ANTICIPATING AND REDUCING THE RISK OF COLLISIONS BETWEEN FLYING SPECIES AND WIND TURBINES THROUGH MODELING OF FORAGING MOVEMENTS

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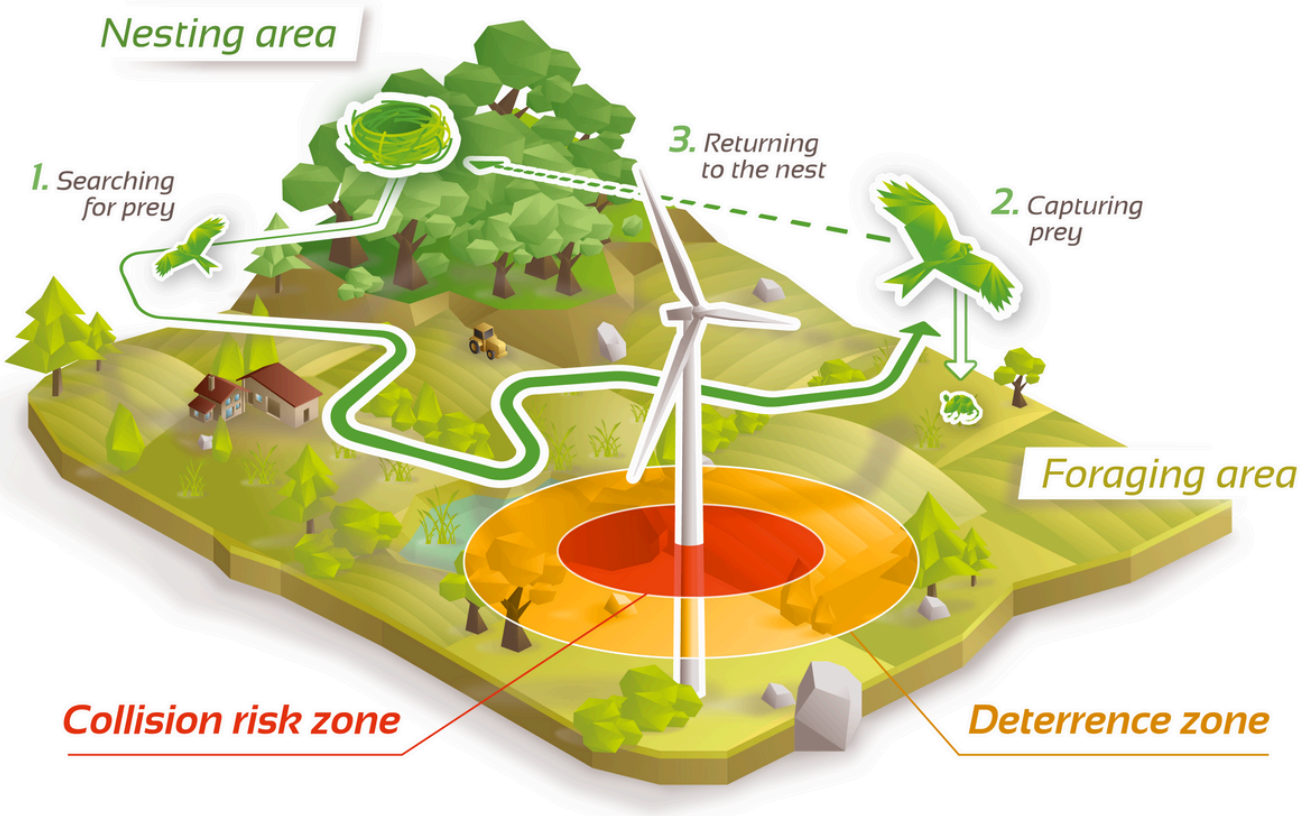
Founded in 2012, French company TerrOïko is a leader in digital and scientific solutions for biodiversity conservation and ecological engineering. For more than ten years, we have been transforming research innovations into operational technologies that are used by hundreds of public and private actors to meet their nature management and protection challenges. In particular, we have developed SimOïko, a sophisticated tool for modeling the life of species in their natural environment, which simulates the movements of individuals and the demographic dynamics of populations. In particular, we have developed SimOïko, a sophisticated tool for modeling the life of species in their natural environment, which simulates the movements of individuals and the demographic dynamics of populations. For the needs of wind farm developers and managers, SimOïko includes a specific module dedicated to analyzing the risk of collision between flying species (birds of prey, bats, etc.) and wind turbine towers and blades.

HOW IT WORKS

This module models the foraging movements of the studied species, using Central Place Foraging (CPF) algorithms:



- Individuals (adults and young) leave the nest daily to search for food resources.
- They move around the landscape, favoring their preferred natural habitats and traveling a maximum daily foraging distance.
- The probability of finding the food resources they seek depends on the type of habitat
- Once they have found the food they are looking for or traveled their maximum foraging distance, individuals return to the nest..
- Each simulation covers a full year and takes into account, depending on the species, potential periods of inactivity (species are absent), periods when only adults hunt, and periods when adults and juveniles both hunt.

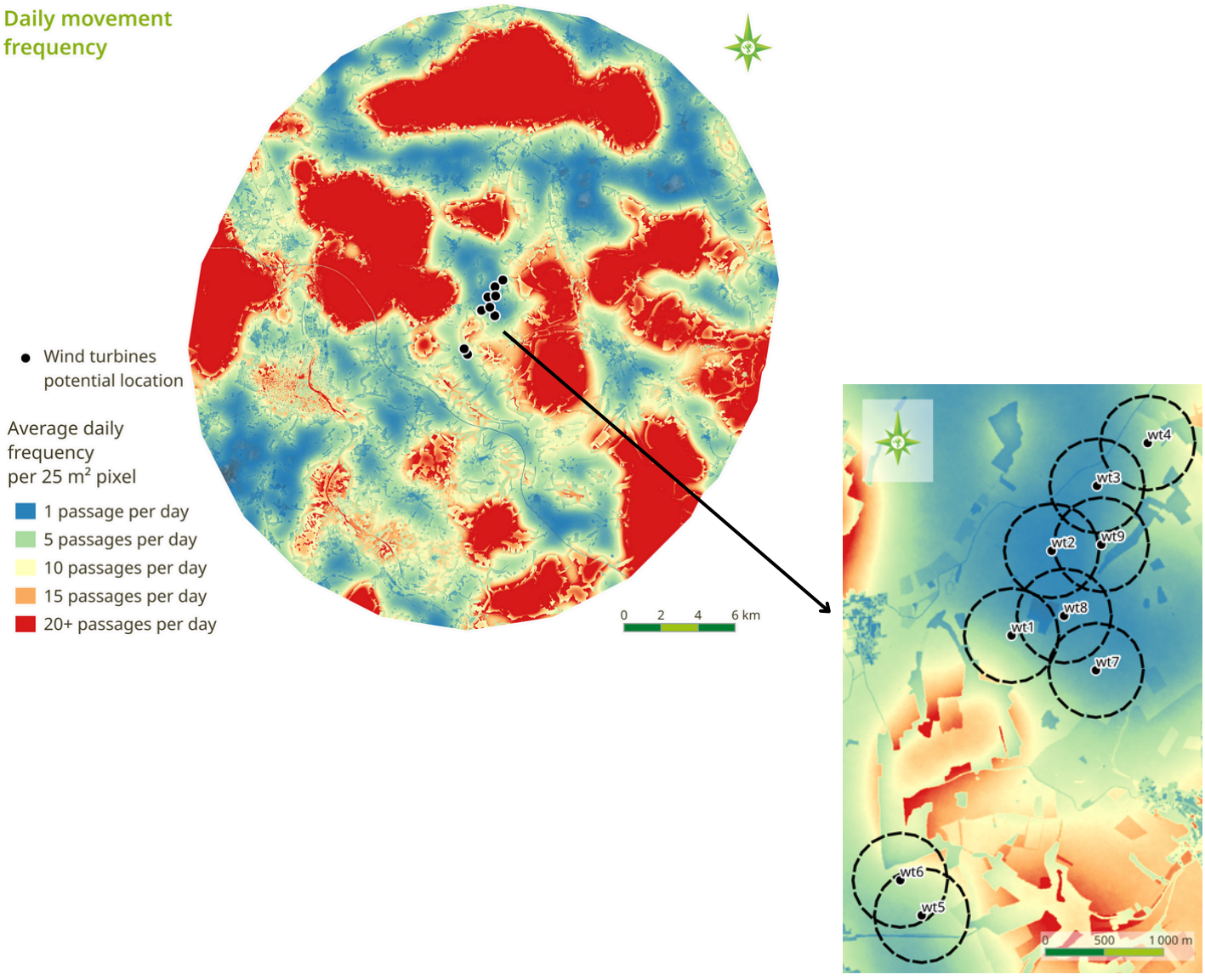
The model produces maps showing the number of annual passages of individuals at each point in the study area, particularly in sectors at risk of collision.

HOW IT CAN HELP YOU

This simulation module has been designed to help wind energy professionals anticipate the impacts of their projects, implement the mitigation hierarchy, and optimize the future operation of their facilities.

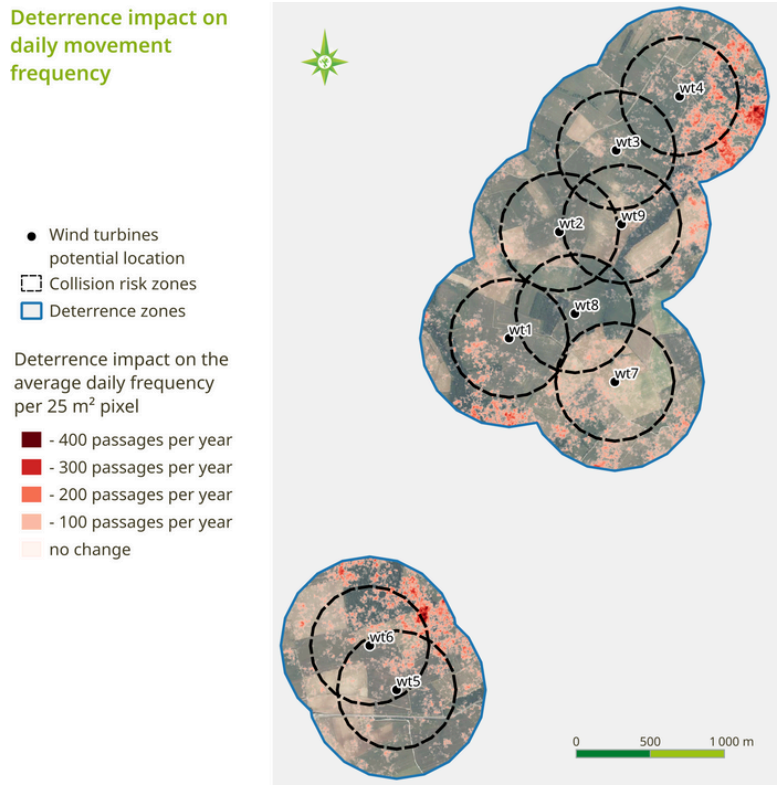
AVOID

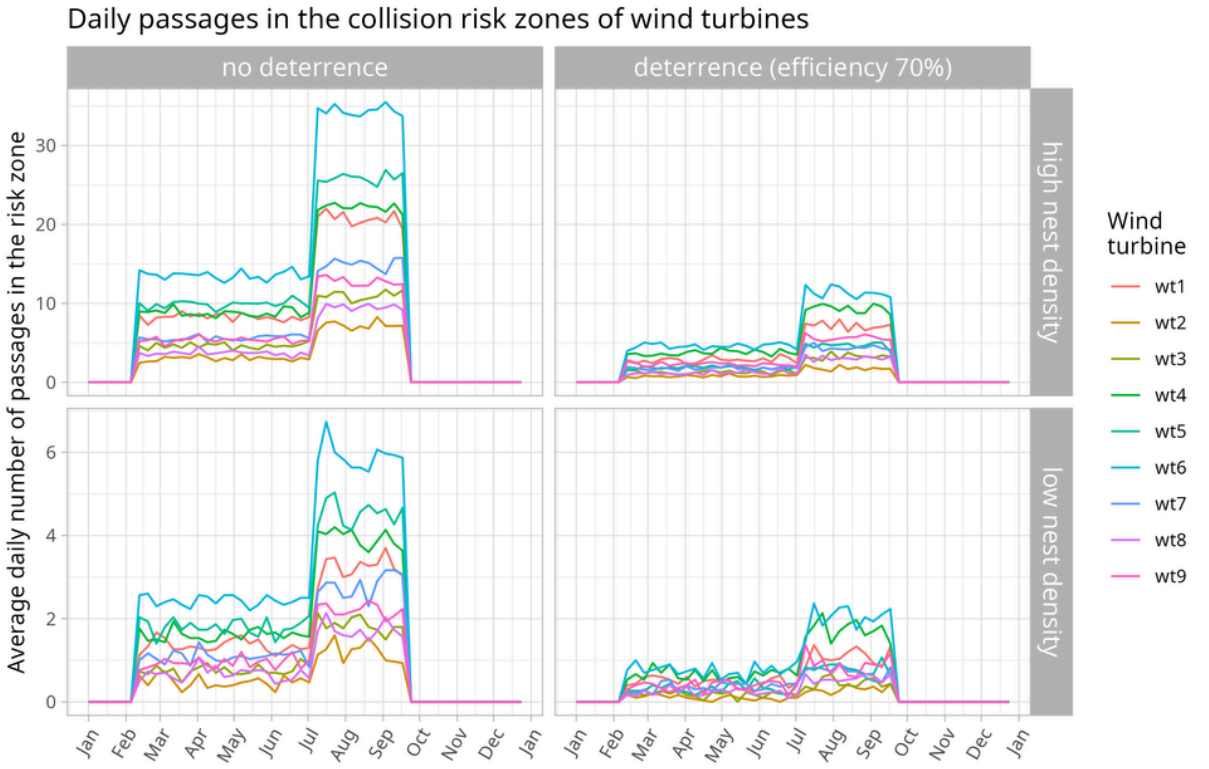
From the design stage of a project, you can identify areas to be avoided, *i.e.*, those where the probable number of individuals passing through (and therefore the risk of collision) is highest.



REDUCE

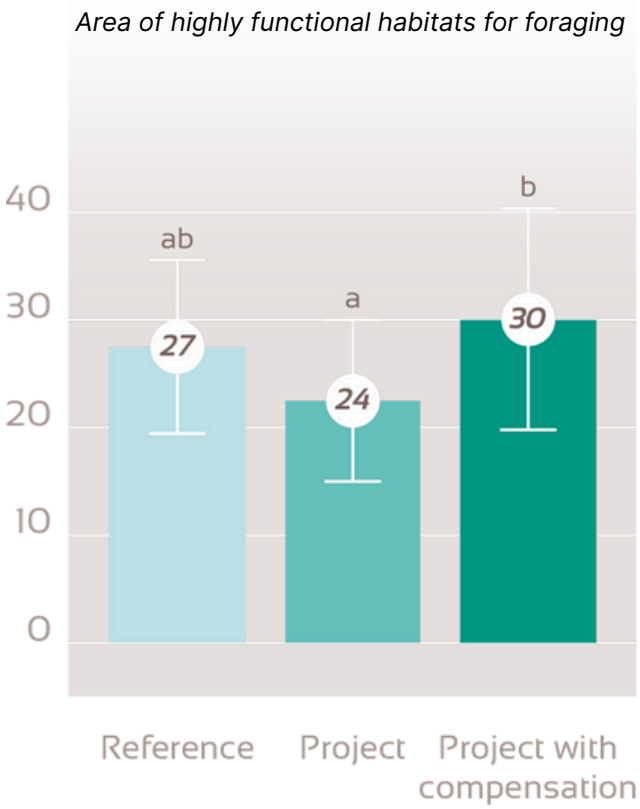
This tool allows you to test and compare the effectiveness of different collision risk reduction scenarios, for example through certain landscaping measures or the installation of deterrent systems.





If your installations are also equipped with automatic blade stop systems (when an individual is detected nearby), you can assess in advance the likely frequency of activation of these systems, estimate the resulting production losses, and identify scenarios that minimize the risk of shutdown.

OFFSET



If you need to offset impacts that cannot be avoided or reduced, SimOïko helps you identify the most suitable offset areas, i.e., those offering the best potential for foraging.

This analysis allows you to scale your offset measures, ensuring that the ecological gains they generate will be equivalent to the losses caused by the project.

WHAT INPUT DATA DO WE NEED?

1 SPECIES CHARACTERISTICS

Species characteristics (reproduction, survival, attractiveness of natural habitats, maximum travel distances, etc.): we set these parameters based on existing scientific knowledge.

2 LAND USE

We collect and compile this data from national sources and integrate your own data when available.

3 INITIAL NEST LOCATIONS:

We either take into account known nests if observation data has been collected in the field, or, if not, we virtually locate nests within favorable habitat areas based on the known density of the species being studied.

4 DESCRIPTION OF YOUR PROJECT

Tower locations, planned risk reduction measures (landscaping, deterrent systems, automatic shutdown systems, etc.).