



**Bureau Waardenburg bv**  
Consultants for environment & ecology

# Birds and electric power lines

Power lines and electricity poles pose a severe mortality risk to birds. Regional characteristics of the electricity structures, the season and the species of bird (including their morphology, age and gender) all have their influence. Birds also use power poles and lines as perching, roosting or nesting sites. In addition to the ecological considerations, birds also form an economic concern to energy supply companies by causing electrical malfunctioning, short-circuits, outages or electrical fires.

Bureau Waardenburg has much in-house knowledge on this subject, including the gathering of field data. Since the beginning of 2007, we have carried out intensive investigations into the effects of (both above and below ground) high-voltage power lines and have advised on possible mitigation measures.

## Risks for birds

Interactions between electric utilities and birds may be categorised in the following way:

1. collisions with the power lines;
2. electrocutions on power lines or poles;
3. disturbance to breeding, resting or foraging birds;
4. positive effects, such as provision of nesting or perching sites.



Grey herons passing power lines

Most power lines carry fatal risks for birds through the collision with power wires or electrocution; when a bird touches two conductors or a conductor and an earthed wire simultaneously. Also, above ground power lines may influence habitat structures and lead to the reduction in breeding, staging and wintering areas for birds.

## Environmental impact assessments (EIAs)

Since 2006, Bureau Waardenburg has been involved in EIAs for new high-voltage power lines in the Netherlands and provides recommendations to the grid administrator for minimising impacts on nature. This includes field research into collision victims, flight behaviour at existing power lines using radar and studying the effectiveness of new types of wire markings as well as carrying out reviews on the issues involved.

## International contacts

Bureau Waardenburg has built up an extensive international network with researchers, NGOs and electricity companies. In this way institutional, as well as scientific aspects can be tackled in the required detail.

This has already been initiated in a symposium, specifically aimed at the interactions between electric utilities and birds, at the 7th European Ornithologists' Union Conference in Zurich in August 2009. The symposium was chaired by Bureau Waardenburg, who invited international specialists to join the discussions into the current status of research into the effects of powerlines and mitigation methods. Bureau Waardenburg is currently undertaking a review for UNEP/AEWA on the conflicts between migratory birds and electricity power grids in the African-Eurasian region. (see [www.buwa.nl/aewareview](http://www.buwa.nl/aewareview)).



Radar study along power lines

## Research methods for interactions between birds and power lines

Collision risks for birds with high-voltage power lines are highest in twilight and at night. Therefore, gathering information on flight paths of local and migrating birds is essential also during this period. In our studies, daytime field observations are combined with radar observations during the night. The mobile radars of Bureau Waardenburg can scan horizontally and vertically, to register the altitudes (up to several km), the flight paths, as well as the flux of birds (total number per km per hr), as well as the alteration of these due to the presence of power lines. Analysis of these data is aided by specialist database and statistical programs, while spatial and trend analyses are carried out using Geographic Information Systems (GIS)

## Monitoring of bird victims along power lines

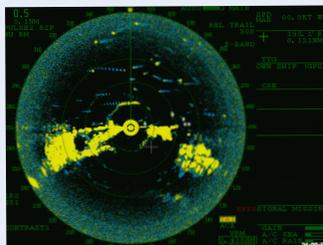
Estimates of the potential number of bird victims can be made prior to construction by carrying out research near existing power lines. Bureau Waardenburg has several years experience on this subject, including fieldwork into collision victims. We have developed standardised search protocols, as well as experiments to correct for the chance of finding a victim (i.e. search efficiency) and loss to scavengers (i.e. disappearance rate).



Search for bird victims along power lines



Mobile radar set-up with vertical and horizontal radar



Radar screen with bird tracks



Spoonbill as a collision victim



Observing bird movements in Italy

## Risk assessment studies

For future power lines risk assessments can be conducted beforehand. This is carried out in the search areas of the power lines based on research on flight movements (by radar and visual observations) and determined relationships of bird collisions and flight movements. The results of such studies are also used to improve our models for estimating the potential collision victims in future initiatives.

## Publications

A number of studies have been carried out by Bureau Waardenburg staff on the subject of power lines and birds. Most of them can be downloaded from our website ([www.buwa.nl](http://www.buwa.nl)). The results of our studies were also presented at national and international conferences.

- Gyimesi, A., R.R. Smits & H.A.M. Prinsen, 2010. Radar study of diurnal and nocturnal bird migration in Calabria, Southern Italy. Monitoring bird passages over a planned 380 kV power line location in spring 2010. Report 10-110.
- Gyimesi, A., R.R. Smits & H.A.M. Prinsen, 2010. Flight movements of geese, ducks and waders in the search area of the high-voltage power grid ZW380. Radar study in the eastern part of the Oosterschelde in the winter of 2009/2010. Report 10-084 (in Dutch).
- Hartman, J.C., A. Gyimesi & H.A.M. Prinsen, 2010. Monitoring the efficiency of wire markers. Field study on bird victims and flight behaviour at a marked transect of a 150 kV power line. Report 10-082 (in Dutch).
- Prinsen, H.A.M., R.R. Smits, F.L.A. Brekelmans, L.S.A. Anema, D. Emond & S. Dirksen, 2009. Background nature study of the Environmental Impact Assessment of the Southern Ring Randstad380. Report 08-003 (in Dutch).
- Smits, R.R., J.C. Hartman, A. Gyimesi, M.P. Collier & H.A.M. Prinsen, 2010. Flight movements of spoonbills, waders and nightjars in the search area of the high-voltage power grid ZW380. Radar study in the eastern part of the Oosterschelde and the Brabantse Wal in the summer half-year of 2010. Report 10-169 (in Dutch).
- Smits, R.R., R.G. Verbeek, H.A.M. Prinsen & J. van der Winden, 2009. Flight movements of colonial birds in the search area of the high-voltage power grid NW380. A study on spoonbills in the province of Flevoland and on purple herons and black storks in North-Holland and Friesland. Report 09-139 (in Dutch).
- Verbeek, R.G. & H.A.M. Prinsen, 2008. Collision victims at the high-voltage power grid Southern Ring Randstad380. Accompanying note (in Dutch).



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