

<b>Name of indicator</b>	4.14 Abundance index of by-caught birds
<b>Type of Indicator</b>	Pressure indicator
<b>Author(s)</b>	Ainars Auniņš, Leif Nilsson, Andres Kuresoo, Leho Luigujõe, Antra Stīpniece
<b>Description of the indicator</b>	<p>This single-species indicator reflects mortality of birds due to drowning in fish nets (gillnets and driftnets) and thus specifically shows impact/pressure of gillnet fishery to marine birds.</p> <p>Single-species version of the indicator is calculated separately for each species. Some species are more affected by bycatch and the impact varies among the species (Žydelis <i>et al.</i> 2009). The following species need to be considered: <i>Gavia arctica</i>, <i>Gavia stellata</i>, <i>Podiceps cristatus</i>, <i>Podiceps grisegena</i>, <i>Phalacrocorax carbo</i>, <i>Aythya fuligula</i>, <i>Aythya marila</i>, <i>Somateria mollissima</i>, <i>Polysticta stelleri</i>, <i>Clangula hyemalis</i>, <i>Melanitta nigra</i>, <i>Melanitta fusca</i>, <i>Bucephala clangula</i>, <i>Mergus albellus</i>, <i>Mergus merganser</i>, <i>mergus serrator</i>, <i>Alca torda</i>, <i>Uria aalge</i>, <i>Cepphus grylle</i>.</p>
<b>Relationship of the indicator to marine biodiversity</b>	The indicator reflects impacts and specific pressure of gillnet and driftnet fishery on birds in marine environment that cause their mortality. Thus it shows condition of particular species at species level as mortality rate due to fishing activities.
<b>Relevance of the indicator to different policy instruments</b>	<p>MSFD descriptor 1 (species level/population condition).</p> <p>Birds Directive (Article 12 requires reporting on existing impacts and threats to all regularly occurring wintering marine waterbird species).</p>
<b>Relevance to commission decision criteria and indicator</b>	<p>1.3. Population condition</p> <p>1.3.1. Population demographic characteristics (e .g. body size or age class structure, sex ratio, fecundity rates, survival/ mortality rates)</p>
<b>Method(s) for obtaining indicator values</b>	<p>Field data collection: using a voluntary logbook in cooperation with fishermen. For this scheme of data collection position of vessel, catching effort (net length per time unit), number of birds drowned by species.</p> <p>Using of electronic monitoring or CCTV systems has been suggested recently (Dalskov, Kindt-Larsen 2009, Tilander, Lunneryd 2010). This includes taking high quality images of the catch and recording data on vessel position, hydraulic pressure and winch/drum rotations. The total catch record is audited by use of 4 video cameras, each filming different angles of catch handling.</p> <p>Additionally a methodology for data collection using coastal surveys and recording all beached birds as well as possible cause of their death exists. Standard methodology has been suggested by Camphuysen (1989) and has successfully been adopted on the Baltic coast (Vaitkus <i>et al.</i> 1993, 1994, Kurochkin 1993, Žydelis <i>et al.</i> 2006 and others). However, data collected this way does not show the true picture of mortality as not all drowned birds are beached later. Thus the first two data collection methods above are preferred.</p> <p>To achieve usable results and to allow assessment of by-catch impact on waterbird populations, monitoring the number of birds drowned (by species) needs to be accompanied with regular monitoring of the population size of waterbird population (Bellebaum <i>et al.</i> 2012, Degel <i>et al.</i> 2010). The latter can be achieved by collecting data for indicators 4.1 to 4.3 and 4.6 to 4.8., however, for other seasons additional fieldwork is needed.</p> <p>Indicator calculation: Indicator is expressed as number of birds drowned per 1000 m of net length per day (birds/NMD)</p>
<b>Documentation of relationship between indicator and pressure</b>	This indicator has a direct relationship to gill-net fisheries as a pressure. Relationship has been described in a number of articles (Qartyukhin, Burkanov 2000, Dagys, Židelis 2002, Kies, Tomek 1990, Miller, Skalski 2006, Žydelis <i>et al.</i> 2006, 2009, Skov <i>et al.</i> 2011)
<b>Geographical relevance of indicator</b>	<ol style="list-style-type: none"> <li>1. Local</li> <li>2. Regional</li> <li>3. National waters</li> <li>4. Baltic Sea wide</li> </ol>
<b>How Reference Conditions (target values/thresholds) for the indicator were obtained?</b>	<p>GES target value for this indicator is 0. GES threshold should be put slightly above 0, however precise value needs to be defined yet.</p> <p>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.</p>

<p><b>Method for determining GES</b></p>	<p>The GES target value has been set at value which indicates that marine bird populations are not being affected by the particular pressure (drowning in fishnets). GES threshold level has not been set. GES thresholds might be site specific due to different levels of oiling pressure in the particular site at base time.</p> <p>While precise GES threshold level cannot be set, a positive trend in this indicator suggests that the indicator can be considered as not being at GES, while negative trend suggests the opposite.</p>
<p><b>References</b></p>	<p>Artyukhin, Y.B., Burkanov, V.N., 2000. Incidental mortality of seabirds in the drift net salmon fishery by Japanese vessels in the Russian Exclusive Economic Zone, 1993–1997. In: Kondratyev, A.K., Litvinenko, N.M., Kaiser, G.W. (Eds.), <i>Seabirds of the Russian Far East</i>. Canadian Wildlife Service, Ottawa, pp. 105–116.</p> <p>Bellebaum J, Schirmeister B, Sonntag N &amp; Garthe S (2012) Decreasing but still high: bycatch of seabirds in gillnet fisheries along the German Baltic coast. <i>Aquatic Conservation: Marine and Freshwater Ecosystems</i>. DOI: 10.1002/aqc.2285.</p> <p>Dagys, M., Žydelis, R., 2002. Bird bycatch in fishing nets in Lithuanian coastal waters in wintering season 2001–2002. <i>Acta Zoologica Lituonica</i> 12 (3), 276–282.</p> <p>Dalskov J., Kindt-Larsen L. 2009. Final Report on Fully Documented Fishery. DTU Aquarapport, National Institute of Aquatic Resources, Technical University of Denmark, 49 pp.</p> <p>Degel, H., Petersen, I.K., Holm, T.E., Kahlert, J. (2010). Fugle som bifangst i garnfiskeriet. Estimat af utilsigtet bifangst af havfugle i garnfiskeriet i området omkring Ærø DTU Aqua-rapport nr. 227-2010. Charlottenlund. Institut for Akvatiske Ressourcer, Danmarks Tekniske Universitet, 56 p.</p> <p>Kies, B., Tomek, T., 1990. Bird mortality in fishing nets in the Gulf of Gdansk, Polish Baltic coast. <i>Pelagicus</i> 5, 23–27. Miller, T.J., Skalski, J.R., 2006. Estimation of seabird bycatch for North Pacific longline vessels using design- and model-based methods. <i>Canadian Journal of Fisheries and Aquatic Sciences</i> 63, 1878–1889.</p> <p>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., Stipnice A., Wahl J. 2011. <i>Waterbird Populations and Pressures in the Baltic Sea</i>. Nordic Council of Ministers, Copenhagen, 201 pp.</p> <p>Tylander D., Lunneryd S.G. 2010. Pilot Studies of Electronic Monitoring (EM) system for fisheries control of small vessels. Paper presented at the 3rd meeting of ICES Study Group for Bycatch of Protected Species, Copenhagen, February 1-4, 2010.</p> <p>Žydelis R., Dagys M., Vaitkus G. 2006. Beached Bird Surveys in Lithuania Reflect Marine Oil Pollution and Bird Mortality in Fishing Nets. <i>Marine Ornithology</i> 34: 161 – 166.</p> <p>Žydelis R., Bellebaum J., Österblom H., Vetemaa M., Schirmeister B., Stipnice A., Dagys M., van Eerden M, Garthe S. 2009. Bycatch in gillnet fisheries – an overlooked threat to waterbird populations. <i>Biological Conservation</i> 142: 1269 – 1281.</p>