

# Wind Turbines and Birds

## Behaviour of Migrant Blue Jays in Relation to Tree Cover and Wind Turbines

*Ross D. James*

During the autumns of 2006 and 2007, while monitoring wind turbines at the Erie Shores Wind Farm near Port Burwell on the north shore of Lake Erie (see James (2008) for more details of the wind farm), an opportunity was provided to make observations of the behaviour of diurnal migrant birds moving along the north shore through the area of the wind farm. One of the most numerous and conspicuous species was Blue Jay (*Cyanocitta cristata*).

While many different turbines had to be visited each day, additional time was spent when possible near several turbines located closest to the lakeshore. Jays were seen throughout the wind farm to two or more kilometres inland. However, large numbers did move close to the shore, and on several days their behaviour was noted in relation to near-shore turbines.

Only a small sample of the total movement of jays was noted, but presumably a similar response would have been seen with others there.

The wind farm is located in a farming region east and west of Port Burwell. The turbines are located in farm fields, which occupy most of the land. Woodlands, mostly small, are located irregularly throughout the area. Some wooded ravines snake inland from the lakeshore, often connecting wooded places. Many farms maintain treed fence rows or hedges to act as windbreaks. These are generally either parallel to or perpendicular to the lakeshore. But fields of various sizes, some quite large, interrupt the tree cover along the north shore, extending right to the high steep bluffs that front the land along Lake Erie in this area.

The observations presented here mainly concern jays that were initially seen moving along the shore between the bluffs and the near-shore turbines. These jays had to pass within a limited distance of the turbines if they wished to continue on course. These observations offer insights into the effect of tree (and shrub) cover on the behaviour of the Blue Jay migrants, and further, look at whether the presence of wind turbines might have influenced their movements.

### Observation sites

Of particular interest were observations made at four turbines located within 150m of the shore bluffs, plus one about 200m and one 400m inland. At three of those turbines (all within 150m of the bluffs) there were trees along the top of the shore bluffs that the jays were following, but then there was a gap in the tree cover where fields extended to the shore bluffs. The jays had to make a decision to either fly across the gap, with no or almost no cover in which to take shelter if necessary, or to turn away from the shore and follow trees inland. Moving inland, they followed treed fence lines or a woodland edge, until they came to more trees that they could follow westward. If making the latter decision, they had to fly out of their way by several hundred metres in order to remain close to tree cover. At the other three turbines, trees and/or shrubs extended along the near shore past the turbines without interruption.

### Movements in relation to tree cover

The flight path followed by the jays was not entirely predictable. Some would continue to fly across a gap seemingly without hesitation. A few would leave the end of trees and fly diagonally away from the shore across a field, going even farther than they would have had they continued west near the shore. But many clearly hesitated to fly across bare fields. Groups would suddenly drop down into the last tree or shrub cover, or mill about in the air before a gap, and then drop into cover. Groups often split, with some continuing west, and others changing flight direction to follow trees. Some even flew back to the east until they came to a treed fence line they could follow inland. Such variation was seen regardless of the time of day or the weather.

Of a sample of about 4,380 jays tallied moving west between the turbine tower and the shore bluffs, at the three near-shore turbines where a choice had to be made, fewer than half (45.8 %) continued to fly across a gap, and more (54.2 %) went out of their way to follow trees, apparently to avoid crossing a gap.

Following cover was evident at other places also, not close to any turbine, that jays were diverging from their westerly movements to stay near trees. Many were seen following treed watercourses, going northwesterly far out of their way until they came to more trees to proceed westward parallel to the Lake Erie shore. Some approached a north-south treed fence row at mid field from the east (following trees), and then either went

north or south, or split, some going both ways, to avoid crossing a field. At times a group moving northwest along a ravine would split, some crossing a field at the narrowest place to get to another hedge parallel to the shore, while some continued along the ravine farther from the shore. This zig-zag movement of Blue Jays following trees all through the area could easily have doubled the travel distance of some jays as they migrated along the north shore of Lake Erie.

At the three other near-shore turbines, where jays were travelling westward between the turbine towers and the shore, but where there was no gap in the tree cover along the shore south of the turbines, 86.3 % (of 8,160 tallied) continued to fly westward over or close to trees and shrubs. Obviously some, for unknown reasons, moved away from the shore, following trees inland and later moving west. Other jays were often moving westward somewhat more inland of these turbines, but why the jays would leave the flock they were with near the bluffs was not apparent. But an increase of 40 % in the proportion of jays travelling steadily past turbines along the near-shore areas where tree cover was nearly continuous, plus jays following water-courses and fence rows when not near turbines, would indicate that the lack of tree cover played a large role in contributing to the movements of many of the jays.

### **Movements in relation to wind turbines**

Considering the three near-shore turbines where jays had to make a decision

to continue across a gap or to change flight direction. At the first of these, the jays reached a decision point just prior to passing the turbine tower, as they reached a crest of a hill there, and could easily see the gap ahead. A narrow strip of trees they could follow extended a short distance past the turbine right at the shore, and the gap was relatively short (about 100m). But of the jays tallied there (1,127), about 40 % turned inland to follow the well-treed fence line passing the turbine tower less than half the distance they would have passed had they continued along the shore trees. The trees in the fence row were barely 10 m beyond the extent of the turbine blades. There were even a couple smaller flocks that moved northward past the turbine and then came back south to the shore to continue west.

At the second of these turbines, the gap was a long one, (about 400m), and the fence row running inland at that point had only 2 trees over a distance of about 250m. While most jays (of 1,218) continued west where there were a few shrubs in a grassy field, and some jays, apparently to stay near cover, dropped over the shore bluffs below field level, as there were at that location some trees and shrubs on the side of the bluffs. Despite the few trees inland from the point of making a decision, nearly 10 % flew north from tree to tree, past the turbine base by about 45m, or fewer than 10m beyond the extent of the turbine blades. The rest, nearly 30%, turned back to the east, reversing their path by 250 m before flying inland among trees. This is despite the fact that the ones turning back had

already passed the turbine when they reached the gap. They flew back past the turbine, and nearly 30 % of those returning chose to fly to the north of the trees at the shore, and closer to the turbine than they could have passed had they stayed among the trees closer to the shore.

The third turbine was in a field corner where there was a woodlot to the east that continued around to the north of the turbine. The gap to the west was a very large one (600m+). More than 70 % of jays arriving between the tower and the bluffs (of 2,036) moved north away from the shore along the woodland edge. All birds, despite having a large woodland to move back into, either followed along the woodland edge or took a short cut across the field corner even closer to the turbine. Those at the woodland edge passed under the extent of the blades, and of those cutting across the field, more than half passed under the extent of the blades, many flocks flying close by on both sides of the turbine tower.

At the three other near-shore turbines where jays could have continued westward with no gap to cross, nearly 14 % did change direction, moving inland along trees that clearly brought them closer (<100m) to a turbine. At two of the three, fence rows were 45m and 50m from the base of towers, so birds were passing almost under the extent of the blades, when they did not have to do so. At one of these two turbines many jays moving west near the shore where there was shrubbery and trees, chose to fly somewhat inland over the edge of the

adjacent field where the turbine was, coming 50-100m closer than they needed to (they continued west and were not considered as part of those coming much closer to a turbine). At the third of these turbines, virtually all jays turned northwest to a woodland, but only after they had passed the turbine. All could have avoided the turbine by more than 300m, but 25 % (of 2,379 tallied) chose to move inland along trees within 50m of the base of the tower, almost under the extent of the blades, and on the west side of the tower.

## Discussion

Most diurnally-migrating passerines that were seen moving at the same time as the Blue Jays did not seem to hesitate to fly across bare fields, but did so in fairly tight flocks. While jays moved in flocks, they tended to be more loosely associated, often straggling through in long “strings”. And, when flying over fields or higher above trees, jays usually fanned out more widely. A tightly knit flock is generally considered better anti-predator behaviour, but the jays did not seem to follow such a strategy closely.

At the same time the jays were migrating, mainly from about mid-September to mid-October, there were Sharp-shinned Hawks (*Accipiter striatus*), Cooper's Hawks (*A. cooperii*) and American Kestrels (*Falco sparverius*), among others, also migrating there. The hawks often were flying low and appeared to be hunting. Several chases were observed as hawks went after jays or other birds. Although no jays were actually seen to be killed, they often

seemed to be very skittish, quickly diving into tree or shrub cover, even when no hawks were evident.

While most Sharp-shinned Hawks (for which more observations were available) simply flew westward over trees or fields, about 15% were also seen to turn and follow trees as the jays did, rather than flying across a field. It seems more likely they were hunting than concerned about flying over a field. The presence of hunting hawks is more likely a reason the jays chose to stay near cover. Cooper's Hawks could readily take jay-sized birds. Sharp-shinned Hawks are known to take prey as large as Blue Jays (Bildstein and Meyer 2000); although they may seldom be successful (Tarvin and Woolfenden, 1999), they did chase jays. American Kestrels are perhaps less likely to take anything as large as a jay (Smallwood and Bird 2002), but at least one was seen chasing jays.

The jays that moved inland closely past turbines showed no hesitation in doing so. Many moved slowly from tree to tree or stopped a while nearer a turbine. They certainly did not flee past, and did not go out of their way to fly around on the side of the trees opposite the turbine. If they were flying at treetop height, they stayed basically at that height, regardless of whether they moved through trees or cut across a field edge under the blades. No evasive flights were noted no matter how close they came to moving blades. Their behaviour near turbines was notably different than the skittish behaviour seen as they approached a field gap. And when flying across a gap, well away from a turbine,

they could often be seen to suddenly drop into any shrub or tree available, as if nervous about something.

A couple of flocks of about 30 and 25 jays were seen flying across a field, directly toward a turbine at the height of the turning blades. The first group changed flight direction about 250m east and passed almost 200m away. But they chose to go inland where there were trees closer to where they would pass, than to the south over an open field. The second group approached to about 50m from the ends of the blades before easily turning away without any sudden changes or hesitation. They also chose to move north toward trees there, avoiding the gap to the south. Other groups of jays were sometimes seen moving from more inland locations south to the shore bluffs, passing turbine towers under or



Subscribe today!  
**MICHIGAN BIRDS**  
and *NATURAL HISTORY*

**Volume-by-volume subscription  
includes 5 complete issues.**

*Michigan's only ornithological journal is peer-reviewed and features bird and butterfly survey data, in addition to articles submitted by amateur and professional ornithologists.*

Subscribe online:  
**[www.michiganaudubon.org](http://www.michiganaudubon.org)**

almost under the extent of the blades. They seemed to have no hesitation in approaching turbines, despite having many other places to pass farther away.

At a more inland turbine, flocks of jays following a line of trees westward, moved directly toward a turbine. These birds encountered a treed ravine east of the turbine. There, they turned north or south to follow the trees to avoid a large gap, the field in which the turbine stood. But, many flew across the ravine to the west side, within 30m of the turbine tower (under the extent of the blades) before moving north or south.

One October afternoon several small groups of Black-capped Chickadees (*Poecile atricapillus*) were also seen avoiding a gap by flying inland from tree to tree.

There is little reason to think that wind turbines had any appreciable effect on the migration of Blue Jays along the Lake Erie near-shore areas (or elsewhere). Jays were not reluctant to move closer to wind turbines. But there is considerable evidence that the farm fields provided definite barriers to the movements of jays (and at least some other species). The extra flying by many of the jays, to avoid crossing gaps, must have contributed considerable energetic cost to the migrant jays.

## Acknowledgements

I am very appreciative of the willingness of private landowners to allow my incursions to monitor turbines and to watch migrant birds. Their tolerance and support was necessary and esteemed. Thanks is also extended to Erie Shores Wind Farm for the opportunity and cooperation in undertaking activities near turbines, and to the personnel of International Power Canada Inc. (formerly AIM PowerGen Corp.) for involving me in the project.

---

## Literature Cited

- Bildstein, K.L.** and **K. Meyer.** 2000. Sharp-shinned Hawk (*Accipiter striatus*). In *The Birds of North America*, No. 482 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, Pennsylvania.
- James, R.D.** 2008. Wind turbines and birds — the Erie Shores Wind Farm experience: nesting birds. *Ontario Birds* 26:119-126.
- Smallwood, J.A.** and **D.M. Bird.** 2002. American Kestrel (*Falco sparverius*). In *The Birds of North America*, No. 602 (A. Poole and F. Gill, eds.). The Birds of North America Inc., Philadelphia, Pennsylvania.
- Tarvin, K.A.** and **G.E. Woolfenden.** 1999. Blue Jay (*Cyanocitta cristata*). In *The Birds of North America*, No. 469 (A. Poole and F. Gill, eds.). The Birds of North America Inc., Philadelphia, Pennsylvania.

---

Ross D. James, S1480, Conc. 7, R.R. #3, Sunderland, ON. L0C 1H0