

Name of indicator	4.12 Proportion of oiled waterbirds
Type of Indicator	Pressure indicator
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Description of the indicator	This indicator reflects impact and specific pressure of oil pollution to waterbirds in marine environment. The indicator shows the proportion of birds in the collected population sample (or alternatively an index reflecting relative abundance of oiled birds) having been affected by oiling. The indicator can have single species and multi-species versions. Single-species version of the indicator is calculated separately for each species. This allows identifying species being more affected by oiling as the impact can vary among the species. The following species need to be considered: <i>Gavia arctica</i>, <i>Gavia stellata</i>, <i>Somateria mollissima</i>, <i>Polysticta stelleri</i>, <i>Clangula hyemalis</i>, <i>Melanitta nigra</i>, <i>Melanitta fusca</i>, <i>Alca torda</i>. Multi-species version of the indicator is calculated as a single measure for all waterbirds (i.e. all species pooled). This allows assessing total impact on waterbird community.
Relationship of the indicator to marine biodiversity	The indicator reflects impact and pressure of oil pollution to birds in marine environment. Thus it shows condition of particular species at species level (single-species version) as well as condition of habitat typical species at habitat level (multi-species version).
Relevance of the indicator to different policy instruments	MSFD descriptor 1 (habitat level/condition of typical species). Birds Directive (Article 12 requires reporting on existing impacts and threats to all regularly occurring wintering marine waterbird species).
Relevance to commission decision criteria and indicator	1.3. Population condition 1.3.1. Population demographic characteristics (e.g. body size or age class structure, sex ratio, fecundity rates, survival/mortality rates) 1.6.1. Condition of the typical species and communities
Method(s) for obtaining indicator values	Field data collection: Two data collection methods have been suggested: Using beached bird survey approach (Camphuysen 1989) where rate of oiled birds among dead birds is assessed. The following information is recorded in each patrol: date, site, observer, length of the patrolled segment, length of segment with visible oil contamination and for each bird found on the beach also species, presence of oil in feathers, type of body found. It has been argued that counts of oiled carcasses result in underestimate of the indicator as large part of birds affected by oil pollution are killed and removed by various predators instead of being stranded (Larsson, Tyden 2005), however, as predation equally affects also birds that have been affected by other impacts such as diseases, starvation etc., the recorded proportion of oiled birds among all stranded birds is still a valid measure. Using proportion of oiled birds that drowned in the fishing nets (i.e. proportion of oiled birds in by-catch) Using visual observations as suggested by Larsson, Tyden (2005). In this case absolute numbers of birds affected by oiling are used instead of the proportion as the number of birds that can be treated as absolute number of birds present (needed for calculation of the proportion) is unknown. Oiled birds more likely move closer to the coast than unaffected individuals thus oiled birds are more likely to be observed during coastal surveys than individuals not affected by oiling. Thus in these conditions the proportion of oiled birds will give overestimate of the impact. To obtain field data for the indicator, constant routes with constant observation spots are needed where all birds that can be defined as being oiled are counted. Birds are considered as being oiled if oil spots can be observed in their plumage or bird behaviour suggests it (bird is continuously preening specific part of its body) Indicator calculation: the proportion based indicator is expressed as proportion (%) of oiled birds from all birds collected in the specific survey. If visual observations are used, the indicator value is expressed as an abundance index, i.e. abundance of oiled birds in a particular year relative to abundance of oiled birds at base year (time period) or it is standardised as a density - number of observed oiled individuals per route unit. 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	This indicator has a direct relationship to oil pollution as a pressure. Impact of oil pollution on marine birds (and thus also relationship of this indicator to the oiling pressure) has been described in a number of articles (Camphuysen 1989, 1998, Camphuysen, van Franeker

and pressure	1992, Camphuysen, Heubeck 2001, Fleet, Reineking 2001, Wiese, Ryan 2003, Larsson, Tyden 2005, Žydelis <i>et al.</i> 2006, Skov <i>et al.</i> 2011)
Geographical relevance of indicator	1. Local 2. Regional 3. National waters 4. Baltic Sea wide
How Reference Conditions (target values/thresholds) for the indicator were obtained?	GES target value for this indicator is 0. GES threshold should be put slightly above 0, however precise value need to be defined yet. Threshold values will be different depending on field method used for data collection due to different measurement scale. Meanwhile trend based GES reference conditions can be used - if there is a significant increasing trend in the value of this indicator, the indicator cannot be at GES. A negative trend of this indicator suggests improvement in ecological status and thus the indicator might be considered as being in GES.
Method for determining GES	The GES target value has been set at value which indicates that marine bird populations are not being affected by the particular pressure (oiling). GES threshold level has not been set and approach will differ depending on the field method used for data collection. If indicator is expressed as a proportion - a constant GES level set at value at which the population can still be regarded as sustainable can be used. If indicator is expressed as an abundance index of oiled birds, the GES thresholds might be site specific due to different levels of oiling pressure in the particular site at base time. While precise GES threshold level cannot be set, a positive trend in this indicator suggest that the indicator can be considered as not being at GES, while negative trend suggests the opposite.
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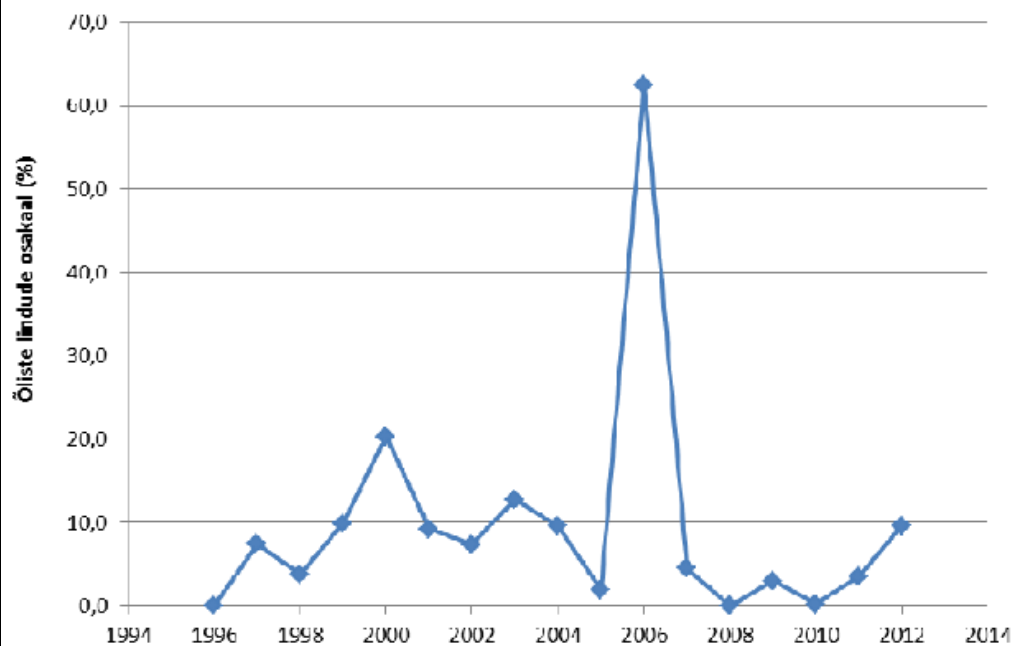


Figure 1. Proportion of oiled waterbirds in north-western Estonia in the spring surveys of beached birds (1996 - 2012) (Nellis 2013).

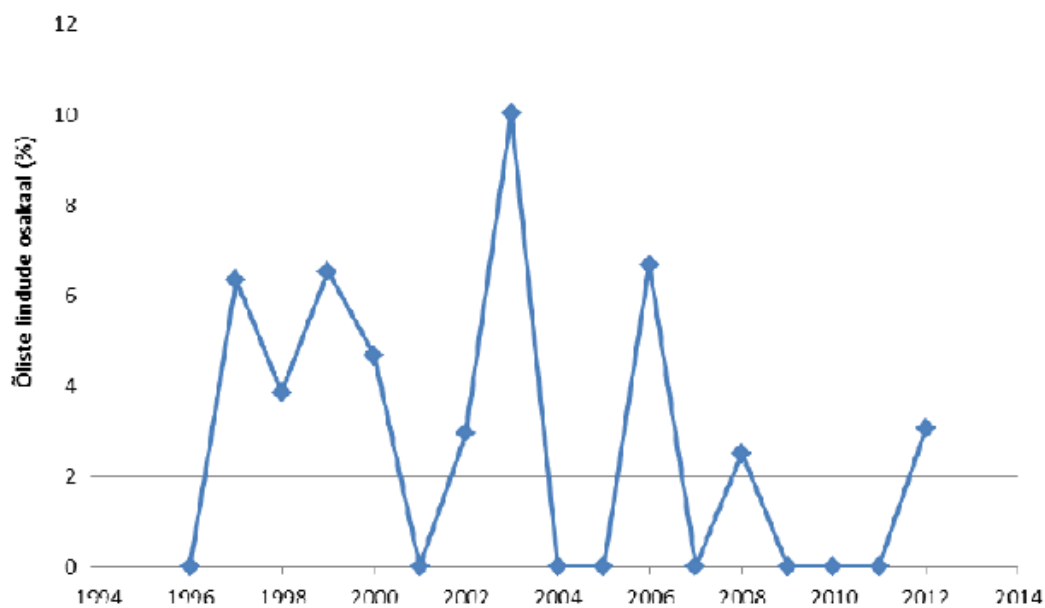


Figure 2. Proportion of oiled waterbirds in north-western Estonia in the autumn surveys of beached birds (1996 - 2012) (Nellis 2013).