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| **Name of indicator** | 4.4 Abundance index of breeding waterbird species |
| **Type of Indicator** | State indicator |
| **Author(s)** | Ainars Auniņš, Leif Nilsson, Andres Kuresoo, Leho Luigujõe, Antra Stīpniece |
| **Description of the indicator** | This is a single species indicator and it reflects level of breeding population of particular species compared to base year (or reference level). Index is calculated for all species that are regularly recorded as breeders at coastal areas of the Baltic Sea and marine environment is important for them in this part of the season.<br><br>Baltic-wide indicators are calculated separately for each of the following species: *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*. Species lists for national and subbasin versions of these indicators are country and subbasin specific. |
| **Relationship of the indicator to marine biodiversity** | The indicator reflects status of important components of the marine biodiversity. |
| **Relevance of the indicator to different policy instruments** | MSFD descriptors 1 (species level/population size and habitat level/condition of typical species) and 4 (abundance trends of functionally important selected species).<br><br>Birds Directive (this indicator is needed for Article 12 reporting to report long-term and short-term population trend of all regularly occurring breeding coastal and marine waterbird species.<br><br>HELCOM CORESET (developed for several species using breeding data collected from national coordinators) |
| **Relevance to commission decision criteria and indicator** | 1.2. Population size<br>1.2.1. Population abundance and/or biomass<br>1.6.1. Condition of the typical species and communities |
| **Method(s) for obtaining indicator values** | Field data collection: using any of the standard recording methods.<br><br>Indicator calculation**:** The index gives species population abundance relative to population at base time (period). Average breeding population during 1991 - 2000 period is suggested as base level. To obtain the population index, site and year specific counts of individuals of particular species are related to site and year effects (factors) and missing values are imputed from the data of all surveyed sites.<br><br>Freeware program TRIM is available to produce annual indices based on loglinear models (Pannekoek & van Strien 1998). In addition to annual indices, TRIM allows the estimation of trends over the whole period. |
| **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:<br><br>coastal development<br><br>eutrophication<br><br>hazardous substances<br><br>predation by non-native species (e.g. American Mink)<br><br>fisheries discards<br><br>climate change<br><br>To a lesser extent also:<br><br>oil pollution/shipping<br><br>by-catch<br><br>wind energy<br><br>sand and gravel extraction<br><br>Latest knowledge and summary of related studies on response of marine waterbird species to important pressures are given in *Skov et al*. 2011. |
| **Geographical** | 2. Regional |

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| **relevance of indicator** | 3. National waters<br>4. Baltic Sea wide |
| **How Reference Conditions (target values/thresholds) for the indicator were obtained?** | Reference conditions (GES thresholds) are set at 30% on both sides from base population level (i.e. mean population during 1991 - 2000 period). Thus indicator for each particular species 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 species specific GES thresholds as well as to choose different and species specific time periods reflecting base population levels. |
| **References** | Ekroos J., Fox A.D., Christensen T.K., Petersen I.K., Kilpi M., Jonsson J.E., Green M., Laursen K., Cervencl A., de Boer P., Nilsson L., Meissner W., Garthe S., Öst M. 2012. Declines amongst breeding Eider *Somateria mollissima* numbers in the Baltic/Wadden Sea flyway. Ornis Fennica 89:81–90.<br><br>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.<br><br>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.<br><br>Van Strien, A.J., Pannekoek, J. et Gibbons, D.W. (2001): Indexing European bird population trends using results of national monitoring schemes: a trial of a new method. Bird Study 48: 200-213.<br><br>Wetlands International 2010. Guidance on waterbird monitoring methodology: Field Protocol for waterbird counting. Report prepared by Wetlands International. |

**Illustrative material for indicator documentation**

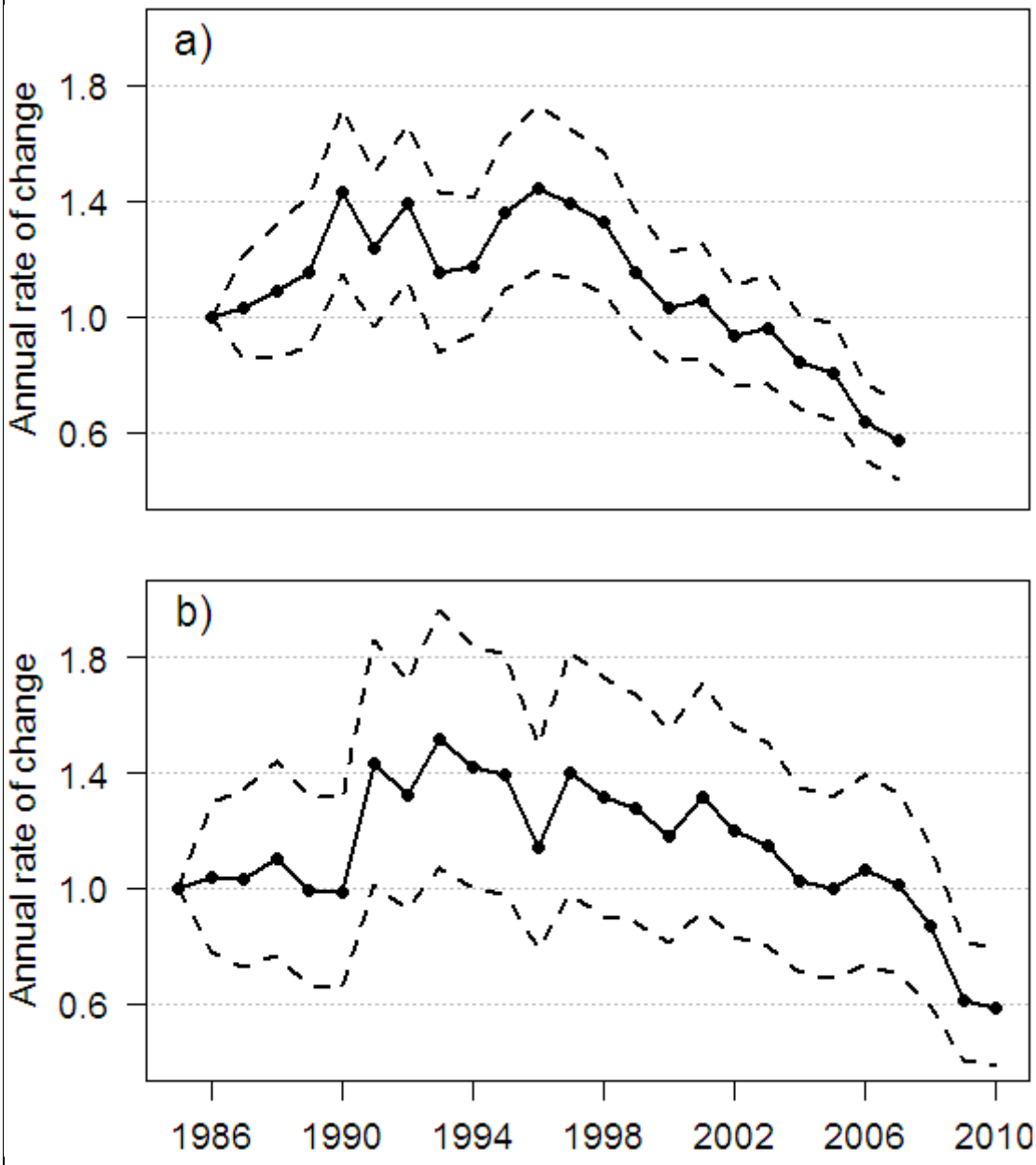


Figure 1. Population development of the Eider in (a) Finland during 1986–2007 and (b) Sweden during 1985–2010 (Ekroos et al 2012