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## Electrocution of Birds and Collision With Power Lines: Solutions to a Global Problem

*Electrocution on power lines is a major threat to many bird species across the world, in particular endangered species such birds of prey, which show the greatest incidence of electrocution. The study is published in the American Journal of Wildlife Management by the University of Barcelona's Conservation Biology Group, which is directed by Joan Real of the Department of Animal Biology. It focuses on preventing bird electrocution through the identification and correction of high-risk pylons.*

Bird death by electrocution is a global problem that has been aggravated by increases in the energy demand of certain regions and is particularly prevalent in natural areas, where the introduction of power lines is a cause of significant disruption to local species. In Catalonia, electrocution is the primary cause of death of the Bonelli's Eagle (*Aquila fasciata*), and across the rest of the Iberian Peninsula it affects particularly large numbers of the endangered Iberian Imperial Eagle (*Aquila adalberti*) and many other ecologically valuable species. In the United States, the problem has a particular impact on the highly symbolic Bald Eagle (*Haliaeetus leucocephalus*). In Africa, common victims include the Cape Vulture (*Gyps coprotheres*) and the Egyptian Vulture (*Neophron percnopterus*).

### **Electrocution: Threats and solutions**

Electrocution occurs when a bird comes into contact with two wires or when it perches on a conductive pylon (for example, a metal structure) and comes into simultaneous contact with a wire. In Catalonia, there are more than 1000 different models of electricity pylons, which pose different levels of threat to birds. The article published in the Journal of Wildlife Management confirms the validity of the predictive model designed by the UB research group to determine the risk of electrocution according to pylon design and location, as well as verifying the effectiveness of corrective measures implemented at electrocution blackspots.

Joan Real explains that, "The threat posed by a pylon depends on the electrotechnical design and the natural features around it. If we apply the predictive model we can correct power lines more effectively without having to apply measures to entire spans of the transmission network." The

model makes it possible to select and act on the most dangerous pylons and correct them effectively. According to Joan Real, applying correction measures "to only 6% of the most dangerous pylons could reduce bird mortality by up to 70%."

### **Effectiveness of corrective measures**

The article reviews more than ten years of pioneering work by the UB team on the detection and correction of potentially dangerous pylons and the evaluation of anti-electrocution measures over an area of 210,000 hectares in the Barcelona pre-littoral mountains. In the design of the predictive tool, the team modelled the risk of bird electrocution posed by 3,869 electricity pylons. Next, the team worked with power companies to apply corrective measures to the most dangerous pylons identified by the model (those with wires or connectors above the cross-arms and located in natural habitats or areas selected by bird species for specific activities). The study confirms that these anti-electrocution measures are effective and reduce the number of birds electrocuted in their natural habitats.

As Joan Real explains, "The predictive model is effective in identifying the pylons that present the greatest risk of electrocution. The results also show the effectiveness of corrective measures in preventing bird death through electrocution." Through its research, the Conservation Biology Group has developed a strategic analytical tool that will be of use to any public or private body involved in environment management in areas, where transmission infrastructures have had adverse effects on bird life -- a specific environmental problem recognized by the Convention on Migratory Species (Bonn Convention, 2002) and in many EU conservation directives, as well as receiving

specific mention in the recent decree on power transmission lines announced by the Spanish government.

**Collision: A hidden threat**

Electrocution is not the only threat that power lines pose to bird species. Collision also has an impact on the survival of birds, in particular endangered species and those with wider home ranges, which include various species of eagles. The findings of an article produced by the UB's Conservation Biology Group, published in the journal *Bird Conservation International*, suggest that the problem is more serious than previously thought.

"Collision with power lines is a lesser-known problem than electrocution and is harder to detect because it can occur at any point along the transmission line," explains Joan Real. In the case of power lines, the bird collides with one of the wires, generally the earth wire, which is less visible. In the study, the UB team presents a predictive model for determining which lines and spans create the greatest risk of collision, describing the most effective strategies for reducing the number of accidents caused by transmission lines. The results of the article, based on a radio-tracking study of Bonelli's eagle populations in the Barcelona and

Tarragona area, suggest that collision risk is influenced by a number of factors, including the topography of surrounding terrain and the proximity of lines and pylons to nests and other areas used frequently by local species.

Since 1980, the Conservation Biology Group has carried out applied research for the conservation of endangered species aimed at identifying effective preventive measures which can be applied by conservation managers and other stakeholders. The group is supported by the Miquel Torres Foundation in Vilafranca Penedès, and funding for its most recent studies has been provided by Barcelona Regional Council and the companies FECSA-ENDESA, Estabanell i Paysa S.A., Electra Caldense S.A. and Red Eléctrica de España, S.A.

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