Baltic Marine Environment Protection Commission

Working Group on the State of the Environment and Nature Conservation

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STATE & CONSERVATION 15-2021

Document title	Waterbird habitat quality
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Background

State & Conservation 14-2021 invited JWGBIRD to outline how baselines and threshold values are identified and established for the indicators under the umbrella of its work. This document contains the respective description of a new developed indicator assessing the status of wintering waterbird species by quantifying disturbance from human activities as a characteristic of habitat quality. The indicator serves the MSFD criterion D1C5.

The document below provides a template filled by indicator leads to provide an overview of progress to STATE & CONSERVATION 15-2021. Key aspects such as methodologies, spatial extent changes, assessment scales and threshold values are presented, identifying ongoing work and other relevant issues towards HOLAS III. This process builds on the prior review of indicator development carried out under STATE & CONSERVATION 14-2021 (summarised in document 4J-16 Rev.1, and detailed within numerous documents under agenda item 4J). The focus of these development works is the completion of indicator development and adjustment work for HOLAS III by the end of 2021, as previously agreed under HOD 57-2019 (document 4-20, Outcomes paragraph 4.51).

The aspect of threshold values in particular is a key issue as threshold value approval will be carried out at HOD 61-2021, with these same templates being submitted to HOD at the same stage as submission to State and Conservation 15-2021 (to allow for the longer national processes required that culminate in approval at HOD).

The document below addresses a single indicator and as well as the generic 'action requests' relating to endorsement of the proposed application in HOLAS III (and the threshold values proposals, where relevant), specific additional requests or statements are also indicated within the separate sections of the document to help guide where further input/discussion/guidance may be needed.

This template aims to report the indicator development for HOLAS III, allowing for technical guidance and endorsement by STATE & CONSERVATION 15-2021 and also simultaneously to facilitate the threshold value approval process by HOD 61-2021.

Action requested

The Meeting is invited to:

- provide further technical guidance to the indicator leads and experts, including specific requests defined within the document;
- consider and endorse the proposed developments of the indicator as a candidate indicator and use in the HOLAS III assessment via the application of case studies to provide supporting contextual information in the thematic assessment.

Waterbird habitat quality

Indicator name
Waterbird habitat quality
Scale of assessment for HOLAS III and rationale
In line with the other waterbird indicators, assessments for this indicator shall be conducted on the geographical scale of seven aggregated sub-basins, the latter representing HELCOM Assessment Unit Scale 2. The subdivisions are defined as follows: • A: Kattegat (Kattegat), • B: Belt Group (Great Belt, The Sound), • C: Bornholm Group (Kiel Bay, Bay of Mecklenburg, Arkona Basin, Bornholm Basin), • D: Gotland Group (Gdansk Basin, Eastern Gotland Basin, Western Gotland Basin, Gulf of Riga), • E: Åland Group (Northern Baltic Proper, Åland Sea), • F: Gulf of Finland (Gulf of Finland), • G: Bothnian Group (Bothnian Sea, The Quark, Bothnian Bay). As in the HELCOM Core Indicator *Abundance of waterbirds in the wintering season*, movements within one winter and between years would increase uncertainty of the assessment and mask the effects of human activities, which are assessed in this indicator. A practical reason to use the same scale in the abundance indicator and the habitat indicator is that the analyses for both indicators can build on the same bird data and the same initial analyses.
Spatial coverage of the indicator for HOLAS III
In principle, this indicator can be applied to the entire Baltic. A prerequisite is the availability of offshore bird data, which exist for all subdivisions of the Baltic Sea.
Methodology to be applied for HOLAS III and rationale
This indicator assesses the quality of a species' habitat. Although other features of habitat quality can be incorporated in future, the indicator currently measures how much of a species' habitat cannot be used or can be used to an only limited degree owing to disturbance from human activities. It contributes to species assessments by identifying the habitat available for a species and thus adding important information to the assessment of abundance in the HELCOM Core Indicator *Abundance of waterbirds in the wintering season*. The indicator directly addresses human activities disturbing waterbirds and their habitats. If good status is not achieved, the indicator results clearly show where the problems for the species concerned can be found. Thus, the indicator has a high potential to inform programmes of measures, for example under MSFD Article 13 or in the *Baltic Sea Action Plan*. Thus, assessing the quality of waterbird habitats has the potential to become a valuable component of bird assessments in the Baltic Sea. An overview of the assessment procedure is depicted in Fig. 1. Interim results and outcomes are shown in Fig. 2-4 on the example of the German Baltic Sea, taken from a pilot assessment, which together with a detailed description of the methodology was presented to State & Conservation 14-2021 (document 4J-24).

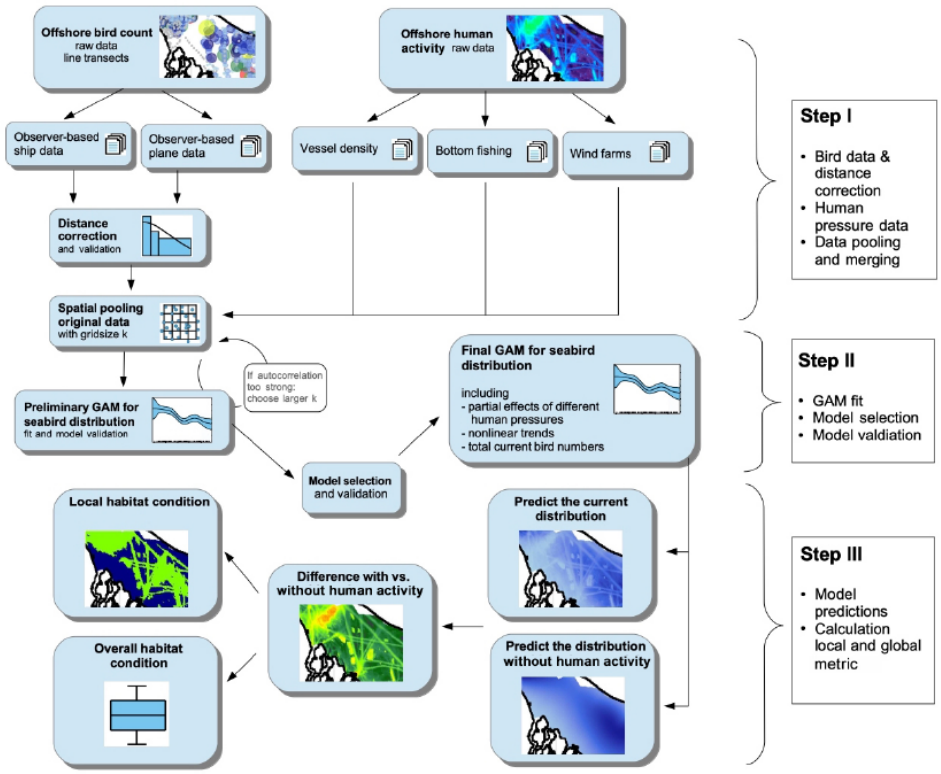

Fig. 1: Flow chart describing the assessment from raw offshore bird count and human pressure data via regression models to final local and global metrics of waterbird habitat condition.

Based on bird data, environmental data and activity data the quantitative distribution of birds (bird densities) is modelled for the actual situation (Fig. 2) and for a scenario without disturbance from activities. (Fig. 3).

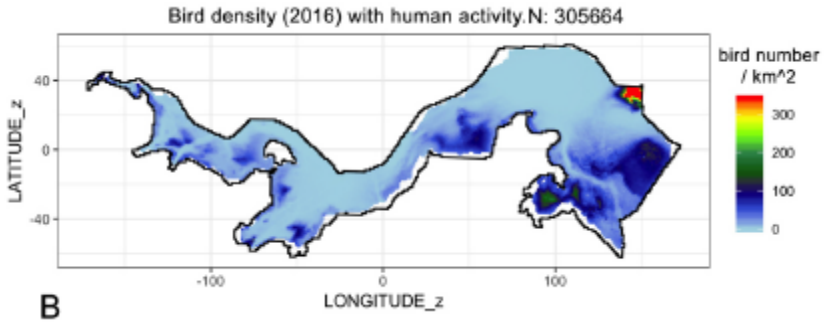

Fig. 2: Model of current long-tailed duck distribution in the German section of the Baltic Sea in winter.

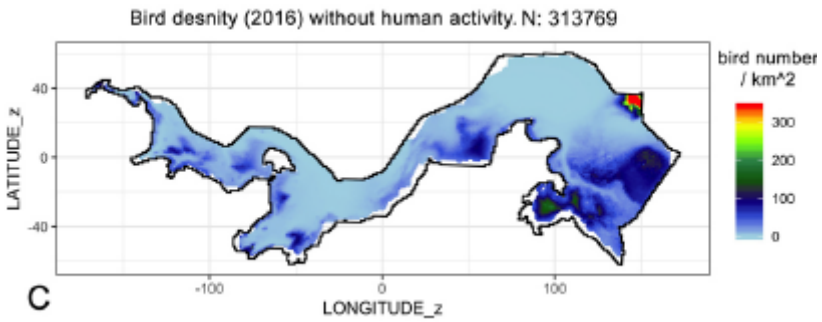

Fig. 3: Model of current long-tailed duck distribution in the German section of the Baltic Sea in winter eliminating the effects of human disturbance.

The local disturbed and undisturbed abundance is calculated for each part of the assessment area. The undisturbed abundance (X) is re-scaled from 0 (no birds) to 1 (highest predicted bird density). For each location, the re-scaled bird abundance is multiplied by the percentage of reduction of that density in the disturbed situation (Y). Thus, the local habitat condition metric (D_{local}) is

$$D_{local} = XY$$

(D_{local} can get a negative value when activities attract birds and the density is rising). An example is given in Fig. 4.

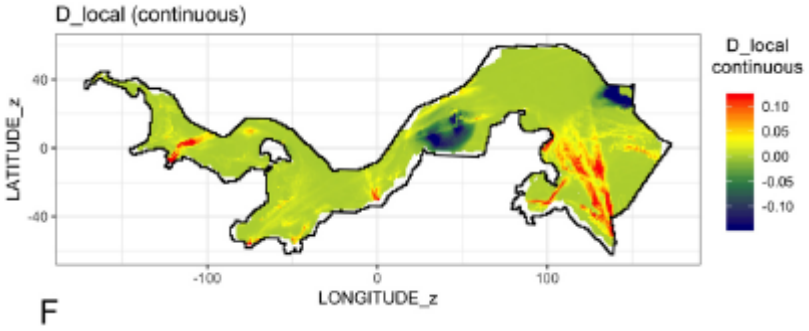

Fig. 4: Map of the metric D_{local} for long-tailed duck and each location in the German section of the Baltic Sea. D_{local} is high where high bird abundance and strong human-related declines co-localize.

The global metric for habitat condition D_{global} averages the D_{local} values for all locations given by

$$D_{global} = \sum XY / \sum X$$

This formula includes that parts of the study area without occurrence of a given species are not considered (because X=0). As the indicator shall identify the amount of habitat of a species which is disturbed, negative D_{local} values (where birds are attracted) are re-defined to Y=0. Thus, D_{global} is an expression for the proportion of individuals of a species experiencing habitat disturbance. As D_{global} is a single value for the entire assessment area, it is used as the metric of the indicator (while a map showing all D_{local} values shows where the habitat is disturbed for a species, see Fig. 4).

The indicator requires the following data, which need to be representative for the assessment period (e.g. 6-year MSFD cycle):

- At-sea bird abundance data from aerial and ship-based surveys. These are the same data as used for the HELCOM Core Indicator *Abundance of waterbirds in the wintering season*. Therefore, there is no need for neither additional monitoring nor a separate data call.
- Environmental data for use as covariates: distance to coast, water depth, chlorophyll *a* concentration, salinity, etc.). These data can be obtained from sources with public access.
- Data describing intensity of human activities: AIS signal data for shipping, swept area ratio for bottom-trawling fishery, wind farm footprints, etc. These data can be obtained from publically accessible sources, including the HELCOM Map & Data Service.

Threshold value setting logic and rationale

The setting of a threshold value should be guided by the indicator's statement that a certain proportion of birds live in habitats disturbed by human activities. For HOLAS III, a pilot assessment is being sought, for which no threshold value is currently required. The results and experiences from the pilot assessment are to serve as a basis for setting a threshold value for subsequent assessments.

The intention in setting a threshold for this indicator is to identify whether a species is not in good status because it is restricted in the use of its habitat. This is indicated by a considerable proportion of the population inhabiting habitats which are disturbed or even has lost suitable habitat because of human activities. The metric of this indicator (D_{global}) quantifies directly the proportion of a population disturbed with respect to its habitat.

There is a clear link to the policy relevance of the indicator:

The *Baltic Sea Action Plan* aspires to viable populations of the species as well as thriving and balanced communities of plants and animals. Both goals can only be achieved if species are not restricted in the use of their habitats.

In more detail, the HELCOM Recommendation 34E/1 *Safeguarding important bird habitats and migration routes in the Baltic Sea from negative effects of wind and wave energy production at sea* recommends (among other things) to

- *apply the precautionary principle by undertaking measures to avoid or minimize negative effects of wind energy facilities on birds in the Baltic Sea, such as disturbance during and after construction, including barrier effects and hampering of migration, habitat modification or loss, and collisions with turbines, through the application of ecosystem-based approach in strategic planning for wind energy facility developments in the Baltic Sea;*
- *enable appropriate planning of the use of marine space that incorporates conservation need of seabirds in the Baltic-wide context thus contributing to reaching their favourable conservation status;*
- *avoid that wind energy facilities and wave energy installations are sited in areas important for birds, and that the loss of off-shore staging habitats will be halted.*

Though yet not concretised, the threshold of this indicator would be strongly linked to the MSFD biodiversity criterion D1C5, which requires *The habitat for the species has the necessary extent and condition to support the different stages in the life history of the species* (Commission Decision 2017/848).

Threshold value(s)

No threshold value will be applied in the pilot assessment for HOLAS III.

Other significant issues that need to be addressed or presented to State and Conservation

A more detailed description of this indicator was published recently (Mercker et al. 2021).

This template was circulated among all experts of the OSPAR/HELCOM/ICES Joint Working Group on Marine Birds (JWGBIRD) for reviewing and commenting. Comments have been received from

experts in HELCOM Contracting Parties (DK, PL) and have been taken into account in the preparation of the final version.
Latest indicator report or (for new indicators) initially completed indicator template
This indicator is newly developed, therefore no indicator report is available.
References Mercker M, Dierschke V, Camphuysen K, Kreutle A, Markones N, Vanermen N & Garthe S 2021. An indicator for assessing the status of marine-bird habitats affected by multiple human activities: A novel statistical approach. Ecol. Ind. 130: 108036. https://www.sciencedirect.com/science/article/pii/S1470160X21007019