Annex 5

Supporting information for spatial representation of migration routes of Eurasian Curlew (*Numenius arquata)*

Introduction:

Observations of Eurasian Curlew 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 and post-breeding (autumn) migration.

Ecology and behavior of species

The breeding area of Eurasian Curlew ranges from W Europe to W Siberia and includes all countries around the Baltic Sea. Migration to and from the winter quarters (Norths Sea to W Africa) takes place at daytime and nocturnally, with the Baltic Sea mostly crossed at night (University of Kiel unpubl. data). Migration seasons are from March to May and from June to October, the latter including moult migration to the Wadden Sea. The flight behaviour at offshore wind farms has not been observed extensively, but is currently studied by the help of GPS data loggers (P. Schwemmer pers. comm.). There is no indication that Eurasian Curlews avoid wind farms.

Conservation status

As a migratory species, Eurasian Curlew 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 near threatened (NT).

Data type and sources

Satellite telemetry:

1. Unpublished data of University of Kiel from project “Vogelzug über dem offenen Meer: Methoden, Raum-Zeit-Muster und Konflikte mit der Offshore-Windenergienutzung (BIRDMOVE)”.

Method used and rational

Tracks of individual Eurasian Curlews equipped with satellite transmitters were generalized and geo-referenced.

Level of confidence in presented results

For communicating the degree of certainty in key findings, confidence in the validity of a finding is presented, and is expressed qualitatively.

Each contributing scientist has rated their confidence in the evidence presented. An overall confidence rating of high, medium or low is derived by qualitatively assessing both the amount and consistency of the available information (e.g. the type, amount, quality, and consistency of evidence (e.g., mechanistic understanding, theory, data, models, expert judgement) and the degree of agreement, or conflicting evidence or differing opinions). Where both are high there is high confidence about what is happening. But if either are insufficient there is a high degree of uncertainty and an overall confidence rating of low (figure 1).

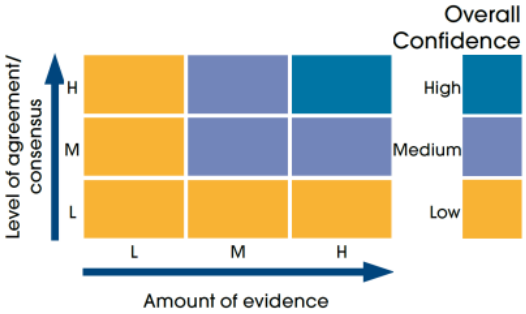


Figure 1.

Confidence in the presented information:

Medium.

Justification for confidence level:

Experts agreed in high quality information concerning the main migration route (H). The amount of evidence is medium (M), because only migration routes between the Wadden Sea and W Russian breeding areas are available. Data for birds migrating to breeding areas in N Fennoscandia and NW Russia were not available.

Knowledge gaps and resource priorities

The Eurasian curlew breeds over a large area, ranging from northwestern Europe to Siberia. The migration routes suggested here shows only flyways for parts of the population. Although not showing the exact flight paths, a review of ringing recoveries may give some further insights. Telemetric data from birds breeding in Fennoscandia or from other relevant areas not included in the data used here would of course be valuable, but if such data will be available in the future is uncertain. Further, data on flight altitudes for birds migrating over the Baltic Sea would be of importance, because they clearly would indicate the risk of collisions between the Eurasian curlew and offshore wind farms.

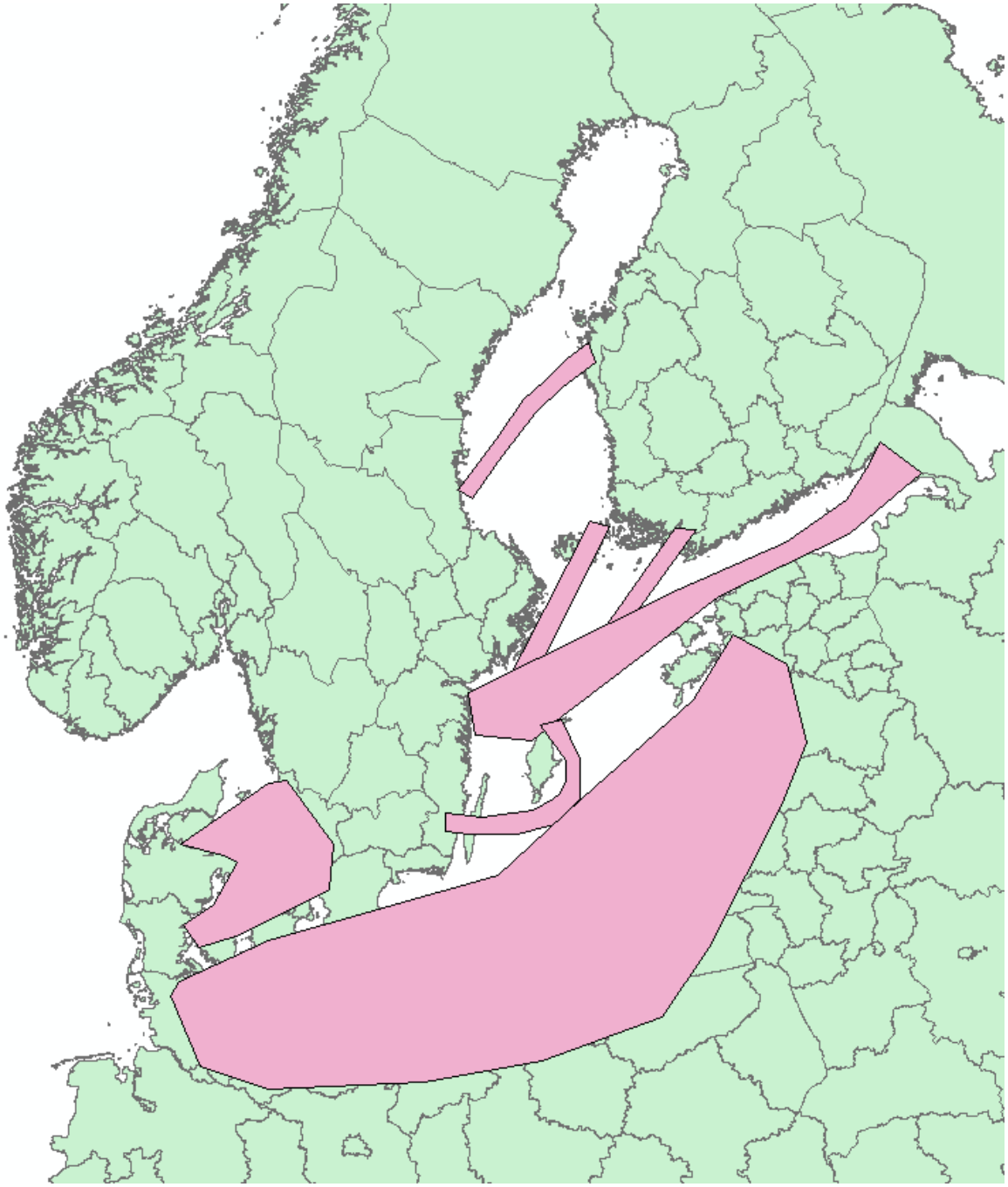
Spatial data product (map) metadata:

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

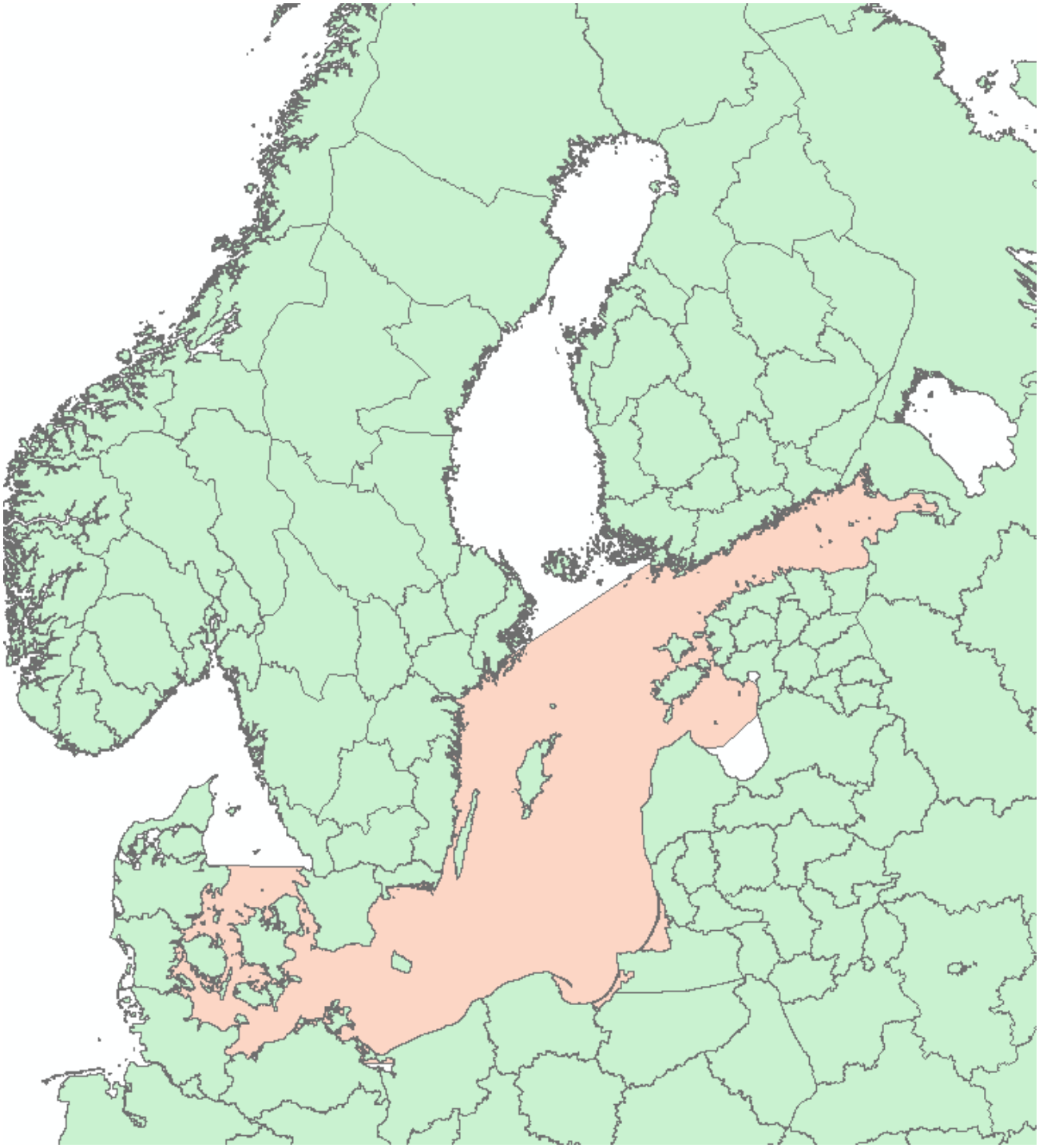
Technical Information

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 the official version (if multiple versions exist))	Origin of the dataset, e.g. This dataset displays spatial representation of the migration routes of **Eurasian Curlew** according to the HELCOM migratory sea birds workshop (MIGRATORY BIRD WS 1-2018) based on the following data sources: Satellite telemetry: 1. Unpublished data of University of Kiel from project "Vogelzug über dem offenen Meer: Methoden, Raum-Zeit-Muster und Konflikte mit der Offshore-Windenergienutzung (BIRDMOVE)".



Eurasian Curlew spring

Please note that the maps presented here are example maps and not yet ready to be used in spatial planning



Eurasian Curlew autumn