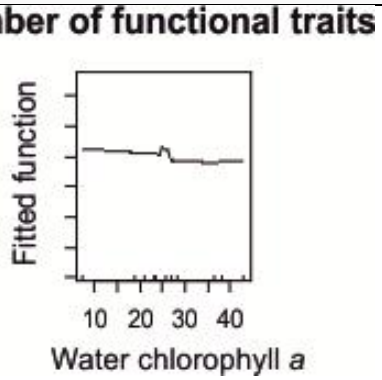
Name of indicator	2.13 Number of functional traits (NFT)
Type of Indicator	State indicator
Author(s)	Jonne Kotta, Merli Pärnoja
Description of the indicator	One of the most promising of the recently proposed approaches to measure community functional diversity is Biological Traits Analysis. Biological traits analysis uses a series of life history, morphological and behavioural characteristics of species present in assemblages to indicate aspects of their ecological functioning. The roles performed by benthic species are important for regulating ecosystem processes and these roles are determined by the biological traits species exhibit. The approach aims to provide a description of multiple aspects of functioning based on features of the biological ecosystem component. It does this by utilising specific species traits as indicators of functioning and examining the occurrence of these traits over assemblages. Community structure is governed by habitat variability and the biological traits exhibited by organisms will provide information about how they behave and respond to stress, thereby indicating the state of the environment.
Relationship of the indicator to marine biodiversity	The development of this diversity index is based on the evidence that the presence of various functional groups in a community hints the functional diversity and ecosystem services performed by the community.
Relevance of the indicator to different policy instruments	There is a potential to use the indicator for assessment of MSFD descriptors 1, 2, 4, 5, 6 and in the frame of the Habitats Directive.
Relevance to commission decision criteria and indicator	1.6. Habitat condition 1.6.1. Condition of the typical species and communities 1.7. Ecosystem structure 1.7.1. Composition and relative proportions of ecosystem components (habitats and species)
Method(s) for obtaining indicator values	Biological Traits Analysis is based on habitat template theory, which states that species' characteristics evolve in response to habitat constrain. Community structure is governed by habitat variability and the biological traits exhibited by organisms will provide information about how they behave and respond to stress, thereby indicating the state of the environment. BTA uses a number of analyses to describe patterns of biological trait composition over entire assemblages (i.e. the types of trait present in assemblages and the relative frequency with which they occur). The NFT index counts the number of functions (biological traits) in the system. Higher number of such functions reflects elevated functional diversity and, thus, such communities are able to provide more ecosystem services compared to those having smaller number of functions. In the current index the observed benthic invertebrate species were classified according to their mobility (mobile and non-migratory) and feeding type (suspension feeders, herbivores, deposit-feeders, and carnivores) based on literature (Bonsdorff and Pearson, 1999) and field observations. Benthic macrophyte species were classified according to their growth form (coarsely branched, filamentous, sheet, thick leathery).
Documentation of relationship between indicator and pressure	The index responded differentially to the studied environmental variables. The links between environmental variables and index were always the strongest at 5 km spatial scale. At smaller spatial scales the index reflected changes to local ice conditions and/or coastal topography. At 5 km spatial scale, however, the index followed the variability in coastal eutrophication. Thus, this is the scale where eutrophication processes are likely to have the largest effects on coastal environment and at which the impacts of eutrophication on coastal biota should be assessed. The NFT index gradually decreased with elevating eutrophication i.e. mainly with increasing chl a values. However, the relationship was not very strong. An explanation of the observed relationship is as follows. The biomass of macrophyte biomass is a function of nutrient availability and that of benthic invertebrates by macrophytes. However, an increasing eutrophication of the Baltic Sea ecosystem favours fast growing species and decreases a chance of perennial benthic function to be observed. Consequently, species and functional diversity is expected to decrease with eutrophication (Kotta *et al.* 2013).
Geographical relevance of indicator	2. Regional
How Reference Conditions (target values/thresholds) for the indicator were obtained?	Due to the lack of historical data of required spatial resolution and extent, the reference condition was set at the upper tail (95th percentile) of the natural variability of the index value in the MARMONI pilot area. This expert judgement is based on the current status of the marine coastal ecosystems and on the established probability distribution of the index value. According to these criteria the reference condition of NFT index was set at 6.6.
Method for	GES was determined using the European Union Water Framework Directive classification

determining GES	scheme for water quality in the Estonian coastal areas. Specifically, among the eutrophication related variables water chlorophyll a was best related to the NFT index. Thus, in order to set GES value, a functional relationship between pressure levels (e.g. chl a values) and index values was established (the BRT modelling). Then, the existing boundary of chl a between moderate and good water quality class was used to define the GES boundary of NFT index. According to the established criteria the GES value of NFT index was 6.2.
References	Bonsdorff, E. & T. H. Pearson, 1999: Variation in the sublittoral macrozoobenthos of the Baltic Sea along environmental gradients; a functional-group approach. Aust. J. Ecol. 24: 312−326. Kotta, J., Orav-Kotta, H., Pärnoja, M. 2013. Role of physical water properties and environmental disturbances on the diversity of coastal macrophyte and invertebrate communities in a brackish water ecosystem. WIT Transactions on Ecology and the Environment, WIT Press, 77 – 88.
Illustrative material for indicator documentation	 **Supplementary figure**. The Boosted Regression Tree model on the functional relationship between eutrophication variable and the index calculated at 5 km spatial scale. As a proxy of eutrophication we used the MODIS satellite derived water chlorophyll a values. The frequency of satellite observations was generally weekly over the whole ice-free period, however, several observations were discarded due to cloudiness. The spatial resolution of satellite data was 1 km. In general, increasing eutrophication is associated with elevated Chl a and kd values in our study area.