Supporting information for spatial representation of migration routes of Velvet Scoter (*Melanitta fusca)*

Introduction:

Observations of Velvet Scoter were collected from the Baltic Sea area for the HELCOM Migratory Sea Birds Workshop (MIGRATORY BIRD WS 1-2018).

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" covers both planning and ecology/conservation aspects. It was identified by the State and Conservation Working Group that one of the first steps in the process to implement the Recommendation is to spatially identify migration routes and sensitivity of a given area with regards to migration.

A workshop on migration routes of birds over the Baltic Sea was convened on 20-22 November 2018 at the premises of HELCOM Secretariat, in cooperation with the ICES/OSPAR/HELCOM Joint Working Group on Seabirds (JWG BIRD). The workshop was organized in order to support the implementation of HELCOM Recommendation 34E/1 by producing maps with migration routes of waterbird species covering the entire Baltic Sea Region. The workshop brought together data from:

i) coastal migration counts,
ii) waterbird counts at staging/stopover sites,
iii) tracking data (satellite telemetry, GPS data loggers)
iv) radar observations.

The workshop agreed to produce a written accounts, e.g. relevant information to be included with the maps as part of the metadata information, and seasonal migration maps for selected example species for which reliable information is available and to include the confidence of the expert judgement or data to these maps.

Please note that in their current form the maps are not ready to be used for planning, but that they represent examples of what can be produced with significantly higher quality, given more time and resources. The maps produced in the workshop represent the initial steps in the process to map migration and represent the available information and the most common routes for the respective birds, but they do not mean that there are no birds migrating outside of the delineated areas. Due to lack of time, no buffers, sensitivity scores nor weighting has been added to the layers.

Migration season represented

Pre-breeding (spring) migration.

Ecology and behavior of species

Velvet Scoters are migrating mostly along coastlines and during daytime (but the amount of nocturnal migration is poorly known). Spring migration ranges from March to May. The flyway population "Western Siberia & Northern Europe/NW Europe" is estimated at 320,000 to 550,000 birds (Wetlands International 2019), of which the great majority is migrating across the Baltic Sea. Flight behaviour when confronting barriers such as offshore wind farms or bridges is poorly known for the species, but evidence from related species (Common Eider, Common Scoter; Pettersson 2005, Petersen et al. 2006, Krijgsveld et al. 2011, Hill et al. 2014) suggests that wind farms are avoided (circumvented) to a large degree.

Conservation status

As a migrating bird, Velvet Scoter is protected under EU Birds Directive and the Bonn Convention on the Conservation of Migratory Species of Wild Animals (CMS). IUCN (2018) is listing the species as vulnerable (VU). The HELCOM Red List status for wintering birds in the Baltic Sea is endangered (EN), while the status

Pettersson, J. (2005): The Impact of Offshore Wind Farms on Bird Life in Southern Kalmar Sound, Sweden. Report to Swedish Energy Agency. Lunds Universitet, Lund.

Wetlands International (2019): Waterbird Population Estimates. Retrieved from wpe.wetlands.org on Monday 25 Feb 2019.

Spatial data product (map) metadata:

Categories	Filled in by Secretariat
Keywords	Filled in by Secretariat e.g. *marine birds *migration *environment
Language	English
Resource identifier (System generated ID)	Filled in by Secretariat
Legal constraints	Data product can be used, given that the source (HELCOM) and underlying data used for creating the data product (the references listed in lineage section) must be referred as original sources.
Resource Constraints	Map based on aggregated data from various sources.
Contact for the resource	HELCOM Secretariat

Technical Information

Representation type	Vector/raster
Coordinate reference system	ETRS89LAEA
Format	ESRI Shapefile / TIFF
Lineage (This is a statement on process history and/or overall quality of the spatial data set. Where appropriate it may include a statement whether the data set has been validated or quality assured, whether it is	This dataset displays spatial representation of the migration routes of **Velvet Scoter** in spring according to the HELCOM migratory sea birds workshop (MIGRATORY BIRD WS 1-2018). It is aggregated from the following data sources: <u>Visual observation of migration:</u> 1. Fehmarnbelt (DE, DK): FEMERN A/S 2013: Feste Fehmarnbeltquerung Planfeststellung-Anlage 15: Umweltverträglichkeitsstudie (UVS) – Band II B. FEMERN A/S Kopenhagen. 607 p. 2. Hiddensee (DE): Dierschke V & Helbig AJ unpubl.data 3. Kåseberga/Sandhammaren and Revsudden (SE): Data from The Swedish species gateway https://www.artportalen.se/ 4. Ottenby (SE): Rrk Öland 2017: Fågelobservationer på Öland 2016 [Bird observations on Öland 2016]. Calidris 2-3: 6-96; Rrk Öland 2018: Fågelobservationer på Öland 2017 [Bird observations on Öland 2017]. Calidris 2-3: 6-94. 5. Pape (LV): Celmins A 1989: The observations of spring migration in Pape in 1987. Putni daba 2: 88-104; Celmins A, Baumanis J, Roze V 1990: Spring migration of waterbirds on the sea near Pape in 1988. Putni daba 3: 92-104; Celmins A, Baumanis J, Roze V 1995: Spring migration of waterfowl in the sea near Pape in 1989. Putni daba 5: 17-31.