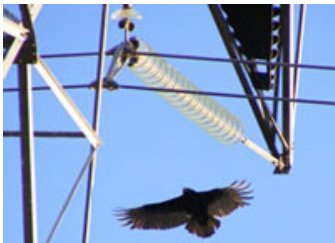


- Communication towers and masts**
- Windows and tall buildings**
- Wind turbines**
- Power lines**
- Light pollution**
- Burdening factors**
- Possible solutions**

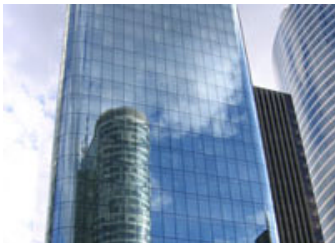
## Communication towers and masts



Communication towers and masts are commonly high structures located on elevated points of land and their supporting guy wires are extremely dangerous for migratory birds. Fast flying birds simply do not notice loose wires and birds that are not very agile have difficulties avoiding them. Stormy nights and bad visibility make supporting wires even more dangerous for birds and dramatically increase the risk of collision. Brightly lit towers in the similar adverse conditions make bird-strikes even more likely. Birds, especially nocturnal birds travelling in weather conditions like fog or mist, lose their navigation cues and get disoriented or dazzled by the lights of towers. Mistaking them for constellations, birds tend to circle around the lights and rarely escape fatal hits

against the wires and other supporting elements. Even if they manage to avoid heavy strikes, birds are often badly injured or they waste energy they need to accomplish their migration journey.

## Windows and tall buildings



Windows of all sizes and types, even small and narrow windows, from those found on tall buildings to those used in residential houses are very dangerous for birds. Ornithologists usually call them "invisible killers" due to the large number of deaths and injuries they cause regardless of species, age, sex and the conditions in which collisions occur. Attracted by the reflection of trees or plants located near the windows, birds try to pass through them, sometimes, at top speed. This can lead to fatal or other injuries or simply exhaustion as they attempt to overcome the invisible barrier and end up falling to the ground and thus becoming easy prey. Predators such as cats often lie in wait for their victims to quickly remove them. Moreover, some studies show that about half of

those birds, which manage to fly away, die later due to injuries received. These facts are often unknown to those observing bird strikes, as they tend to think collisions do not actually harm birds and that they are able to fly away without any lasting damage.

## Wind turbines



Wind turbines, especially when standing isolated in large-scale wind farm developments, also represent a severe potential hazard for migratory birds. Their blades rotate at speeds of up to 200 kilometres per hour and, when placed along the major migratory routes of birds, wind turbines can become extremely dangerous obstacles causing both injuries and fatalities to many species of migratory birds. In addition to causing collisions, wind turbines are also known to cause displacement of migratory birds and are considered especially detrimental in areas where there is a known high concentration of migratory birds, for example at major stop-over and feeding sites. Like other obstacles that are surrounded with lights for air traffic safety, wind turbines

equipped with bright lights can also attract disorientated birds and lead to fatal injuries during the night.

Wind farms are often built along coastlines and mountaintops, usually in areas that have high wind potential, and which often lie along the flight paths of many migratory birds. Unfortunately, wind farms are still being built along coastlines, mountain ridges and wetlands, sometimes without any prior assessment of their potential environmental impact on migratory birds and in places where there is a known high concentration of many migratory bird species. It is especially a cause for concern when wind farms are being constructed in areas that are frequently used by endangered and rare bird species.

## Power lines



Power lines and fences are believed to pose a particular risk to migratory birds. Overhead power lines stretch for millions of kilometres globally and the resulting carpet of surface cables continues to increase. Apart from the risk of electrocution, which poorly designed power poles pose for birds, the cables themselves constitute objects for potential collisions. Fast-flying birds, so-called poor fliers due to their small wings and birds lacking in agility are especially at risk: they tend to hit conductors and ground wires, frequently at night and in poor weather conditions.

## Light pollution



The luminous glow of artificial light over cities and towns obscuring the stars at night, which astronomers describe as 'light pollution', takes a large toll on bird populations as well as distracting and confusing them during their migration. Birds are frequently deceived by bright lights on misty and stormy nights, when their usual points of reference – the stars – become invisible. In these cases, bright artificial lights caused by our ever-expanding urban landscapes attract migratory birds, leading to their disorientation, which in turn, can lead to changes in their usual flight path and migratory course. Following the wrong cues, they can be sent off course and their precious energy stores, which are needed to complete the onward journey are squandered. Light

pollution also prevents birds from choosing the ideal stopover sites and some get involved in endless "lit-beam circling" until they drop from exhaustion or collide with surrounding objects.

## Burdening factors

When wind turbines, power lines and other man-made structures are placed in areas where the density of birds is high or along major migratory paths, the probability of collisions significantly increases. In particular, the placement of windfarms and other structures along landscape features such as river valleys and coastal areas, used by migratory birds as navigation cues, is believed to significantly increase collisions. Collision risks are also increased or diminished by the intensity and use of lighting and size – the more lighting in place and the taller the structure is, the more dangerous the objects are for birds. Bad weather and darkness, as well as the physical characteristics of birds (acuteness of vision) or flight behaviour (flocks), also influence the collision rate.

## Possible solutions

To ensure the safety of migratory birds, site-by-site environmental assessments which include studies on the potential impact of a proposed development on migratory birds are needed prior to construction of wind turbines, towers, powerlines and other potentially damaging structures. Lowering towers, slowing the frequency of flashing lights that surround structures, and removing all unnecessary lighting, using non-reflective films or stickers for windows can collectively make a decisive contribution towards improving the situation.

In addition, locating or re-locating structures away from migratory paths and reducing the clustering of such objects, will provide migration corridors for birds and other species and can help to avoid fatalities. Avoidance of these conflicts can often result from a strategic environmental assessment carried out for large-scale developments. Only when the design and location of such structures incorporates the needs of all target groups, including migratory birds, can harm then be avoided. In some forward thinking cities around the world, it is already common practice to switch off the lights of sky-scrapers during the main migration seasons.