Project Related Documents

1. *The Baseline Information Requirements for Evaluation and Effects of Wind Power Facilities On Migratory Birds in Atlantic Canada*. Canadian Wildlife Service.

2. *Species at Risk Document*- Peregrine Falcon Anatum.

3. Avian Collisions- *"Putting Wind Power's Effect on Birds in Perspective*.

4. *Avian Collisions with Wind Turbines: Summary of Studies to Date and Comparison to other Sources of Collisions*. NWCC Resource Document

The following is the Information Requirements provided by Canadian Wildlife Services for the protection of avian species which Unity Bay Energy Ltd. agrees to work with all government agencies involved.

Baseline Information Requirements for Evaluation of Effects of Wind Power Facilities on Migratory Birds in Atlantic Canada

It is critical that the impacts of wind power facilities on local and migrant bird populations be assessed with as much accuracy as possible for each new project proposed for Atlantic Canada. Some birds are likely to be more sensitive than others to wind power facilities. Therefore, in order to properly evaluate potential impacts of wind power sites on avian species, it is important to achieve an understanding of:

the distribution and abundance of birds, and their use of the project area during all seasons (i.e. breeding season, migration, winter);

site-specific attributes that may affect bird vulnerability (e.g. topography, weather conditions, prevailing wind direction, proximity to coast);

how birds may be vulnerable or sensitive to the various aspects of a proposed wind power facility; and

what mitigation measures are available to minimize impacts.

An early assessment of the bird use of an area is important for the proper siting of a wind power facility. If potential siting conflicts are identified in the initial stages, alternative siting options can be explored in order to mitigate impacts on birds. Preliminary information about bird use of an area should be obtained by literature searches and consultations with appropriate natural resource agencies, environmental non-government organizations (ENGOs) and the local population. There are many sources that can be used to obtain this information, including:

natural history publications,

scientific literature,

provincial natural history databases (including the archives of natural history listservs),

the Atlantic Canada Conservation Data Centre (AC CDC),

local naturalists and naturalist groups,

various volunteer-based bird monitoring surveys, including

The Atlas of Breeding Birds of the Maritime Provinces,

Christmas Bird Counts,

Breeding Bird Surveys,

the provincial natural resource department, and

the Canadian Wildlife Service (CWS).

Project proponents should verify these sources as a first step in determining if the proposed site hosts significant species, has large concentrations of breeding, staging or wintering birds, or is located on a major migration route or near nesting bird colonies.

Once the initial literature search and consultation is performed, bird use and habitat characterization should be described through on-site surveys. Fieldwork should be done at the appropriate times of year for the species of interest and should be conducted by qualified biologists, experienced in conducting the appropriate surveys and in identifying birds by sight and sound. Ideally surveys should be done during different seasons (i.e. breeding season, migration, winter) to get a good representation of bird abundance, distribution and use of the area throughout the year. Detailed survey methodology and results should be provided with environmental assessment documentation submitted to regulatory agencies for review. The potential effects that turbines and associated infrastructure may have on birds in the area (including mortality and avoidance of the area) should then be evaluated.

NOTE *- Proponents should not undertake surveys of known bird colonies and breeding areas for certain avian species at risk, such as the Piping Plover, as these are particularly susceptible to human disturbance. In cases of uncertainty whether areas should be surveyed, proponents should contact CWS for advice. For those sections of the study area where surveys were not advisable, information obtained from organizations listed previously should be provided with environmental assessment documentation. Should new colonies or breeding areas of species at risk be discovered while conducting field work, this information should be immediately sent to appropriate federal and provincial natural resource agencies and to the AC CDC.*

Breeding Birds

The impacts that wind power facilities may have on breeding birds include: habitat loss, destruction of active nests, obstruction of regular flight paths, disturbance caused by the turbines or human activity around breeding sites, mortality or injury due to collision with structures, and obstruction of important feeding areas (especially in offshore or tidal areas).

In order to evaluate the potential effects of a proposed wind power facility on the breeding birds of the area, the following information should be provided:

What avian species breed at the site, and what is their relative abundance? What avian species breed in the surrounding area (within 5 km of the site)?

Are any of these birds considered Species of Concern (Species listed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), species listed as S1, S2, and S3 by the AC CDC, species listed provincially, or species of high conservation priority for the Bird Conservation Region (BCR))? Do nests or critical habitat of Species at Risk listed by COSEWIC occur in the area?

Do bird colonies occur in the area?

Migrating Birds

The greatest concern for migrants in the area of a proposed wind power facility would normally be the risk of collision. If the structure includes lighting, the problem could be further exacerbated for species that are attracted to light. In addition to collisions with lit structures, birds attracted to lights

may collide with guy wires, other birds, or the ground, or they may circle around the light until they drop to the ground of exhaustion. The birds surviving on the ground are then at risk of depredation. However, disturbance can also be a factor for migrants if wind turbines are located near important staging areas where large numbers of birds concentrate to rest or feed.

Collisions by migrants are most likely to occur during the first hours after nightfall, at the initiation of the migration flight when birds are at a low climbing altitude, or in the hours between midnight and dawn, when many birds begin a gradual descent as they terminate their night flight. However, inclement weather can increase the risk of collision. For instance, clouds have an influence on the altitude of migrants by forcing higher flying migrants to lower altitudes, which increases the density of migrants near the ground and increases the probability of collisions with tall obstacles. Drizzle, fog, and haze impair visibility and also cause birds to fly at lower altitudes and to follow topographical clues. If a wind power facility is proposed in a migration corridor, the altitude that birds are passing over the site during different meteorological conditions should be determined. If the average height of migration is at blade height, the risk of collision is likely higher. Similarly, if there is a high proportion of fog days at the proposed site during the migration period, there is likely an increased risk of collision.

In order to adequately evaluate the risk of collisions and disturbance effects on migrants, the following information should be provided:

Is the proposed site within a known migratory bird flyway?

What is the species composition of birds that migrate through the area?

Are any of these birds considered Species of Concern (Species listed by COSEWIC, species listed as S1, S2, and S3 by the AC CDC, species listed provincially, or species of high conservation priority for the Bird Conservation Region (BCR))?

What is the approximate number of migrants that use the area? How does this number compare to other nearby sites? (i.e., does the proposed area host more migrants than other sites?)

What is the flight altitude of migrants through the area during different meteorological conditions (if large numbers of birds are found to migrate through the area)?

What is the frequency of inclement weather?

What is the number of fog days per year and per season, and when during the day does the fog most often occur?

Are there significant staging areas on-site or near the site (e.g., within 5 km)?

If significant numbers of birds stage in the area of the proposed wind power facilities, are there any activities taking place nearby that could potentially spook birds resulting in collisions with turbines, transmission lines, etc.?

Wintering Birds

During the winter, bird numbers and movement are generally reduced. Simply by having fewer birds using an area, the number of collisions should be minimal at land-based sites. However, offshore and nearshore wind facilities may have a greater potential for problems. For example, in ice-free areas, large concentrations of wintering ducks and seabirds may use offshore or nearshore areas. To properly evaluate the potential effects of wind power facilities on wintering birds, the following questions should be answered:

What is the species composition of wintering birds in the area?

Are any of these birds considered Species of Concern (Species listed by COSEWIC, species listed as S1, S2, and S3 by the AC CDC, species listed provincially, or species of high conservation priority for the Bird Conservation Region (BCR))?

What is the approximate number of birds that use the area in winter? How does this number compare to other nearby sites? (i.e. does the proposed area host more wintering birds than other sites?)

What is the importance of the site for wintering birds?

Are there alternative wintering sites in the area?

Do wintering waterfowl and seabirds fly over headlands and other land bodies in the area?

Other Information Requirements

In additional to life-cycle specific questions in the preceding sections, the following general questions should be answered in environmental assessment documentation submitted for review:

What habitat types are found on-site and in the immediately surrounding the area?

What types of habitat will be lost or altered? How much of each type of habitat will be lost or altered?

Are any wetlands potentially impacted by the proposed project? For projects on Federal Lands or receiving Federal Funding, *The Federal Policy on Wetland Conservation* would apply.

What are the topographical features (peninsulas, ridges, river valleys, shorelines, wetlands, woodlots in agricultural landscapes) at and near the site that may influence bird movement?

Is the site already designated or in the process of being identified as an area of special importance for birds (e.g. Important Bird Area (IBA), National Wildlife Area (NWA), Migratory Bird Sanctuary, RAMSAR site, Western Hemisphere Shorebird Reserve Network site, etc)?

What is the expected amount and type (vehicles, pedestrians) of human presence at the site during different project phases (pre-construction, construction, operation, and decommissioning) during the breeding season, migration, and winter?

What is the prevailing direction and average strength of wind at the site?

A detailed map (to scale) should be presented showing the proposed location of each of the turbines, as well as all associated infrastructure (access roads, transmission lines, maintenance buildings, etc…).

A larger scale map showing the proposed project area and associated infrastructure should also be provided. This map should also show environmental constraints avoided during project planning.

Maps should contain UTM coordinates or other identifying parameters.

What is the time-frame for construction?

What would be the scale of the facility? How many turbines are proposed? In what configuration would turbines be placed?

What would be the height of the turbines?

What would be the rotor diameter?

What would be the rotor speed?

Would blades be marked to make them more visible to birds?

Would the towers be tubular or lattice structures?

Would a concrete foundation be required? Is so, what would be the area of this structure?

Would the turbines be lit? If so, a description of lights should be provided. What colour lights would be used? Would solid lights be used or flashing or strobe lights?

Would power lines be placed underground? If not, what mitigation measures are proposed to avoid impacts such as avian collisions with power lines? What mitigation measures are proposed to avoid impacts such as avian collisions with transmission lines?

What species are proposed for revegetation efforts at disturbed areas of the site?

Would any materials hazardous for wildlife (including birds) be stored on site? If so, what measures would be taken to ensure that wildlife is not impacted by these substances? What measures would be proposed to avoid impacts to wildlife during accidental events? What measures would be taken in the event that wildlife came into contact with these substances?

Detailed descriptions of proposed project activities (construction, maintenance, etc.) for all project related infrastructure and mitigation measures proposed to avoid adversely impacting birds, species of concern, and wetlands in the area should be provided for all project phases.

How would bird collision injuries and mortalities at the site be monitored?

Do any non-avian species of concern occur on-site or in the vicinity of the project area? If so, what measures are proposed to ensure that the project not impact these species?

How would the success of mitigation measures be monitored? What mechanisms would ensure that corrective measures are taken if mitigation is not successful?

Documentation should include a commitment to compliance with the *Migratory Birds Convention Act* and the *Species at Risk Act* as well as provincial wildlife legislation during all project phases, and should show details on how compliance will be achieved.

NOTE - This document has been prepared to help proponents understand the type of information that CWS would expect to receive with environmental assessment documentation submitted for review in order to evaluate the effects of potential wind power projects on migratory birds. However, CWS may require further information depending on site-specific conditions or as questions regarding avian interactions with wind power facilities evolve.
NOTE - Although this document has focused mostly on birds, wind power facilities may impact other wildlife of interest to provincial wildlife agencies (bats, raptors, non-avian species of concern) and CWS (non-avian species of concern), as well as habitats such as wetlands. CWS would expect that these also be included as Valued Ecosystem Components (VECs) in environmental assessment documentation submitted for review, including the cumulative effects analysis.

Some of the information in this document was condensed from a draft document on EA guidelines for wind turbines and migratory birds being produced by Bird Studies Canada for Environment Canada.

Peregrine Falcon anatum subspecies

Latin name:

Falco peregrinus anatum Birds

Taxonomic group: Risk category:

Threatened

Range:

YT NT NU BC AB SK MB ON QC NB NS NL

Year of designation:

2000

Description:

Falcons are birds of prey that are smaller and more streamlined than hawks, with long pointed wings that enable them to fly at great speed. The Peregrine is a crow-sized falcon. A blackish "moustache" (black stripe below the eye) and bluish-grey or slate-coloured upper parts characterize adults of both sexes. The under parts are white to buff with brown bars on the sides and thighs, and spots on the abdomen; the underside of the wing is white with black bars. Young peregrines have a blackish moustache, brownish upper parts, a dark brown tail

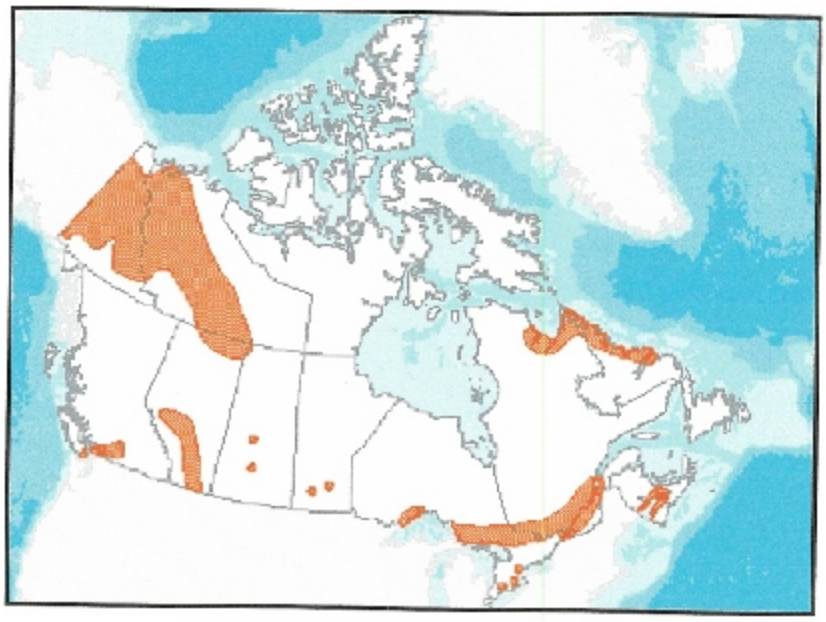
ww. **speciesatrisk.** gc. **ca/ search/SearchDetail_e.cfm ?Speciesill=29**

6/28/2003

with buff-coloured bars and white tips, and buff-coulored under parts with blackish-brown streaks. The three subspecies are similar, differing slightly in colouration and size; the anatums are medium- sized, coloured buffy-salmon on the breast, and often have black cheeks.

Biology:

Peregrine Falcons begin breeding in their second year. Although the average lifespan is 4 to 5 years, some birds have been known to live much longer. Clutch size varies from 2 to 5 eggs, increasing southwards. The reproductive cycle of the three subspecies is similar, the main difference being in the timing of events: Peregrine Falcon pealei subspecies' lay eggs during April, boreal forest peregrines lay in May, and Arctic birds lay in mid-June. Renesting will occur in southern populations if the eggs are destroyed early in the incubation period. Peregrines are excellent hunters that feed almost entirely on birds, usually catching them in flight.



Population and Distribution:

The three subspecies have distinct geographic distributions. The Peregrine Falcon anatum subspecies, also known as the American peregrine, breeds south of the treeline in Alaska and Canada, throughout most of the U.S.A., and from central to south Mexico. The northern birds winter from Mexico south to southern South America. This subspecies was extirpated from most of eastern Canada, southern Alberta, Manitoba, and the interior of British Columbia. Precipitous declines in peregrine populations in North America were associated with the widespread, intensive use of persistent organochlorine compounds, particularly the pesticide DOT. Levels of organochlorine contamination have declined substantially since restrictions were put in place in 1970.

In 2000, an estimated 500 pairs of Peregrine I subspecies nested in Canada. Releases of ca from 1974 to 1996 were important in populatlc subspecies.

- alcon anatum ptive-bred peregrines n recovery of the

w. **speciesatrisk.** gc. cal **search/SearchDetail_e.cfin? Speciesill=29**

Habitat:

The habitat requirements of the Peregrine Falcon can be divided into three components:

1) the nest site: nests are usually scrapes made on cliff ledges on steep cliffs, usually near wetlands --including artificial cliffs such as quarries and buildings;

2) the nesting territory: the area defended around the nest prevents other pairs from nesting within 1 km or more, ensuring adequate food for all nesting pairs and their young; the density of nests tends to be related to food availability;

3) the home range: the extended, non-defended area in which the peregrines hunt for additional food and which can extend to 27 km from the nest; peregrines prefer open habitats such as wetlands, tundra, savanna, sea coasts and mountain meadows, but will also hunt over open forest.

Threats:

The major cause of decline of Peregrine Falcon populations was the presence of agricultural pesticides, especially organochlorine compounds, in the environment. These compounds cause egg-shell thinning, egg breakage, reduced hatching success, reduced brood- size and reduced breeding success. Since Peregrine Falcons are at the top of the food chain, their tissues accumulate a great deal of these substances. Organochlorine contamination is no longer a major limiting factor for peregrines. Current threats include the small population size and the diminishing quality of habitat. Locally, peregrines may be affected by destruction of breeding sites and breeding areas, or by human intrusion near nest sites.

Protection:

Because the Peregrine Falcon is protected through provincial jurisdiction, its level of protection varies from province to province. In Manitoba, Ontario, and New Brunswick, it is protected under Endangered Species Acts, which protect it from shooting, collecting, harassment, and destruction of habitat. In the other provinces, it is protected from collecting and harassment under Wildlife Acts, and in Nova Scotia, it is also protected under the Environment Act. The province of Alberta has the authority to protect peregrine habitat on a case-by-case and area-by-area basis when needed. The species is protected from hunting in Nunavut, except by native people, who hunt the peregrine only rarely for ceremonial purposes. Nunavut also legally protects the falcon from live possession and trade. The Peregrine Falcon is incleded under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES),
which restricts the import and export of individual peregrines and their eggs.

Recovery efforts:

Recovery Plan Status: National Recovery Plan was published in 1988; update is in development.

Plan Goals: The goals and objectives of the 1988 recovery plan have been met. New goals will be developed for the updated plan.

http://www. speciesatrisk. gc. ca/ search/SearchDetail_e.cfin ?Speciesill=29

Summary of Research/Monitoring Activities:

- 1970 - 2000: conducted status surveys every five years in most regions of Canada.
- 1970 - present: monitoring the peregrine falcon in Wood Buffalo National Park and other locations.
- 1995 to present: study the migration of Peregrines using stable isotopes.
- 1998 - current: tracked individual peregrine falcons using satellite telemetry .
- 2001: initiated a study of the effects of human disturbance on falcon rearing at Lyster Lake.
- 2002 - 2003: study genetics of the three subspecies and the purity of anatum genotype in falcons in eastern Canada.

Summary of Recovery Activities:

- up to 1992: established nest sites for captive-raised young peregrine falcons in Quebec, the Maritimes, and Ontario.
- 1994 -1996: established nest sites for captive-raised young peregrines in Ontario and Alberta.
- 1993: closed the Montreal captive-breeding facility.
- 1994: the Department of National Defence agreed to modify its low level aerial training flights in Labrador to reduce the negative effects of the flights on nesting peregrines.
- 1998 - present: conducting closed-circuit video coverage of Calgary, Edmonton, Montreal, Toronto, and Winnipeg nesting sites.
- 1998 - 2000: re-introduced peregrines to the Okanagan Valley through the release program in Kelowna, British Columbia.
- 2001: initiated a conservation project at Mont Saint-Hilaire (Dieppe Cliff Wildlife Refuge) including the easement, donation, and acquisition of properties supporting falcon habitat; established a required buffer zone around the falcon nesting site at Lyster Lake; continued to raise awareness and promote stewardship of the peregrine falcon and other species at risk in Labrador.

Summary of Progress to Date:

Captive breeding of the peregrine falcon from 1972 to 1996 was very effective. In 1996, the Canadian Wildlife Service captive breeding facility at Wainright closed after 25 years, as a result of a decreased need for the facility due to continued peregrine population recoveries. The facility produced more than 1550 young for release. The annual release of young falcons from captive breeding facilities has been largely responsible for the increased peregrine numbers. One young falcon released in the Okanagan Valley in 1998 returned in 1999 and one pair bred in central BC in 2001.

Peregrine populations have been re-established in six geographic zones within their historical range in Canada, except for the Okanagan Valley. Wild populations are expected to expand within their historic range. In 1999, with more than 320 pairs breeding in the wild in Canada, the anatum subspecies was down listed by COSEWIC to Threatened, to reflect the peregrine falcon's improved status.

speciesatrisk. gc. ca/ search/SearchDetail_e. cfm?S peciesill=29

6/28/2003

ADVICE FROM AN EXPERT
by Mick Sagrillo

PUTTING WIND POWER'S EFFECT ON BIRDS IN PERSPECTIVE

Electricity generated from renewable energy resources is an environmentally-preferred alternative to conventionally produced electricity from fossil fuel and nuclear power plants. Many people believe that wind turbines should be part of the solution to a healthier environment, not part of the problem.

Over the past fifteen years, a number of reports have appeared in the popular press about wind turbines killing birds. Some writers have gone so far as to dub wind generators "raptor-matics" and "cuisinarts of the sky". Unfortunately, some of these articles have been used as "evidence" to stop the construction of a wind generator in someone's back yard. The reports of dead birds create a dilemma. Do wind generators really kill birds? If so, how serious is the problem?

A confused public oftentimes does not know what to believe. Many people participate in the U.S.'s second largest past time, bird watching. Other's are truly concerned about the environment and what they perceive as yet another assault on our fragile ecosystem. Unwittingly, they rally behind the few ill-informed obstructionists who have realized that the perception of bird mortality due to wind turbines is a hot button issue, with the power to bring construction to a halt.

Birds live a tenuous existence. There are any number of things that can cause their individual deaths or collective demise. For example, bird collisions with objects in nature are a rather common occurrence, and young birds are quite clumsy when it comes to landing on a perch after flight. As a result, about 30% of total first-year bird deaths are attributed to natural collisions.

By far, the largest causes of mortality among birds include loss of habitat due to human infringement, environmental despoliation, and collisions with man-made objects. Since wind turbines fall into the last category, it is worthwhile to examine other human causes of avian deaths and compare these to mortality from wind turbines.

Death by....

Utility transmission and distribution lines, the backbone of our electrical power system, are responsible for 130 to 174 million bird deaths a year in the U.S. 1 Many of the affected birds are those with large wingspans, including raptors and waterfowl. While attempting to land on power lines and poles, birds are sometimes electrocuted when

their wings span between two hot wires. Many other birds are killed as their flight paths intersect the power lines strung between poles and towers. One report states that: "for some types of birds, power line collisions appear to be a significant source of mortality." 2

Collisions with automobiles and trucks result in the deaths of between 60 and 80 million birds annually in the U.S. 3 As more vehicles share the roadway, and our automotive society becomes more pervasive, these numbers will only increase. Our dependence on oil has taken its toll on birds too. Even the relatively high incidence of bird kills at Altamont Pass (about 92 per year) pales in comparison to the number of birds killed from the Exxon Valdez oil spill in Alaska. In fact, according to author Paul Gipe, the Altamont Pass wind farm would have to operate for 500 to 1000 years to "achieve" the same mortality level as the Exxon Valdez event in 1989.

Tall building and residential house windows also claim their share of birds. Some of the five million tall buildings in U.S. cities have been documented as being a chronic mortality problem for migrating birds. There are more than 100 million houses in the U.S. House windows are more of a problem for birds in rural areas than in cities or towns. While there are no required ongoing studies of bird mortality due to buildings or house windows, the best estimates put the toll due collisions with these structures at between 100 million and a staggering 1 billion deaths annually. 4

Lighted communication towers turn out to be one of the more serious problems for birds, especially for migratory species that fly at night. One study began its conclusion with, "It is apparent from the analysis of the data that significant numbers of birds are dying in collisions with communications towers, their guy wires, and related structures." 5 Another report states, "The main environmental problem we are watching out for with telecommunication towers are the deaths of birds and bats." 6

This is not news, as bird collisions with lighted television and radio towers have been documented for over 50 years. Some towers are responsible for very high episodic fatalities. One television transmitter tower in Eau Claire, WI, was responsible for the deaths of over 1,000 birds on each of 24 consecutive nights. A "record 30,000 birds were estimated killed on one night" at this same tower. 7 In Kansas, 10,000 birds were killed in one night by a telecommunications tower. 8 Numerous large bird kills, while not as dramatic as the examples cited above, continue to occur across the country at telecommunication tower sites.

The number of telecommunication towers in the U.S. currently exceeds 77,000, and this number could easily double by 2010. The rush to construction is being driven mainly by our use of cell phones, and to a lesser extent by the impending switch to digital television and radio. Current mortality estimates due to telecommunication towers are 40 to 50 million birds per year. 9 The proliferation of these towers in the near future will only exacerbate this situation.

Agricultural pesticides are "conservatively estimated" to directly kill 67 million birds per year. 10 These numbers do not account for avian mortality associated with other pesticide applications, such as on golf courses. Nor do they take into consideration secondary losses due to pesticide use as these toxic chemicals travel up the food chain. This includes poisoning due to birds ingesting sprayed insects, the intended target of the pesticides.

Cats, both feral and housecats, also take their toll on birds. A Wisconsin Department of Natural Resources (DNR) report states that, "recent research suggests that rural free-ranging domestic cats in Wisconsin may be killing

between 8 and 217 million birds each year. The most reasonable estimates indicate that 39 million birds are killed in the state each year." 11

There are other studies on the impacts of jet engines, smoke stacks, bridges, and any number of other human structures and activities that threaten birds on a daily basis. Together, human infrastructure and industrial activities are responsible for one to four million bird deaths per day!

But what about wind turbines?

Commercial wind turbines

Since the mid-1980's, a number of research organizations, universities, and consultants have conducted studies on avian mortality due to wind turbines. In the U.S., these studies were prompted because of the relatively high number of raptors that were found dead at the Altamont Pass Wind Farms near San Francisco.

After dozens of studies spanning nearly two decades, we now know that the Altamont Pass situation is unusual in the U.S. The high raptor mortality there was the result of a convergence of factors, some of which were due to the bad siting in the local ecosystem while others were due to the wind turbine and tower technology used at the time. In fact, a very different situation exists not far away at the San Gorgonio Pass Wind Farms near Palm Springs. A 1986 study found that 69 million birds flew though the San Gorgonio Pass during the Spring and Fall migrations. During both migrating seasons, only 38 dead birds were found during that typical year, representing only 0.00006% of the migrating population.

A report recently prepared for the Bonneville Power Administration in the Northwest U.S. states that "raptor mortality has been absent to very low at all newer generation wind plants studied in the U.S. This and other information regarding wind turbine design and wind plant/wind turbine siting strongly suggests that the level of raptor mortality observed at Altamont Pass is quite unique." 12

The National Wind Coordinating Committee (NWCC) completed a comparison of wind farm avian mortality with bird mortality caused by other man-made structures in the U.S.

The NWCC did not conduct its own study, but analyzed all of the research done to date on various causes of avian mortality, including commercial wind farm turbines. They report that "data collected outside California indicate an average of 1.83 avian fatalities per turbine (for all species combined), and 0.006 raptor fatalities per turbine per year. Based on current projections of 3,500 operational wind turbines in the US by the end of 2001, excluding California, the total annual mortality was estimated at approximately 6,400 bird fatalities per year for all species combined." 13

This report states that its intent is to "put avian mortality associated with windpower development into perspective with other significant sources of avian collision mortality across the United States." 14 The NWCC reports that: "Based on current estimates, windplant related avian collision fatalities probably represent from 0.01% to 0.02% (i.e., 1 out of every 5,000 to 10,000) of the annual avian collision fatalities in the United States." 15 That is,

commercial wind turbines cause the direct deaths of only 0.01% to 0.02% of all of the birds killed by collisions with man-made structures and activities in the U.S.

Back in Wisconsin

My home state of Wisconsin is a good example of current research. In December of 2002, the report "Effects of Wind Turbines on Birds and Bats in Northeast Wisconsin" was released. The study was completed by Robert Howe and Amy Wolf of the University of Wisconsin-Green Bay, and William Evans. Their study covered a two-year period between 1999 and 2001, in the area surrounding the 31 turbines operating in Kewaunee County by Madison Gas & Electric (MG&E) and Wisconsin Public Service (WPS) Corporation.

The report found that over the study period, 25 bird carcasses were found at the sites. The report states that "the resulting mortality rate of 1.29 birds/tower/year is close to the nationwide estimate of 2.19 birds/tower.16- The report further states, "While bird collisions do occur (with commercial wind turbines) the impacts on global populations appear to be relatively minor, especially in comparison with other human-related causes of mortality such as communications towers, collisions with buildings, and vehicles collisions. This is especially true for small scale facilities like the MG&E and WPS wind farms in Kewaunee County."[17]

The report goes on to say, "previous studies suggest that the frequency of avian collisions with wind turbines is low, and the impact of wind power on bird populations today is negligible. Our study provides little evidence to refute this claim."[18]

So, while wind farms are responsible for the deaths of some birds, when put into the perspective of other causes of avian mortality, the impact is quite low. In other words, bird mortality at wind farms, compared to other human-related causes of bird mortality, is biologically and statistically insignificant. There is no evidence that birds are routinely being battered out of the air by rotating wind turbine blades as postulated by some in the popular press.

Home-sized wind systems

How does all of this impact the homeowner who wishes to secure a building permit to install a wind generator and tower on his or her property? They will likely still be quizzed by zoning officials or a concerned public with little to go on but the sensational headlines in the regional press. But while the press may or may not get the facts right, peoples' concerns are real, and need to be addressed with factual information such as is presented here.

While there have been any number of studies done on bird mortality caused by commercial wind installations, none have been done on the impact of home-sized wind systems on birds. The reason? It is just not an issue, especially when "big" wind's impact on birds is considered biologically insignificant.

When confronted with the question of why there were no studies done on home-sized wind systems and birds, a Wisconsin Department of Natural Resources person familiar with these issues responded, "it is not even on the radar screen." There has never been a report or documentation of a home-sized wind turbine killing birds in Wisconsin.

The Wisconsin Department of Natural Resources, or any other government or research organization for that matter, just does not have the financial resources to conduct a study just because a zoning official requests it, especially given the lack of evidence nationwide that any problem exists with home-sized turbines. Based on our best available information, the relatively smaller blades and short tower heights of residential wind energy systems do not present a threat to birds.

Notes:

1. National Wind Coordinating Committee Avian Collisions with Wind Turbines: A Summary of Existing Studies and Comparisons to Other Sources of Avian Collision Mortality in the United States (NWCC), p. 10.
2. NWCC, p. 10.
3. NWCC, p. 8.
4. Tower Kill p. 2.
5. Communication Towers: A Deadly Hazard To Birds p. 19.
6. Battered By Airwaves p. 6.
7. Battered By Airwaves p. 4.
8. Communication Tower Guidelines Could Protect Migrating Birds p. 2.
9. NWCC p. 12.
10. The Environmental and Economic Costs of Pesticide Use p. 1.
11. Cats and Wildlife: A Conservation Dilemma p. 2.
12. Synthesis and Comparison of Baseline Avian and Bat Use, Raptor Nesting and Mortality information from Proposed and Existing Wind Developments p. 7.
13. NWCC p. 2.
14. NWCC p. 1.
15. NWCC p. 2.
16. Effects of Wind Turbines on Birds and Bats in Northeast Wisconsin p. 68.
17. Effects of Wind Turbines on Birds and Bats in Northeast Wisconsin p. 75.
18. Effects of Wind Turbines on Birds and Bats in Northeast Wisconsin p. 67.

References:

Avian Collisions with Wind Turbines: A Summary of Existing Studies and Comparisons to Other Sources of Avian Collision Mortality in the United States; National Wind
Coordinating Committee; West, Inc.; August, 2001

Battered By Airwaves; Wendy K. Weisenel; Wisconsin Department of Natural Resources; October, 2002.

Cats and Wildlife: A Conservation Dilemma; John S. Coleman, Stanley A. Temple, and Scott R. Craven; University of Wisconsin-Extension; 1997.

Communication Towers: A Deadly Hazard To Birds; Gavin G. Shire, Karen Brown, and Gerald Winegrad; American Bird Conservancy; Jume, 2000.
Communication Tower Guidelines Could Protect Migrating Birds; Cat Laazaroff; Environmental News Service; 2002.
Effects of Wind Turbines on Birds and Bats in Northeast Wisconsin; Robert W. Howe, William Evans, and Amy T. Wolf; November, 2002.
Synthesis and Comparison of Baseline Avian and Bat Use, Raptor Nesting and Mortality information from Proposed and Existing Wind Developments; West, Inc.; December, 2002
The Environmental and Economic Costs of Pesticide; David Pimentel and H. Acquay; Bioscience; November, 1992.
Tower Kill; Joe Eaton; Earth Island Journal; Winter, 2003.

Back to: Advice from an Expert

Wind Energy FAQ | Publications | AWEA Home Page