Name of indicator	4.5 Breeding waterbird index (BWBI)
Type of Indicator	State indicator
Author(s)	Ainars Auniņš, Leif Nilsson, Andres Kuresoo, Leho Luigujõe, Antra Stīpniece
Description of the indicator	This is a multi-species indicator and it reflects status of breeding waterbird community compared to base (reference) level. All regularly breeding species ecologically connected with the Baltic Sea during breeding period are included in calculation of the indicator. Computationally this indicator is similar to farmland bird index (one of the EU Sustainable development indicators) and other wild bird indices that are calculated for breeding land birds (Gregory *et al*. 2005, Gregory, van Strien 2010). The multi-species index is calculated from single species indices (the indicator *Abundance index of breeding waterbird species*). Species to be included in the calculation of the Baltic-wide version of this indicator are: *Cygnus olor, Melanitta fusca, Somateria mollissima, Aythya marila, Tadorna tadorna, Alca torda, Uria aalge, Cepphus grylle, Larus canus, Larus argentatus, Larus marinus, Sterna caspia, Sterna hirundo, Sterna paradisaea, Sterna sandvicensis, Sterna albifrons, Phalacrocorax carbo*. For those species having populations breeding inland, Species lists for national and subbasin versions of this indicator are country and subbasin specific.
Relationship of the indicator to marine biodiversity	The indicator reflects health of breeding waterbird communities connected with marine environment. In this type of multi-species indicator (geometric mean of the single species indices) both abundance and diversity of its forming species is taken into account (Gregory, van Strien 2010).
Relevance of the indicator to different policy instruments	MSFD descriptor 1 (habitat level/Condition of the typical species and communities and ecosystem level/Composition and relative proportions of ecosystem components (habitats and species)
Relevance to commission decision criteria and indicator	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	Field data collection: using any of the standard recording methods for breeding birds. Indicator calculation**:** The indicator is calculated from single species indices (see Abundance index of breeding waterbird species) using geometric mean. Every species is treated equally (i.e. no weighting). Standard errors are calculated using formula $\mathrm{var}(\bar{I}) \approx \left(\frac{I}{T}\right)^2 \sum_i \left(\frac{\mathrm{var}(I_i)}{I_i^2}\right)$, where Ī – multi-species index value, T – number of indices (species), It – species abundance index value
Documentation of relationship between indicator and pressure	This multispecies indicator is affected by all pressures acting on species forming the indicator. Thus the indicator responds to ensemble of following pressures: coastal development eutrophication hazardous substances predation by non-native species (e.g. American Mink) fisheries discards climate change To a lesser extent also: oil pollution/shipping by-catch wind energy sand and gravel extraction Latest knowledge and summary of related studies on response of marine waterbird species to important pressures are given in Skov *et al*. 2011.
Geographical relevance of indicator	2. Regional 3. National waters 4. Baltic Sea wide
How Reference	Reference conditions (GES thresholds) are set at 30% on both sides from base population

Conditions (target values/thresholds) for the indicator were obtained?	level (i.e. mean population during 1991 - 2000 period). Thus indicator can be considered being at GES if it falls between 70 and 130% (ICES 2013).
Method for determining GES	Currently GES levels have been set arbitrarily at 30% on both sides from base population level (ICES 2013). More ecological studies are needed to set more precise and better justified GES thresholds or to choose different time period to serve as base level.
References	Gregory R.D., van Strien A.J., Vorisek P., Gmelig Meyling A.W., Noble D.G., Foppen R.P.B. et Gibbons D.W. (2005): Developing indicators for European birds. Philosophical Transactions of the Royal Society B 360: 269-288. Gregory, R.D., van Strien, A. (2010): Wild bird indicators: using composite population trends of birds as measures of environmental health. Ornithological Science 9 (1): 3-22. ICES. 2013. Report of the Joint ICES/OSPAR Ad hoc Group on Seabird Ecology (AGSE), 28-29 November 2012, Copenhagen, Denmark. ICES CM 2012/ACOM:82, 30 pp. Skov. H., Heinänen S., Žydelis R., Bellebaum J., Bzoma S., Dagys M., Durinck J., Garthe S., Grishanov G., Hario M., Kieckbusch J.J., Kube J., Kuresoo A., Larsson K., Luigujõe L., Meissner W., Nehls H.W., Nilsson L., Petersen I.K., Roos M.M., Pihl S., Sonntag N., Stock A., Stipniece A., Wahl J. 2011. Waterbird Populations and Pressures in the Baltic Sea. Nordic Council of Ministers, Copenhagen, 201 pp. Wetlands International 2010. Guidance on waterbird monitoring methodology: Field Protocol for waterbird counting. Report prepared by Wetlands International.