8C1.47 - Benzo(a)pyrene, BALEED8C1.48 - Benzo(b)fluoranthene, BALEED8C1.49 - Benzo(k)fluoranthene, BALEED8C1.50 - Benzo(g,h,i)perylene, BALEED8C1.51 - Indeno(1,2,3,-cd)pyrene, BALEED8C1.36 - Brominated diphenylethers (congener numbers 28, 47, 99, 100, 153 and 154), BALEED8C1.24 - Alachlor, BALEED8C1.25 - Atrazine, BALEED8C1.26 - Chlorfenvinphos, BALEED8C1.27 - Chlorpyrifos, BALEED8C1.28 - Total cyclodiene pesticides (aldrin + dieldrin + endrin + isodrin), BALEED8C1.29 - Total DDT (DDT, p,p' + DDT, o,p' + DDE, p,p' + DDD, p,p'), BALEED8C1.30 - DDT, p,p', BALEED8C1.31 - Diuron, BALEED8C1.32 - Endosulfan, BALEED8C1.33 - Isoproturon, BALEED8C1.34 - Simazine, BALEED8C1.35 - Trifluralin, BALEED8C1.23 - Tributyltin-cation, BALEED8C1.52 - Di(2-ethylhexyl)phthalate (DEHP), BALEED8C1.57 - Hexachlorocyclohexane, BALEED8C1.1 - Nonylphenol, BALEED8C1.2 - Octylphenol (4-(1,1',3,3'-tetramethylbutyl)-phenol), BALEED8C1.3 - Pentachlorophenol, BALEED8C1.4 - Phenol, BALEED8C1.5 - 2-methyl-phenol (O-Cresol), BALEED8C1.6 - m-/p-Cresol, BALEED8C1.7 - 2,3-dimethyl-phenol, BALEED8C1.8 - 2,6-Dimethyl phenol, BALEED8C1.9 - 3,4-dimethyl-phenol, BALEED8C1.10 - 3,5-Dimethyl phenol, BALEED8C1.11 - Resorcinol, BALEED8C1.58 - Pentachlorobenzene, BALEED8C1.12 - Non-dioxin like PCB (sum of 6 PCB: 28, 52, 101, 138, 153 and 180), BALEED8C1.64 - Dioxins and dioxin-like polychlorinated biphenyls (PCBs), BALEED8C1.65 - Hexabromocyclododecane (HBCDD), BALEED8C1.66 - Perfluorooctane sulphonate (PFOS) and its derivatives
Contact	Estonian Environment Agency: Anastasiia Kovtun-Kante, anastasiia.kovtun-kante@envir.ee; Arthur Kivi, arthur.kivi@envir.ee

References	The monitoring programme is approved by the minister of the environment and available at https://www.envir.ee/et/eesmargid-tegevused/merekeskkonna-kaitse/meres trateegia (https://www.envir.ee/sites/default/files/mereala_seireprogramm_2021_2026.pdf) (in Estonian).

MONITORING PROGRAMME	BALEE-D08-30_ContaminantSediment - Contaminant levels – in sediment			
Introduction/overview of programme	The aim of the programme is to monitor the concentrations of contaminants in sediments. It provides data to monitoring strategy "SD8 – Contaminants" and is related to GES Descriptor D8, Criterion D8C1. The pressure levels in the environment are assessed for the Estonian waters, both the coastal and the off-shore areas (territorial waters, HELCOM division). Sediment samples are analysed for the following harmful substances: PAHs, PBDEs and BDE209, DEHPs, HCHs, phenols, metals (Hg, Cd, Ni, Pb, Zn, Cu, Ba, Cr, As, Sn), TBT, pesticides, chlorobenzenes, PFOS, dioxins and dl-PCBs, HBCDDs, hydrocarbons (C10-C40). The programme data collection is regionally coordinated via HELCOM, but data are delivered separately by each country. HELCOM guidelines are followed as well as EU-WFD guidelines on sediment sampling for chemical status assessment. The data are yearly reported to the environmental monitoring database KESE (by 1 March) and the HELCOM ICES database (by 1 September). The programme has been modified since 2014: the list of monitoring substances and monitoring sites was updated. The programme corresponds to the following monitoring programmes in the indicative list: Contaminant levels - in water/sediment.			
Purpose of programme	Environmental state and impacts, Pressures in the marine environment, Effectiveness of measures			
Other EU or international policies to which programme contributes	HELCOM Monitoring programmes, Water Framework Directive, Minamata Convention on Mercury, Monitoring programme targeting at national legislation			
Monitoring details	According to the national environmental monitoring programme, coastal water sediment samples are taken from clayey sediments (more than 20% of sediments with siltstone or clay fraction particles d <0.63 µm) from the upper sediment layer of the accumulation areas (depth 0-3-5 cm, maximum 10 cm for older pollution). Minimum of three subsamples are collected for the pooled sample. Samples, with a total volume of at least 1 litre, are mixed, sieved to remove stones and other unnecessary particles. In the laboratory, the concentrations of hazardous substances (µg/kg dry weight) and supplementary parameters as total organic carbon (TOC) concentration are determined. The HELCOM sediment sampling methodology may be used for sampling and contaminants' trend analysis in the territorial sea area. The monitoring is carried at designated sites out in rotation. The monitoring data are also gathered from the environmental impact assessment projects and environmental permits when the corresponding requirement is listed.			
Ecosystem components, anthropogenic pressures and activities monitored	Contaminants - non UPBT substances			
	Elements monitored	Cadmium and its compounds		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
		Lead and its compounds		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
		Nickel and its compounds		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
		Arsenic and its compounds		
		GES criteria	D8C1 Contaminant in environment	

		addressed	Parameters monitored	Concentration in sediment (total)
		Barium		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
		Chromium and its compounds		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
		Zinc and its compounds		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
		Copper and its compounds		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
		Tin and its compounds		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
		Anthracene		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
		Fluoranthene		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
		Naphthalene		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
		Brominated diphenylethers (congener numbers 28, 47, 66, 85, 99, 100, 153, 154, and 183)		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
		Alachlor		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
		Atrazine		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
		Chlorfenvinphos		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
		Chlorpyrifos		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
		Total cyclodiene pesticides (aldrin + dieldrin + endrin + isodrin)		

		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
		Total DDT (DDT, p,p' + DDT, o,p' + DDE, p,p' + DDD, p,p')		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
		DDT, p,p'		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
		Diuron		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
		Endosulfan		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
		Isoproturon		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
		Simazine		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
		Trifluralin		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
		Di(2-ethylhexyl)phthalate (DEHP)		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
		Hexachlorocyclohexane (α-, β-, γ-HCH)		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
		Nonylphenol		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
		Octylphenol		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
		Pentachlorophenol		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
		Phenol		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
		2-methyl-phenol		
		GES criteria	D8C1 Contaminant in environment	

		addressed	Parameters monitored	Concentration in sediment (total)
		m-/p-Cresol		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
		2,3-dimethyl-phenol		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
		2,6-Dimethyl phenol		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
		3,4-dimethyl-phenol		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
		3,5-Dimethyl phenol		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
		Resorcinol		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
		Chloroalkanes C10-13		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
		Trichlorobenzenes (all isomers)		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
		Petroleum hydrocarbons		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
	Contaminants - UPBT substances			
	Elements monitored	Mercury and its compounds		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
		Tributyltin-cation		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
		Total PAHs (Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(ghi)perylene, Indeno(1,2,3-cd)pyrene)		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
		Hexabromocyclododecanes (HBCDD)		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)

		Perfluorooctane sulfonic acid (PFOS) and its derivatives		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in sediment (total)
Spatial zones monitored	Coastal waters (WFD), Territorial waters			
Start(and end) date of the programme	2014-9999			
Frequency of the monitoring	Yearly			
Type of monitoring	In-situ sampling coastal, In-situ sampling offshore			
Data management and access	The data are yearly reported to the national environmental monitoring database KESE (by 1 March), ICES (HELCOM). The data gathered from environmental permits are stored at database KOTKAS.			

Indicators to which the programme contributes	BALEED8C1.13 - Cadmium and its compounds, BALEED8C1.14 - Lead and its compounds, BALEED8C1.15 - Nickel and its compounds, BALEED8C1.16 - Arsenic and its compounds, BALEED8C1.17 - Barium, BALEED8C1.18 - Chromium and its compounds, BALEED8C1.19 - Zinc and its compounds, BALEED8C1.20 - Copper and its compounds, BALEED8C1.21 - Mercury and its compounds, BALEED8C1.22 - Tin and its compounds, BALEED8C1.44 - Anthracene, BALEED8C1.45 - Fluoranthene, BALEED8C1.46 - Naphthalene, BALEED8C1.47 - Benzo(a)pyrene, BALEED8C1.48 - Benzo(b)fluoranthene, BALEED8C1.49 - Benzo(k)fluoranthene, BALEED8C1.50 - Benzo(g,h,i)perylene, BALEED8C1.51 - Indeno(1,2,3,-cd)pyrene, BALEED8C1.36 - Brominated diphenylethers (congener numbers 28, 47, 99, 100, 153 and 154), BALEED8C1.24 - Alachlor, BALEED8C1.25 - Atrazine, BALEED8C1.26 - Chlorfenvinphos, BALEED8C1.27 - Chlorpyrifos, BALEED8C1.28 - Total cyclodiene pesticides (aldrin + dieldrin + endrin + isodrin), BALEED8C1.29 - Total DDT (DDT, p,p' + DDT, o,p' + DDE, p,p' + DDD, p,p'), BALEED8C1.30 - DDT, p,p', BALEED8C1.31 - Diuron, BALEED8C1.32 - Endosulfan, BALEED8C1.33 - Isoproturon, BALEED8C1.34 - Simazine, BALEED8C1.35 - Trifluralin, BALEED8C1.23 - Tributyltin-cation, BALEED8C1.52 - Di(2-ethylhexyl)phthalate (DEHP), BALEED8C1.57 - Hexachlorocyclohexane, BALEED8C1.1 - Nonylphenol, BALEED8C1.2 - Octylphenol (4-(1,1',3,3'-tetramethylbutyl)-phenol), BALEED8C1.3 - Pentachlorophenol, BALEED8C1.4 - Phenol, BALEED8C1.5 - 2-methyl-phenol (O-Cresol), BALEED8C1.6 - m-/p-Cresol, BALEED8C1.7 - 2,3-dimethyl-phenol, BALEED8C1.8 - 2,6-Dimethyl phenol, BALEED8C1.9 - 3,4-dimethyl-phenol, BALEED8C1.10 - 3,5-Dimethyl phenol, BALEED8C1.11 - Resorcinol, BALEED8C1.65 - Hexabromocyclododecane (HBCDD), BALEED8C1.66 - Perfluorooctane sulphonate (PFOS) and its derivatives, BALEED8C1.53 - Chloroalkanes C10-13, BALEED8C1.61 - Trichlorobenzenes (all isomers), BALEED8C1.62 - Petroleum hydrocarbons (C10-C40)
Contact	Estonian Environment Agency: Anastasiia Kovtun-Kante, anastasiia.kovtun-kante@envir.ee; Arthur Kivi, arthur.kivi@envir.ee

References	The monitoring programme is approved by the minister of the environment and available at https://www.envir.ee/et/eesmargid-tegevused/merekeskkonna-kaitse/meres trateegia (https://www.envir.ee/sites/default/files/mereala_seireprogramm_2021_2026.pdf) (in Estonian).

MONITORING PROGRAMME	BALEE-D08-31_ContaminantWater - Contaminant levels – in water			
Introduction/overview of programme	The aim of the programme is to monitor the concentrations of contaminants in water. It provides data to monitoring strategy "SD8 – Contaminants" and is related to GES Descriptor D8, Criterion D8C1. The pressure levels in the environment are assessed for the Estonian waters, both the coastal and the off-shore areas (territorial waters, HELCOM sub-divisions). Water samples are analysed for the harmful substances: DEHPs, phenols, metals (Hg, Cd, Ni, Pb, Zn, Cu, Ba, Cr, As, Sn), TBT, pesticides, PFOS, PFAS, hydrocarbons (C10-C40). The program data collection is regionally coordinated via HELCOM (data delivered separately by each country), and the HELCOM guidelines and requirements of WFD and its daughter directives are followed. The data are yearly reported to the environmental monitoring database KESE (by 1 March) and the HELCOM ICES database (by 1 September). The programme has been modified since 2014: the list of monitoring substances was updated. The programme corresponds to the following monitoring programmes in the indicative list: Contaminant levels - in water/sediment			
Purpose of programme	Environmental state and impacts, Pressures in the marine environment, Effectiveness of measures			
Other EU or international policies to which programme contributes	HELCOM Monitoring programmes, Water Framework Directive, Minamata Convention on Mercury, Monitoring programme targeting at national legislation			
Monitoring details	The samples for analyses of contaminant levels in water are collected from coastal and territorial waters in frames of the national monitoring programme. The monitoring considers WFD requirements. Total organic carbon and water hardness are also measured for supplementary background information. The monitoring is conducted annually in rotation at designated sites - 3 times in the 6-year period at certain sites, 1-4 times during the ice-free period. The monitoring data are also gathered from companies' environmental permits, according to monitoring and frequency requirements listed.			
Ecosystem components, anthropogenic pressures and activities monitored	Contaminants - non UPBT substances			
	Elements monitored	Cadmium and its compounds		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		Lead and its compounds		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		Nickel and its compounds		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		Arsenic and its compounds		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		Barium		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		Chromium and its compounds		
		GES criteria	D8C1 Contaminant in environment	

		addressed	Parameters monitored	Concentration in water
		Zinc and its compounds		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		Copper and its compounds		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		Tin and its compounds		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		Alachlor		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		Atrazine		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		Chlorfenvinphos		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		Chlorpyrifos		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		Total cyclodiene pesticides (aldrin + dieldrin + endrin + isodrin)		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		Total DDT (DDT, p,p' + DDT, o,p' + DDE, p,p' + DDD, p,p')		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		DDT, p,p'		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		Diuron		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		Endosulfan		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		Isoproturon		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		Simazine		
		GES criteria	D8C1 Contaminant in environment	

		addressed	Parameters monitored	Concentration in water
		Trifluralin		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		Di(2-ethylhexyl)phthalate (DEHP)		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		Nonylphenol		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		Octylphenol		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		Pentachlorophenol		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		Phenol		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		2-methyl-phenol		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		m-/p-Cresol		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		2,3-dimethyl-phenol		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		2,6-Dimethyl phenol		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		3,4-dimethyl-phenol		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		3,5-Dimethyl phenol		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		Resorcinol		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		Trichlorobenzenes (all isomers)		
		GES criteria	D8C1 Contaminant in environment	

		addressed	Parameters monitored	Concentration in water
		Petroleum hydrocarbons		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		Hexachlorobenzene		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		Pentachlorobenzene		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		Benzene		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		Toluene		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		1,2-Dichloroethane		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		Dichloromethane		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		Trichloromethane		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		o-Xylene		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		Meta xylene + para xylene		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
	Contaminants - UPBT substances			
	Elements monitored	Mercury and its compounds		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		Tributyltin-cation		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
		Perfluorooctane sulfonic acid (PFOS) and its derivatives		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in water
Spatial zones monitored	Coastal waters (WFD), Territorial waters			

Start(and end) date of the programme	2010-9999
Frequency of the monitoring	Yearly
Type of monitoring	In-situ sampling coastal, In-situ sampling offshore
Data management and access	The data are yearly reported to the national environmental monitoring database KESE and ICES (HELCOM). The data gathered from environmental permits are stored at database KOTKAS.
Indicators to which the programme contributes	BALEED8C1.13 - Cadmium and its compounds, BALEED8C1.14 - Lead and its compounds, BALEED8C1.15 - Nickel and its compounds, BALEED8C1.16 - Arsenic and its compounds, BALEED8C1.17 - Barium, BALEED8C1.18 - Chromium and its compounds, BALEED8C1.19 - Zinc and its compounds, BALEED8C1.20 - Copper and its compounds, BALEED8C1.21 - Mercury and its compounds, BALEED8C1.22 - Tin and its compounds, BALEED8C1.1 - Nonylphenol, BALEED8C1.2 - Octylphenol (4-(1,1',3,3'-tetramethylbutyl)-phenol), BALEED8C1.3 - Pentachlorophenol, BALEED8C1.4 - Phenol, BALEED8C1.5 - 2-methyl-phenol (O-Cresol), BALEED8C1.6 - m-/p-Cresol, BALEED8C1.7 - 2,3-dimethyl-phenol, BALEED8C1.8 - 2,6-Dimethyl phenol, BALEED8C1.9 - 3,4-dimethyl-phenol, BALEED8C1.10 - 3,5-Dimethyl phenol, BALEED8C1.11 - Resorcinol, BALEED8C1.66 - Perfluorooctane sulphonate (PFOS) and its derivatives, BALEED8C1.24 - Alachlor, BALEED8C1.25 - Atrazine, BALEED8C1.26 - Chlorfenvinphos, BALEED8C1.27 - Chlorpyrifos, BALEED8C1.28 - Total cyclodiene pesticides (aldrin + dieldrin + endrin + isodrin), BALEED8C1.29 - Total DDT (DDT, p,p' + DDT, o,p' + DDE, p,p' + DDD, p,p'), BALEED8C1.30 - DDT, p,p', BALEED8C1.31 - Diuron, BALEED8C1.32 - Endosulfan, BALEED8C1.33 - Isoproturon, BALEED8C1.34 - Simazine, BALEED8C1.35 - Trifluralin, BALEED8C1.23 - Tributyltin-cation, BALEED8C1.52 - Di(2-ethylhexyl)phthalate (DEHP), BALEED8C1.55 - Hexachlorobenzene, BALEED8C1.58 - Pentachlorobenzene, BALEED8C1.61 - Trichlorobenzenes (all isomers), BALEED8C1.37 - Benzene, BALEED8C1.38 - 1,2-Dichloroethane, BALEED8C1.39 - Dichloromethane, BALEED8C1.40 - Trichloromethane, BALEED8C1.41 - o-Xylene, BALEED8C1.42 - Meta xylene + para xylene, BALEED8C1.43 - Toluene, BALEED8C1.62 - Petroleum hydrocarbons (C10-C40)

Contact	Estonian Environment Agency: Anastasiia Kovtun-Kante, anastasiia.kovtun-kante@envir.ee; Arthur Kivi, arthur.kivi@envir.ee
References	The monitoring programme is approved by the minister of the environment and available at https://www.envir.ee/et/eesmargid-tegevused/merekeskkonna-kaitse/meres trateegia (https://www.envir.ee/sites/default/files/mereala_seireprogramm_2021_202 6.pdf) (in Estonian).

MONITORING PROGRAMME	BALEE-D09-32_ContaminantSeafood - Contaminant levels – in seafood			
Introduction/overview of programme	The aim of the programme is to monitor the concentrations of contaminants in seafood (fishes in Estonian case). It provides data to monitoring strategy "SD9 – Contaminants in seafood" and is related to GES Descriptor D9, Criterion D9C1. The pressure levels in the environment and the contamination of the seafood for human consumption are assessed for the Estonian waters, both the coastal and the off-shore areas (ICES divisions). Fish samples are analysed for the following harmful substances: Pb, Cd, Hg, dioxins, PCBs. The program is coordinated on the EU level (EU food safety regulations) and relevant guidelines are followed. Not regionally coordinated by HELCOM. Food safety monitoring was a part of the programme "Contaminant level - in biota" in 2014, but a new separate programme was created in 2020 update. The programme corresponds to the following monitoring programmes in the indicative list: Contaminant levels - in species, including seafood.			
Purpose of programme	Environmental state and impacts, Pressures in the marine environment, Effectiveness of measures			
Other EU or international policies to which programme contributes	Foodstuffs Regulation			
Monitoring details	Of the seafood, the most widely consumed fish in Estonia is analysed at the request of the Veterinary and Food Board. Additional studies on the content of contaminants in seafood are being carried out on a project basis. The monitoring is performed from herring, sprat, flounder, pikeperch, salmon, perch and river lamprey specimens at least once in the 6-year period, dioxins and PCBs should be preferably monitored annually.			
Ecosystem components, anthropogenic pressures and activities monitored	Contaminants – in seafood			
	Elements monitored	Lead and its compounds		
		GES criteria addressed	D9C1 Contaminants in seafood	
			Parameters monitored	Concentration in biota – other
		Cadmium and its compounds		
		GES criteria addressed	D9C1 Contaminants in seafood	
			Parameters monitored	Concentration in biota – other
		Mercury and its compounds		
		GES criteria addressed	D9C1 Contaminants in seafood	
			Parameters monitored	Concentration in biota – other
		Sum of dioxins (WHO-PCDD/F-TEQ)		
		GES criteria addressed	D9C1 Contaminants in seafood	
			Parameters monitored	Concentration in biota – other
		Dioxins and dioxin-like compounds (7 PCDDs + 10 PCDFs + 12 PCB-DLs)		
		GES criteria addressed	D9C1 Contaminants in seafood	
			Parameters monitored	Concentration in biota – other
		Non-dioxin like PCB (sum of 6 PCB: 28, 52, 101, 138, 153 and 180)		
		GES criteria addressed	D9C1 Contaminants in seafood	
			Parameters monitored	Concentration in biota – other
Spatial zones monitored	Territorial waters, EEZ (or similar)			

Start(and end) date of the programme	2002-9999
Frequency of the monitoring	Other (specify)
Type of monitoring	In-situ sampling offshore
Data management and access	The data collected during the monitoring and reports are submitted to the Veterinary and Food Board. The data are also stored at the Ministry of Rural Affairs (Chemical and Biological Food Safety Bureau) (the processed data are available).
Indicators to which the programme contributes	BALEED9C1.1 - Concentration of lead in seafood, BALEED9C1.2 - Concentration of cadmium in seafood, BALEED9C1.3 - Concentration of mercury in seafood, BALEED9C1.4 - Sum of dioxins (WHO-PCDD/F-TEQ) in seafood, BALEED9C1.5 - Dioxins and dioxin-like compounds (7 PCDDs + 10 PCDFs + 12 PCB-DLs) in seafood, BALEED9C1.6 - Non-dioxin like PCB (sum of 6 PCB: 28, 52, 101, 138, 153 and 180) in seafood
Contact	Ministry of Rural Affairs (Chemical and Biological Food Safety Bureau): Maia Radin: Maia.Radin@agri.ee
References	The monitoring programme is approved by the minister of the environment and available at https://www.envir.ee/et/eesmargid-tegevused/merekeskkonna-kaitse/meres trateegia (https://www.envir.ee/sites/default/files/mereala_seireprogramm_2021_2026.pdf) (in Estonian).

MONITORING PROGRAMME	BALEE-D0809-33_Radionuclides - Radioactive substances			
Introduction/overview of programme	The aim of the programme is to monitor the concentrations of radioactive substances in the marine environment. It provides data to monitoring strategy "SD8 – Contaminants" and is related to GES Descriptor D8, Criterion D8C1. The pressure levels and status are assessed for the Estonian waters in the Gulf of Finland as agreed in HELCOM MORS. Monitoring is conducted yearly, and the samples collected from water, sediments and biota are analysed for Cs-137 and K-40 concentrations. The program data collection is regionally coordinated via HELCOM (data delivered separately by each country) and the HELCOM guidelines are followed. Data are yearly reported to the national environmental monitoring database KESE (by 1 March) and ICES (HELCOM Combine). The programme corresponds to the following monitoring programmes in the indicative list: Contaminant levels - in water/sediment; Contaminant levels - in species, including seafood. The programme is essentially the same as in 2014, only the code was changed.			
Purpose of programme	Pressures in the marine environment			
Other EU or international policies to which programme contributes	HELCOM Monitoring programmes			
Monitoring details	Radioactive substances monitoring is carried out by the Environmental Board in the frame of national environmental monitoring programme (radiation monitoring sub-programme). Monitoring in seawater, biota (fish, bladderwrack) and sediments is carried out every year at designated sites and areas in the Gulf of Finland, and long-term data series are already available. Water samples and sediment samples are collected during off-shore monitoring cruises, benthic samples are collected separately and fish samples are obtained from professional fishermen (commercial fishing). The collection and analysis of samples are guided by the HELCOM MORS guidelines and the radiation monitoring sub-programme of the national environmental monitoring programme. Water samples from the Baltic Sea are collected from five stationary stations agreed in the framework of the HELCOM marine monitoring programme. The concentration of Cs-137 and K-40 in the surface water samples of the Gulf of Finland is determined by gamma spectrometry.			
Ecosystem components, anthropogenic pressures and activities monitored	Contaminants - non UPBT substances			
	Elements monitored	Cesium-137		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in biota (total), Concentration in sediment (total), Concentration in water
		K-40		
		GES criteria addressed	D8C1 Contaminant in environment	
			Parameters monitored	Concentration in biota (total), Concentration in sediment (total), Concentration in water
Spatial zones monitored	Coastal waters (WFD), Territorial waters			
Start(and end) date of the programme	1997-9999			
Frequency of the monitoring	Yearly			

Type of monitoring	In-situ sampling coastal, In-situ sampling offshore
Data management and access	The data collected during the monitoring are stored at the Environmental Board but also submitted to the national monitoring database KESE. Monitoring data are reported to the HELCOM Combine database as well (and to the Helcom MORS working group).
Indicators to which the programme contributes	BALEED8C1.63 - Cesium-137
Contact	Environmental Board: Monika Lepasson: monika.lepasson@keskkonnaamet.ee; Estonian Environment Agency: Anastasiia Kovtun-Kante, anastasiia.kovtun-kante@envir.ee; Arthur Kivi, arthur.kivi@envir.ee
References	The monitoring programme is approved by the minister of the environment and available at https://www.envir.ee/et/eesmargid-tegevused/merekeskkonna-kaitse/meres trateegia (https://www.envir.ee/sites/default/files/mereala_seireprogramm_2021_2026.pdf) (in Estonian).

<table>
<tr><td>MONITORING PROGRAMME</td><td colspan="4">BALEE-D08-34_OilPollution - Oil spills</td></tr>
<tr><td>Introduction/overview of programme</td><td colspan="4">The aim of the programme is to detect oil spills in the Estonian marine waters. It provides data to monitoring strategy “SD8 – Contaminants” and is related to GES Descriptor D8, Criterion D8C3 (and D8C1). Data are gathered by regular aerial surveillance flights and remote sensing. The extent, duration and volume of oil spills are estimated. The program is regionally coordinated and the HELCOM Response manual (Ch. 7: CO-OPERATION ON AERIAL SURVEILLANCE OVER THE BALTIC SEA AREA) is followed. Data are yearly reported to HELCOM.
The programme corresponds to the following monitoring programmes in the indicative list: Contaminant inputs – acute pollution events, incl. oil spills.
The programme is essentially the same as in 2014, only the code was changed.</td></tr>
<tr><td>Purpose of programme</td><td colspan="4">Pressures in the marine environment,
Human activities causing the pressures,
Effectiveness of measures</td></tr>
<tr><td>Other EU or international policies to which programme contributes</td><td colspan="4">International Convention for the Prevention of Pollution from Ships,
International Convention on Oil Pollution Preparedness, Response and Co-operation,
HELCOM Monitoring programmes,
Protocol on Preparedness, Response and Co-operation to pollution Incidents by Hazardous and Noxious Substances</td></tr>
<tr><td>Monitoring details</td><td colspan="4">Oil pollution is monitored by the Estonian Police and Border Guard Board. The remote observation is performed either by satellite or aerial surveys (ordered and patrol flights), which provides the detection of pollution. The satellite images also contain additional information about the possible level of pollution alert. Three alert levels – green, yellow and red – are distinguished depending on pollution seriousness. When pollution is detected, an aircraft or ship is sent to assess the situation. There are also regular flights conducted 2-3 times a week on certain routes. In case of flight monitoring during daylight hours, the extent and volume of pollution shall be determined visually by the operator in accordance with HELCOM methods. In the dark time, the radar device provides information on the extent of the pollution.
To detect oil pollution, satellite images are ordered and patrol flights are organized in the Estonian sea area. Patrols are coordinated with Finland by a Memorandum of Understanding (MoU), under which the Gulf of Finland is covered by patrols even if one of the parties is unable to do so at some reason. The rest of the Estonian sea area is covered only by Estonian patrol flights.</td></tr>
<tr><td rowspan="4">Ecosystem components, anthropogenic pressures and activities monitored</td><td colspan="4">Acute pollution events</td></tr>
<tr><td rowspan="3">Elements monitored</td><td colspan="3">Not Applicable</td></tr>
<tr><td rowspan="2">GES criteria addressed</td><td colspan="2">D8C3 Acute pollution events</td></tr>
<tr><td>Parameters monitored</td><td>Extent,
Amount on water surface</td></tr>
<tr><td>Spatial zones monitored</td><td colspan="4">Coastal waters (WFD),
Territorial waters,
EEZ (or similar)</td></tr>
<tr><td>Start(and end) date of the programme</td><td colspan="4">2000-9999</td></tr>
<tr><td>Frequency of the monitoring</td><td colspan="4">Continually</td></tr>
<tr><td>Type of monitoring</td><td colspan="4">Remote satellite imagery,
Remote surveillance</td></tr>
<tr><td>Data management and access</td><td colspan="4">The data are stored at Joint Rescue Coordination Centre - JRCC Tallinn.</td></tr>
<tr><td>Contact</td><td colspan="4">Maritime security centre (Joint Rescue Coordination Centre - JRCC Tallinn): jrcc@politsei.ee.</td></tr>
</table>

References	The monitoring programme is approved by the minister of the environment and available at https://www.envir.ee/et/eesmargid-tegevused/merekeskkonna-kaitse/meres trateegia (https://www.envir.ee/sites/default/files/mereala_seireprogramm_2021_2026.pdf) (in Estonian).

MONITORING PROGRAMME	BALEE-D08-35_BirdsWashedAshore - Birds – mortality due to oil pollution (birds washed ashore)			
Introduction/overview of programme	The aim of the programme is to assess the impact of oil pollution on water birds. It provides data to monitoring strategy "SD8 – Contaminants" and is related to GES Descriptor D8, Criteria D8C2 and D8C4, and potentially provides data for monitoring strategy „SD1.1 – Biological diversity – Birds". Data are gathered to assess the impact of human-induced pressures. Monitoring is conducted twice a year (spring and autumn) by counting dead birds washed ashore along the selected monitoring sites (on beaches). The species and their contamination by oil are recorded, and data are reported as the number of dead birds per 1 km of coastline. The monitoring program is regionally not coordinated yet. Data are yearly reported to the national environmental monitoring database KESE (by 1 March). The programme corresponds to the following monitoring programmes in the indicative list: Mobile species – mortality/injury rates from other human activities. The programme is essentially the same as in 2014, only the code was changed.			
Purpose of programme	Environmental state and impacts, Pressures in the marine environment, Effectiveness of measures			
Other EU or international policies to which programme contributes	Birds Directive			
Monitoring details	The monitoring is carried out twice a year in four designated areas: in spring, usually in April and May, when migratory waterbirds have not left yet, and in autumn, usually in late October or early November, when the autumn migration of birds is ending. In some monitoring areas additional winter and spring observations have also been conducted at the initiative of observers. The number of dead birds is characterized by the density (number of individuals/km). At certain monitoring area, all dead birds or their remains washed ashore are counted. Residues that are difficult to determine are collected with reference material for later determination. In addition, dead seals found during the observations are recorded. The main parameters obtained as a result of monitoring are the density of dead waterbirds (individuals/ km) and the proportion of oil-stained waterbirds of all found waterbirds (%). The monitoring is carried out in frames of the national environmental monitoring programme (Wildlife diversity and landscape monitoring subprogramme, monitoring activity Birds washed ashore).			
Ecosystem components, anthropogenic pressures and activities monitored	Adverse effects on species or habitats			
	Elements monitored	Not Applicable		
		GES criteria addressed	D8C4 Adverse effects of acute pollution events	
			Parameters monitored	Abundance (number of dead individuals, ind/km); Age distribution; Distribution (pattern); Proportion of oil-stained waterbirds of all found dead waterbirds (%); Sex; Presence of oil contamination on the body
	Input of litter (solid waste matter, including micro-sized litter)			
	Elements monitored	Not Applicable		
		GES criteria	D10C4 Adverse effects of litter	

		addressed	Parameters monitored	Number of individuals, which are adversely affected due to litter
	Acute pollution events			
	Elements monitored	Not Applicable		
		GES criteria addressed	D8C3 Acute pollution events	
			Parameters monitored	Presence
Spatial zones monitored	Coastal waters (WFD)			
Start(and end) date of the programme	1992-9999			
Frequency of the monitoring	Other (specify)			
Type of monitoring	Visual observation			
Data management and access	Data and reports are yearly submitted to the national environmental monitoring database KESE.			
Contact	Estonian Environment Agency: Piret Kiristaja, piret.kiristaja@envir.ee; Anastasiia Kovtun-Kante, anastasiia.kovtun-kante@envir.ee; Arthur Kivi, arthur.kivi@envir.ee.			
References	The monitoring programme is approved by the minister of the environment and available at https://www.envir.ee/et/eesmargid-tegevused/merekeskkonna-kaitse/meres trateegia (https://www.envir.ee/sites/default/files/mereala_seireprogramm_2021_2026.pdf) (in Estonian).			

MONITORING PROGRAMME	BALEE-D10-36_MacroLitter - Macrolitter – characteristics and abundance/volume on coast and seabed			
Introduction/overview of programme	The aim of the programme is to monitor the abundance of macrolitter and litter items on the coast and at the seabed. It provides data to monitoring strategy "SD10 – Litter" and is related to GES Descriptor D10, Criterion D10C1. Data are gathered to assess the pressure levels in the marine environment, environmental status in coastal waters and efficiency of measures. Seabed litter monitoring is conducted yearly in some monitoring transects (in areas with human impact and background sites) or at least once during six years. For beach litter, monitoring is conducted annually three times a year. The monitoring programme is regionally coordinated via HELCOM – the HELCOM guidelines for monitoring of beach litter are followed (joint monitoring strategy is regionally agreed). For litter at seabed regionally coordinated data collection is agreed, but data are delivered separately by each country and monitoring guidelines are under development. Monitoring of floating litter and ingested litter is not regionally coordinated. Data are yearly reported to the national environmental monitoring database KESE. The threshold values for the indicators are preliminarily set, but need to be agreed at EU level. The programme corresponds to the following monitoring programmes in the indicative list: Litter - characteristics and abundance/volume on coast, water surface, seabed. The programme has been changed since 2014, marine macrolitter monitoring is also conducted at benthic habitats' transects now. The code of the programme was also changed.			
Purpose of programme	Environmental state and impacts, Pressures in the marine environment, Human activities causing the pressures, Effectiveness of measures			
Other EU or international policies to which programme contributes	HELCOM Monitoring programmes, Monitoring programme targeting at national legislation, Waste Framework Directive			
Monitoring details	Beach litter monitoring is conducted annually at up to 10 monitoring areas (in case of rotation at least once every 3 years). The annual monitoring includes three observation periods - spring, summer and autumn. The quantities of litter on the seabed are monitored on a project basis yet (ordered by the Ministry of the Environment or the Environment Agency), at least once every six years, as the quantities of litter are small.			
Ecosystem components, anthropogenic pressures and activities monitored	Litter in the environment			
	Elements monitored	Macrolitter (all)		
		GES criteria addressed	D10C1 Litter (excluding micro-litter)	
			Parameters monitored	Amount on coastline, Amount on seabed, Litter type and material; Litter item
Spatial zones monitored	Coastal waters (WFD), Territorial waters, EEZ (or similar)			
Start(and end) date of the programme	2012-9999			
Frequency of the monitoring	Other (specify)			
Type of monitoring	Visual observation, Remote surveillance			
Data management and access	The data and reports are submitted to the national environmental monitoring database KESE. Beach litter data are also reported to the EMODnet.			

Indicators to which the programme contributes	BALEED10C1.2.1 - Macrolitter on seafloor in coastal sea [natural areas], BALEED10C1.2.2 - Macrolitter on seafloor in coastal sea [areas affected by human activity], BALEED10C1.1 - Contamination ratio of beach litter
Contact	Estonian Environment Agency: Anastasiia Kovtun-Kante, anastasiia.kovtun-kante@envir.ee; Arthur Kivi, arthur.kivi@envir.ee.
References	The monitoring programme is approved by the minister of the environment and available at https://www.envir.ee/et/eesmargid-tegevused/merekeskkonna-kaitse/meres trateegia (https://www.envir.ee/sites/default/files/mereala_seireprogramm_2021_2026.pdf) (in Estonian).

MONITORING PROGRAMME	BALEE-D10-37_MicroLitter - Litter micro-particles – abundance in water, sediment, and organisms			
Introduction/overview of programme	The aim of the programme is to monitor the abundance of micro-particles in water (sea surface), sediments and marine organisms. It provides data to monitoring strategy "SD10 – Litter" and is related to GES Descriptor D10, Criterion D10C2, potentially as well D10C3 and D10C4. Data are gathered to assess the pressure levels in the marine environment, environmental status in coastal waters and off-shore sub-basins of the Baltic Sea (HELCOM sub-divisions), inputs of litter and effectiveness of measures. Monitoring is conducted yearly or at least once in six years with a seasonal coverage of three samplings a year for monitoring of micro-particles in water. Sampling from sediments is done once a year (rotation is used) and from organisms project-based researches are carried out. The program is not regionally coordinated, but HELCOM guidelines are under development. Data are yearly reported to the environmental monitoring database KESE (by 1 March). Threshold values for the indicators are preliminarily set, but need to be agreed regionally or at the European level (incl for criteria). The programme corresponds to the following monitoring programmes in the indicative list: Litter micro-particles - abundance/volume in water, sediment; Litter/micro-litter in biota. The programme and its code have been changed since 2014, micro-litter in sediments and ingested micro-litter are also covered by the programme now.			
Purpose of programme	Environmental state and impacts, Pressures in the marine environment, Effectiveness of measures, Pressures at source			
Monitoring details	Trawling the water surface layer and seabed sediment sampling are conducted for monitoring the microlitter in the marine environment. For ingested microlitter monitoring, fish and mussels are collected.			
Ecosystem components, anthropogenic pressures and activities monitored	Micro-litter in the environment			
	Elements monitored	Artificial polymer materials		
		GES criteria addressed	D10C2 Micro-litter	
			Parameters monitored	Amount in biota (ingested); Type of litter; Material; Amount
	Input of litter (solid waste matter, including micro-sized litter)			
	Elements monitored	Not Applicable		
		GES criteria addressed	D10C4 Adverse effects of litter	
			Parameters monitored	Amount of microlitter; Litter type; Load
Spatial zones monitored	Coastal waters (WFD), Territorial waters, EEZ (or similar)			
Start(and end) date of the programme	2016-9999			
Frequency of the monitoring	Yearly			
Type of monitoring	In-situ sampling coastal, In-situ sampling offshore			
Data management and access	The data and reports are submitted to the national environmental monitoring database KESE.			
Indicators to which the programme contributes	BALEED10C2.1 - Microlitter in the surface layer of the water column, BALEED10C2.2 - Microlitter in seabed sediment, BALEED10C3.1 - The amount of microlitter ingested by marine animals			
Contact	Estonian Environment Agency: Anastasiia Kovtun-Kante, anastasiia.kovtun-kante@envir.ee; Arthur Kivi, arthur.kivi@envir.ee.			

References	The monitoring programme is approved by the minister of the environment and available at https://www.envir.ee/et/eesmargid-tegevused/merekeskkonna-kaitse/meres trateegia (https://www.envir.ee/sites/default/files/mereala_seireprogramm_2021_2026.pdf) (in Estonian).

<table>
<tr><td>MONITORING PROGRAMME</td><td colspan="4">BALEE-D11-38_AcuteNoise - Impulsive underwater noise – distribution, frequency and levels</td></tr>
<tr><td>Introduction/overview of programme</td><td colspan="4">The aim of the programme is to monitor the spatial and temporal distribution and levels of anthropogenic impulsive sound. It is related to GES Descriptor D11, Criterion D11C1 and monitoring strategy „SD11 – Underwater noise“. Data are gathered to assess the duration per calendar year of impulsive sound sources in the ICES squares of the Baltic Sea. Monitoring is conducted yearly by collecting data on impulsive noise events. Data are collated from seismologic monitoring, registers of licenced events such as pile driving, controlled explosions from naval operations and other activities that release energy. The program data collection is regionally coordinated via HELCOM, but data are delivered by each country separately. Data are reported to the ICES impulsive noise event database once at the end of the year.
The programme corresponds to the following monitoring programmes in the indicative list: Impulsive underwater noise - distribution, frequency and levels.
The programme essentially the same as in 2014, only code has been changed.</td></tr>
<tr><td>Purpose of programme</td><td colspan="4">Pressures in the marine environment,
Human activities causing the pressures</td></tr>
<tr><td>Monitoring details</td><td colspan="4"></td></tr>
<tr><td rowspan="4">Ecosystem components, anthropogenic pressures and activities monitored</td><td colspan="4">Input of anthropogenic sound (impulsive, continuous)</td></tr>
<tr><td rowspan="3">Elements monitored</td><td colspan="3">Not Applicable</td></tr>
<tr><td rowspan="2">GES criteria addressed</td><td colspan="2">D11C1 Anthropogenic impulsive sound</td></tr>
<tr><td>Parameters monitored</td><td>Number of disturbance days</td></tr>
<tr><td>Spatial zones monitored</td><td colspan="4">Coastal waters (WFD),
Territorial waters,
EEZ (or similar)</td></tr>
<tr><td>Start(and end) date of the programme</td><td colspan="4">2011-9999</td></tr>
<tr><td>Frequency of the monitoring</td><td colspan="4">Yearly</td></tr>
<tr><td>Type of monitoring</td><td colspan="4">Remote surveillance,
Administrative data collection</td></tr>
<tr><td>Data management and access</td><td colspan="4">Data are reported to the ICES impulsive noise event database once at the end of the year. The data on seismic monitoring is stored at the Geological Survey and as reports in the national environmental monitoring database KESE.</td></tr>
<tr><td>Contact</td><td colspan="4">Tallinn University of Technology (Department of Civil Engineering and Architecture): Aleksander Klauson: aleksander.klauson@taltech.ee.</td></tr>
<tr><td>References</td><td colspan="4">The monitoring programme is approved by the minister of the environment and available at https://www.envir.ee/et/eesmargid-tegevused/merekeskkonna-kaitse/meres trateegia (https://www.envir.ee/sites/default/files/mereala_seireprogramm_2021_2026.pdf) (in Estonian).</td></tr>
</table>

MONITORING PROGRAMME	BALEE-D11-39_DiffuseNoise - Continuous underwater noise – distribution, frequency and levels			
Introduction/overview of programme	The aim of the programme is to monitor the spatial and temporal distribution of anthropogenic low-frequency continuous noise. It is related to GES Descriptor D11, Criterion D11C2 and monitoring strategy „SD11 – Underwater noise“. Ambient sound is measured by autonomous submersible marine recorders. Monitoring is conducted continuously by 2-3 deployments per year in one monitoring station and once per six years in additional monitoring stations. Data are processed and presented as sound pressure level time series that are further statistically analysed and used for the calibration of the sound propagation model. Modelling is aiming in the calculation of the monthly soundscape maps to assess the spatial distribution of the ambient sound. The programme data collection is regionally coordinated via HELCOM (data are delivered by each country separately) and the HELCOM guidelines are followed. Data are reported to the ICES continuous noise database once at the end of the year. The programme corresponds to the following monitoring programmes in the indicative list: Continuous underwater noise - distribution, frequency and levels. The programme and its code have been modified since 2014, one site was added to the programme (continuous measurements in the Gulf of Finland) and project-based measurements.			
Purpose of programme	Pressures in the marine environment, Human activities causing the pressures			
Monitoring details	Ambient sound is measured by autonomous submersible marine recorders - 15-45 minutes/hour with recording frequency 24 kHz. Recordings are processed and sound pressure levels and exceedances of levels (%) that characterise the temporal variability of ambient noise are found. The modelling of the level and distribution of continuous underwater noise is carried out in cooperation with the HELCOM contracting parties once in the 6-year assessment period. Vessel traffic data is used as input and the model is calibrated using underwater noise monitoring data.			
Ecosystem components, anthropogenic pressures and activities monitored	Input of anthropogenic sound (impulsive, continuous)			
	Elements monitored	Not Applicable		
		GES criteria addressed	D11C2 Anthropogenic continuous low-frequency sound	
			Parameters monitored	Sound pressure level
Spatial zones monitored	Territorial waters, EEZ (or similar), Coastal waters (WFD)			
Start(and end) date of the programme	2014-9999			
Frequency of the monitoring	Continually			
Type of monitoring	Remote surveillance, Numerical modelling			
Data management and access	The raw data are stored at the Tallinn University of Technology, processed data are reported to ICES. Data reported to the ICES becomes available at the end of the monitoring year, modelled soundmaps - next year, by 1 of March.			
Indicators to which the programme contributes	BALEED11C2.1 - Sound pressure level			
Contact	Tallinn University of Technology (Department of Civil Engineering and Architecture): Mirko Mustonen, mirko.mustonen@taltech.ee; Aleksander Klauson, aleksander.klauson@taltech.ee.			

References	The monitoring programme is approved by the minister of the environment and available at https://www.envir.ee/et/eesmargid-tegevused/merekeskkonna-kaitse/meres trateegia (https://www.envir.ee/sites/default/files/mereala_seireprogramm_2021_2026.pdf) (in Estonian).

MONITORING PROGRAMME	BALEE-D00-40_MarineAndCoastalActivities - Marine and coastal activities			
Introduction/overview of programme	The aim of the monitoring programme is to collect data on human activities that directly or indirectly impact the marine environment. The monitored human activities are those listed in the MSFD Annex III Table 2b (2017/845/EC) and relevant for point (c) of Article 8(1), and Articles 10 and 13. The following activities are covered: Coastal defence and flood protection; Offshore structures (other than for oil/gas/renewables); Restructuring of seabed morphology, including dredging and depositing of materials; Extraction of minerals; Extraction of oil and gas, including infrastructure; Extraction of water; Renewable energy generation (wind, wave and tidal power), including infrastructure; Transmission of electricity and communications (cables); Fish harvesting (professional, recreational); Fish and shellfish processing; Marine plant harvesting; Hunting and collecting for other purposes; Aquaculture — marine, including infrastructure; Transport infrastructure; Transport — shipping; Waste treatment and disposal; Tourism and leisure infrastructure; Tourism and leisure activities; Military operations and Research, survey and educational activities. Data are gathered at least once during a six-year assessment period, but in some cases also annually. The system of such data collection activities is still under development. The programme corresponds to the following monitoring programmes in the indicative list: Activities extracting living resources (fisheries including recreational, marine plant harvesting, hunting and collecting); Activities extracting non-living resources (sand, gravel, dredging); Activities producing food (aquaculture); Activities with permanent infrastructures (e.g. renewable energy, oil & gas, ports) or structural changes (e.g. coastal defences); Sea-based mobile activities (shipping, boating); Coastal human activities (e.g. tourism, recreational sports, ecotourism). The programme is the further development of the programme presented in 2014. The code of the programme also changed.			
Purpose of programme	Pressures in the marine environment, Human activities causing the pressures, Pressures at source, Effectiveness of measures			
Other EU or international policies to which programme contributes	Maritime Spatial Planning Directive, Monitoring programme targeting at national legislation, Data Collection Framework Multi-Annual Plan (Common Fisheries Policy), Water Framework Directive, Urban Waste Water Treatment Directive, Nitrates Directive, National Emission Ceilings Directive, Stockholm Convention on persistent organic pollutions (POPs), Minamata Convention on Mercury, Convention on Long-Range Transboundary Air Pollution, International Convention for the Control and Management of Ships' Ballast Water and Sediments, Bathing Water Directive, Habitats Directive, Birds Directive			
Monitoring details				
Ecosystem components, anthropogenic pressures and activities monitored	Coastal defence and flood protection			
	Elements monitored	Not Applicable		
		GES criteria addressed	GES component not relevant	
			Parameters monitored	Length of defence structure; Coastline pressure index
	Offshore structures (other than for oil/gas/renewables)			

Elements monitored	Not Applicable		
	GES criteria addressed	GES component not relevant	
		Parameters monitored	Area of structure; Area pressure index
Restructuring of seabed morphology, including dredging and depositing of materials			
Elements monitored	Not Applicable		
	GES criteria addressed	GES component not relevant	
		Parameters monitored	Soil volume; Extent; Area pressure index
Extraction of minerals (rock, metal ores, gravel, sand, shell)			
Elements monitored	Not Applicable		
	GES criteria addressed	GES component not relevant	
		Parameters monitored	Mining volume; Mining area; Area pressure index
Extraction of oil and gas, including infrastructure			
Elements monitored	Not Applicable		
	GES criteria addressed	GES component not relevant	
		Parameters monitored	Pipe length (area); Area pressure index
Extraction of water			
Elements monitored	Not Applicable		
	GES criteria addressed	GES component not relevant	
		Parameters monitored	Volume
Renewable energy generation (wind, wave and tidal power), including infrastructure			
Elements monitored	Not Applicable		
	GES criteria addressed	GES component not relevant	
		Parameters monitored	Area; Area pressure index
Transmission of electricity and communications (cables)			
Elements monitored	Not Applicable		
	GES criteria addressed	GES component not relevant	
		Parameters monitored	Cable length (area); Area pressure index
Fish and shellfish harvesting (professional, recreational)			
Elements monitored	Not Applicable		
	GES criteria addressed	GES component not relevant	
		Parameters monitored	Catch; By-catch
Marine plant harvesting			
Elements monitored	Not Applicable		
	GES criteria addressed	GES component not relevant	
		Parameters monitored	Amount (kg); Area
Hunting and collecting for other purposes			
Elements monitored	Not Applicable		
	GES criteria addressed	GES component not relevant	
		Parameters monitored	Number of individuals hunted by species (waterbirds, seals)
Aquaculture – marine, including infrastructure			
Elements monitored	Not Applicable		
	GES criteria addressed	GES component not relevant	
		Parameters monitored	Production (tonnes); Area; Nutrient load

	Transport infrastructure			
	Elements monitored	Not Applicable		
		GES criteria addressed	GES component not relevant	
			Parameters monitored	Area; Volume (goods and passengers); Number of load and unload operations supervision inspections (including number of complaints)
	Transport – shipping			
	Elements monitored	Not Applicable		
		GES criteria addressed	GES component not relevant	
			Parameters monitored	Number of ships (incl. number of ships complying with international environmental requirements); Number of ports; Acute pollution incidents; Protection capacity; Plans on pollution control in ports and handling plans of ship-generated and cargo waste
	Waste treatment and disposal			
	Elements monitored	Not Applicable		
		GES criteria addressed	GES component not relevant	
			Parameters monitored	Areas of dumping sites and volume of dumped material
	Tourism and leisure infrastructure			
	Elements monitored	Not Applicable		
		GES criteria addressed	GES component not relevant	
			Parameters monitored	Number of marinas per coastline; Length of beach
	Tourism and leisure activities			
	Elements monitored	Not Applicable		
		GES criteria addressed	GES component not relevant	
			Parameters monitored	Number of vacationists; Number of visits; People's environmental awareness level; Number of environmentally friendly tourism sites and campaigns
	Military operations (subject to Article 2(2))			
	Elements monitored	Not Applicable		
		GES criteria addressed	GES component not relevant	
			Parameters monitored	Number of explosions; Number of trainings; Training area
	Research, survey and educational activities			
	Elements monitored	Not Applicable		
		GES criteria	GES component not relevant	

		addressed	Parameters monitored	Volume of costs on marine researches; Number of researches; Number of use of scientific tools and equipment (sonars); Duration of use of scientific tools and equipment (sonars)
	Input of anthropogenic sound (impulsive, continuous)			
	Elements monitored	Not Applicable		
		GES criteria addressed	GES component not relevant	
			Parameters monitored	Level of sound, Number of disturbance days - Impulsive underwater noise; Sound pressure level - continuous underwater noise
	Input of litter (solid waste matter, including micro-sized litter)			
	Elements monitored	Not Applicable		
		GES criteria addressed	GES component not relevant	
			Parameters monitored	Amount on coastline, Amount in water column, Amount on seabed, Amount in sediments; Litter type and material
	Input of nutrients – diffuse sources, point sources, atmospheric deposition			
	Elements monitored	Not Applicable		
		GES criteria addressed	GES component not relevant	
			Parameters monitored	Pollution load (tonnes/year) - N, P, BHT5
	Input of other substances (e.g. synthetic substances, non-synthetic substances, radionuclides) – diffuse sources, point sources, atmospheric deposition, acute events			
	Elements monitored	Not Applicable		
		GES criteria addressed	GES component not relevant	
			Parameters monitored	Pollution load (tonnes/year) - Hg, Cd, Cu, Pb, Zn, Ni, Cr
Spatial zones monitored	Coastal waters (WFD), Territorial waters, EEZ (or similar)			
Start(and end) date of the programme	2015-9999			
Frequency of the monitoring	Other (specify)			
Type of monitoring	Administrative data collection			
Data management and access	The data are compiled from different databases of different institutions. The compilation and collection of data are coordinated by the Marine Environment Department of the Ministry of the Environment.			
References	The monitoring programme is approved by the minister of the environment and available at https://www.envir.ee/et/eesmargid-tegevused/merekeskkonna-kaitse/meres trateegia (https://www.envir.ee/sites/default/files/mereala_seireprogramm_2021_2026.pdf) (in Estonian).			