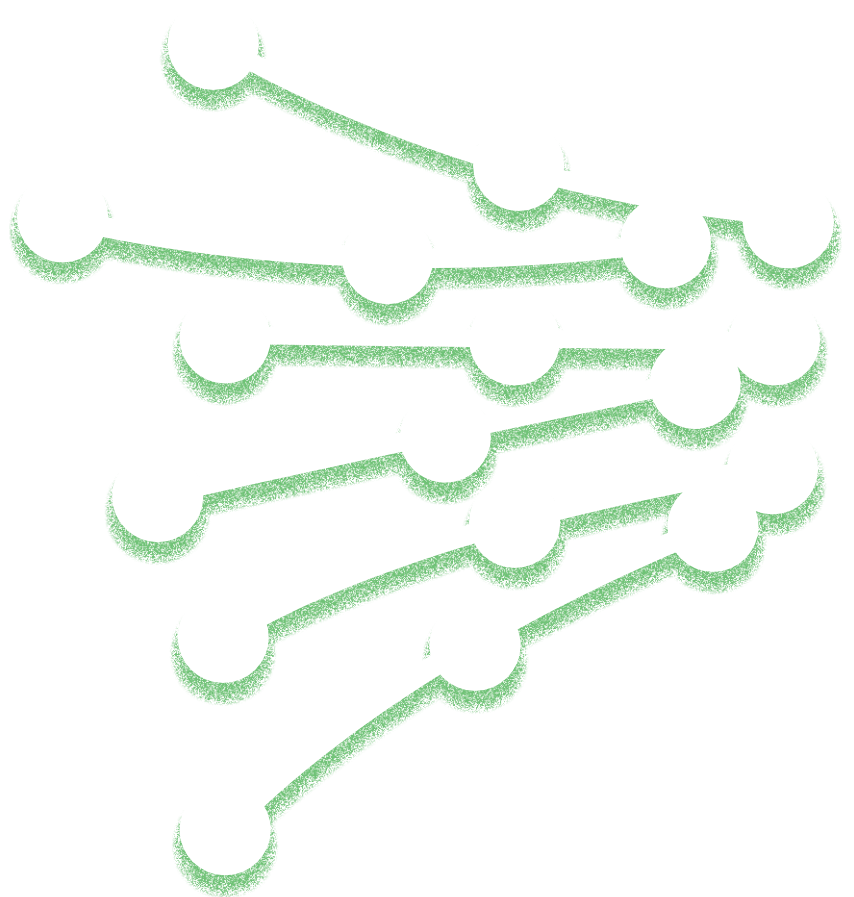


**IDENTIFICATION, CHARACTERISATION
AND MAPPING OF THE
FLIGHT PATHS OF BIRDS
THAT INTERACT WITH
HIGH-VOLTAGE POWER LINES**



January 2014



RED
ELÉCTRICA
DE ESPAÑA

And innovation project to improve prevention of bird mortality by collision with the cables of electricity transmission lines.

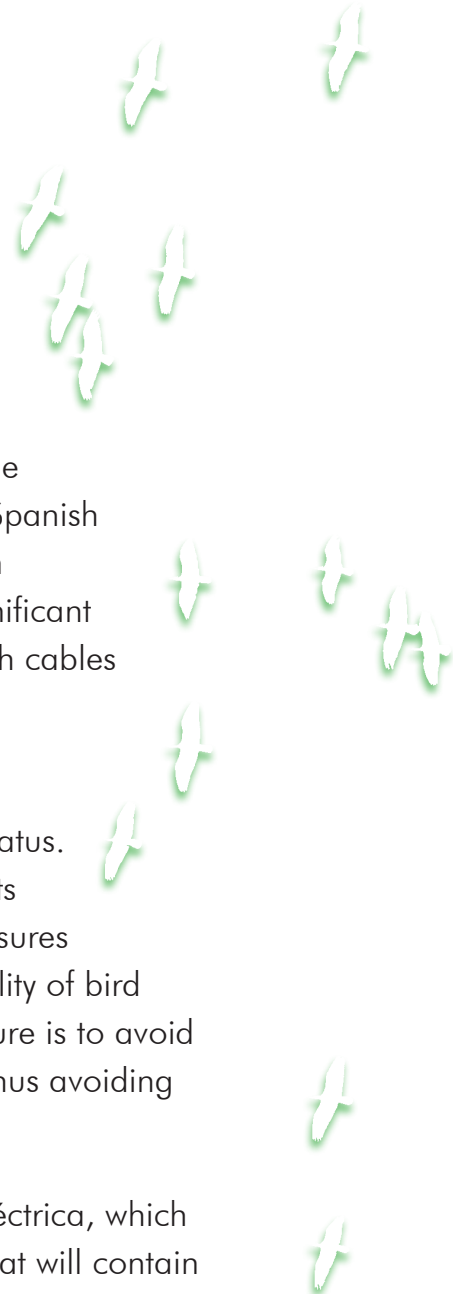
Red Eléctrica de España presents an initiative that will help reduce the impacts of power transmission lines on endangered bird species.

Introduction

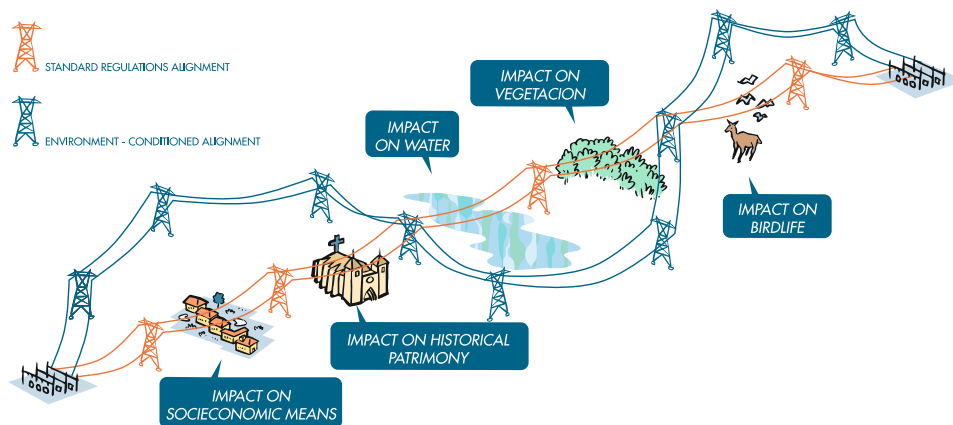
Red Eléctrica de España S.A.U. is the company responsible for the transmission of high voltage electricity and the operation of the Spanish electricity system. The power transmission grid, consisting of high voltage lines, has a length of about 41,000 km and its most significant environmental impacts include the mortality of birds colliding with cables of overhead installations.

The collision with power lines, in the case of some endangered species of birds, has a significant impact on their conservation status. Red Eléctrica has worked for years in studying the problem and its resolution. The Company applies preventive and mitigation measures to its lines, known as “bird-flight diverters”, to reduce the possibility of bird collisions with overhead power installations. Still, the best measure is to avoid installing power lines in areas where sensitive birds are present thus avoiding intercepting the busiest bird flight paths.

In this context, a new initiative has been set in motion by Red Eléctrica, which consists of generating a Geographic Information System (GIS) that will contain the most up-to-date and relevant information on the distribution of the most sensitive birds and their flight paths.



The availability of this system in the context of decision-making concerning planning and designing of new projects will anticipate the adoption of solutions before the problem arises and will provide the best environmental fit for future power transmission lines.



Fauna in general and specifically birds are one of the main aspects considered in the design of the corridors for new power lines

A phased-approach project

The **first stage** of the project was planned as a “pilot project” and was carried out in 2010 & 2011 by Red Eléctrica and the consulting company Asistencias Tecnicas Clave S.L., with collaboration from the Doñana Biological Station (CSIC) and the regional environmental ministries of Andalusia and Extremadura.

The satisfactory results obtained from this pilot project led to a **second stage** in 2012 which extended the initiative to a wider geographical area that included the territories of the autonomous communities of Madrid, Castilla y León, Murcia, Valencia and the Canary Islands.

Finally, in a **third stage**, which began in 2013 and is currently underway, the project will be completed by including the rest of the national territory.



Flock of birds in flight.

Objective

The goal of the project is to learn about and map the flight paths of birds which are potentially susceptible to collisions with power lines; it is about identifying the areas and flight routes most frequented and used by the birds in their regular movements, which are the ones most associated with situations of potential risk of collision with cables.

The information obtained from the project serves to facilitate the following actions:

- 1) The strategic decision-making in the transmission grid planning and design stages
- 2) The adoption of corridors for power lines with the least impact for new projects
- 3) Identifying potential trouble spots in the current grid in order to adopt mitigation measures



*The knowledge of the flight routes and areas most frequented by birds will help in the adoption of preventive and mitigation measures during the early stages of new power line projects.
(image: flock of cranes in their wintering area)*

Species of Interest

Applying a series of different criteria, a group of about 40 species of interest was identified and became the “focal species” of the project. These species were selected from all the birds affected by power transmission lines, and for which the most relevant information available has been collected regarding areas of presence and their flight paths. Both sedentary and migratory birds are included.

SOME OF THE SPECIES OF INTEREST FOR THE PROJECT

Steppe birds	Great Bustard, Houbara Bustard, Little Bustard, Black-bellied Sandgrouse, Pin-tailed Sandgrouse
Necrophagous birds	Cinereous Vulture, Griffon Vulture, Egyptian Vulture, Bearded Vulture
Raptors	Spanish Imperial Eagle, Bonelli's Eagle, Golden Eagle, Barbary Falcon
Wading birds	White Stork, Black Stork, Common Flamingo, Common Crane
Aquatic birds	White-headed Duck, Marbled Duck, Red-knobbed Coot



The bustard and flamingo are among the focal species selected for the project.

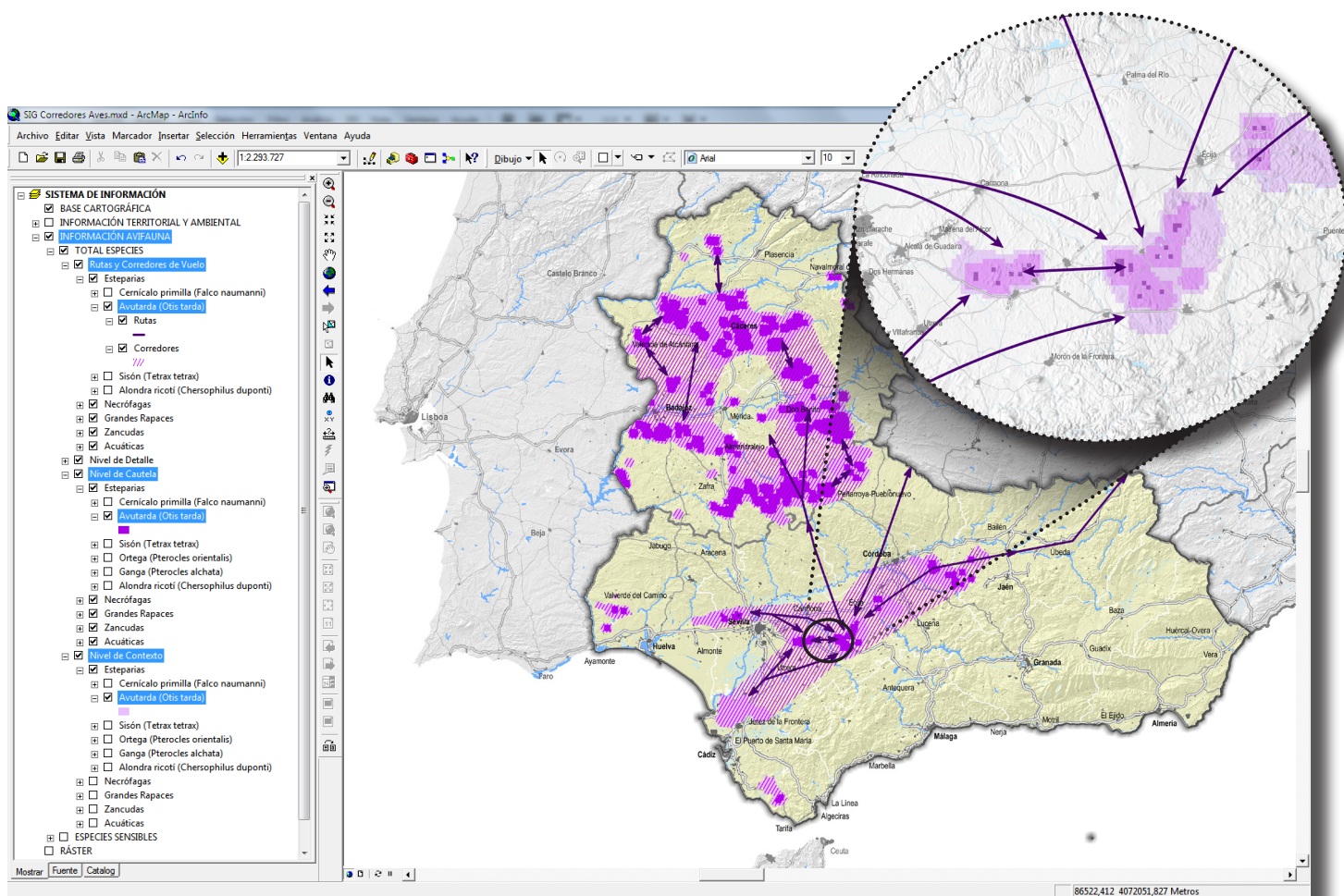
Collection and Processing of Information

There has been a very important effort made in the project to identify, collect and map all of the relevant information, both published and unpublished, regarding the areas of presence and flight paths of the selected bird species.

The collaboration of the environmental ministries of the different autonomous communities has been essential to this task. Additionally, the project has benefited from unpublished information provided by researchers, naturalists' associations, etc.

The information collected has been integrated into a Geographic Information System (GIS) that allows consultation and analysis at different levels of detail and work levels.

The system integrates information about the areas of presence, routes and flight paths, and also includes geographical information and environmental information of a different nature that is equally relevant to decision making in projects.



The Geographic Information System allows the available information to be consulted at different levels of precision for making decision at different echelons of work.

The Future

The tool designed during the first stage of the project has already generated results that are being applied to the selection of corridors of least impact for new power line projects in seven autonomous communities. During 2014, the tool will be extended to cover the territories of the new autonomous communities included in the third stage of the project, so that thereafter the tool will be applicable to the whole of the Spanish territory (peninsular and insular).

Red Eléctrica aims to share this tool with the various public administrations responsible for biodiversity conservation and the environmental assessment of new projects, as well as with other institutions and organisations, so that it becomes a common framework for the assessment of new power line projects and

for the adoption of preventive measures. In this sense, the Company foresees the periodic updating of the system and its possible expansion to include new species of interest.

Finally, the identification of the most sensitive areas also will help prioritize the allocation of resources to correct the current impact of the existing power lines on birds.



Transmission line tower equipped with bird-saving devices

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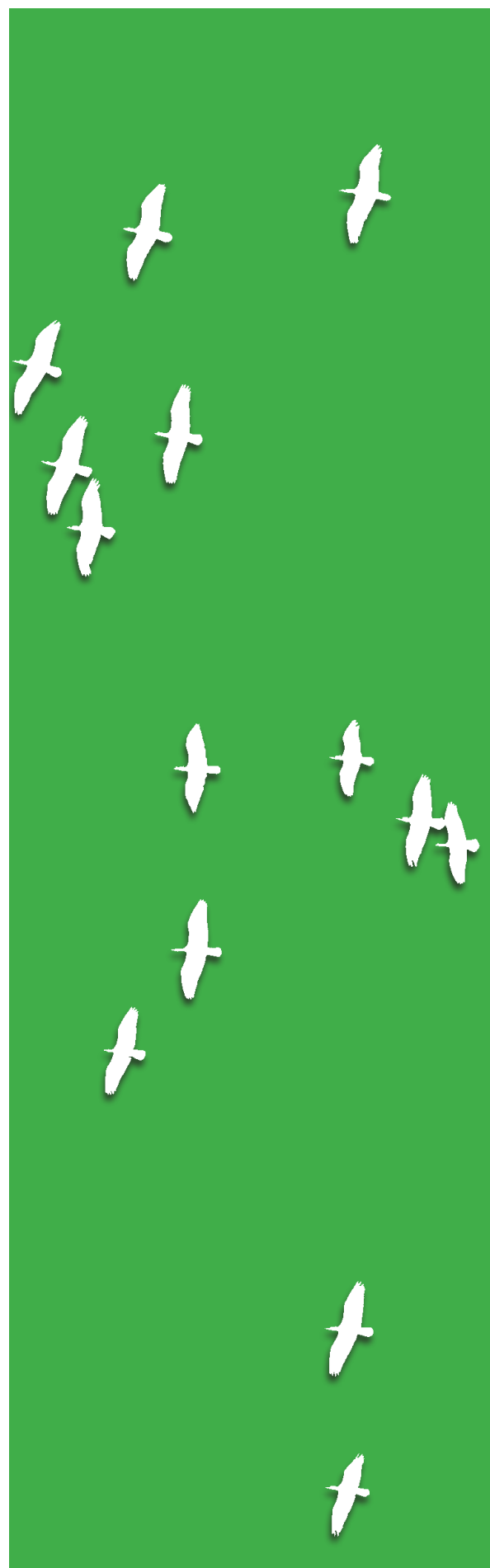
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