

## Planche 4: Birds flyways and windfarms

### Map 4: Migrating birds flyways and windfarms

#### Data description:

This map is composed of three layers:

1. The database on “offshore wind farms” (layer 1) in the EU was created in 2014 by CETMAR for the European Marine Observation and Data Network (EMODnet). It is the result of the aggregation and harmonization of datasets provided by several sources. It is updated every year and is available for viewing and download on EMODnet Human Activities web portal ([www.emodnet-humanactivities.eu](http://www.emodnet-humanactivities.eu)). The database contains points and/or (where available) polygons representing offshore wind farms in the following countries: Belgium, Denmark, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Netherlands, Norway, Poland, Portugal, Spain, Sweden and United Kingdom. Each point has the following attributes (where available): Name, N° of turbines, Status (Approved, Planned, Construction, Production, Test site), Country, Year, Power (MW), Distance to coast (metres) and Area (square kilometres). The distance to coast (EEA coastline shapefile) has been calculated using the UTM WGS84 Zone projected coordinate system where data fall in. Dataset was updated the 2020-03-05. Data can be downloaded on the Emodnet platform (<https://www.emodnet-humanactivities.eu/view-data.php>)
2. A second layer is composed of a set of layers, one for each of 5 migration birds. These 5 bird species have been identified by Tour du Valat as an available sample but it is very partial in terms of the number of individuals ( $n=X$  for each population), the number of populations tracked, and the number of species (it is estimated than more than 300 terrestrial bird species migrate over the Mediterranean Sea) and do not represent representative avifauna over the Mediterranean. The data were extracted from [MoveBank website](#).
3. “Important Bird and Biological Area” (layer 3) is provided by the BirdLife project (BirdLife International (2020) Important Bird and Biodiversity Area (IBA) digital boundaries: September 2020 version. BirdLife International, Cambridge, UK).

#### Mapping method:

Raw data of migration (GPS loggers fixed to the animals) were directly added to the map. Concerning windfarms, only projects for which the number of turbines is known are represented (to date, for some projects the total power is known but the number of turbines has not been decided yet).

Proportional circles for windfarms number of turbines have been built following the Flannery method<sup>1</sup>. This method compensates the people worse judging of relative areas using a technic called *apparent magnitude* scaling which increase the circle applying an exponent on the scaling factor.

The GIS layer cannot be representative of birds potentially impacted by wind farms because it is partial in terms of number of individuals for a given population also partial in terms of populations monitored

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<sup>1</sup> [https://en.wikipedia.org/wiki/Proportional\\_symbol\\_map#Apparent\\_magnitude\\_\(Flannery\)\\_scaling](https://en.wikipedia.org/wiki/Proportional_symbol_map#Apparent_magnitude_(Flannery)_scaling)

and finally partial in terms of species (here 6 species whereas it is estimated that at least 300 terrestrial species cross the Mediterranean).

### Analytical part:

All the current projects of offshore wind farms installations are located in the north part of the basin, mainly in France, Italy Albania and Greece and are located close or directly on some birds' corridors of migration. *Larus fuscus* (Lesser Black-backed Gull) seems to be the specie the most threatened by windfarms installations in the sample set of birds selected. In addition, local threats emerge: Platalea leucorodia (Euraisa spoonbill) in the south of France, Common Cuckoo *Cuculus canorus* in Albania but the type of tags used on this species (Geolocators) does not allow a precise visualization of the tracks; Honey Buzzard *Pernis apivorus* and Woodwarbler *Phylloscopus silbatrix* in the west coast of Italy; Honey Buzzard *Pernis apivorus* and Yelkouan Shearwater *Puffinus yelkouan* in the south of Italy; and Common Cuckoo *Cuculus canorus* in the Aegean Sea.

Bird trajectories represented here are only a partial and biased sample of the hundreds of species crossing the Mediterranean Sea twice a year. Hence, the cartographic representation of interspecific variation will deserve tagging many more species to document their main migratory routes. Furthermore, trajectories depend on a few numbers of birds tagged with GPS so that intra-specific variation is also poorly documented here. Despite these limitations, the map allows showing conflicts between windfarm settlement and migratory birds that would deserve further attention, including research to avoid, reduce and mitigate future implantations. That's why more data acquisition and research programmes could contribute to fill this gap especially because migratory birds decline more than non-migratory birds.

It's also important to mention that some of the windfarms project are located close to important bird and biodiversity areas (IBBA). The following graph shows the number of windfarms project in (blue) and out (red) IBBA.

