

**RE: GALLOO ISLAND WIND, LLC. Case No. 15-F-0327**

Date: October 25, 2016

Document title: Request for radar studies.

Submitted by:

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October 25, 2016

Hon. Kathleen H. Burgess  
Secretary to the Commission  
Three Empire State Plaza  
Albany, New York 12223-1350

Kevin Casutto  
Presiding Examiner  
Three Empire State Plaza  
Albany, New York 12223-1350

**RE: GALLOO ISLAND WIND, LLC. 15-F-0327**

Dear Secretary Burgess and Presiding Examiner Casutto:

In addition to concerns for Galloo Wind Farm infrasound and low frequency noise impacts on nesting birds on Little Galloo<sup>1</sup>, there is another issue of concern, collision mortality, that was largely ignored in Galloo Island Wind LLC's Preliminary Scoping Statement (PSS).

In drafting the Power New York Act of 2011, New York legislators were concerned with *"the expected environmental impacts of the (wind-powered) facility on avian and bat species."*<sup>2</sup> They were concerned to the extent that they stipulated *"preconstruction studies, avoidance plans and where unavoidable, a plan to minimize and mitigate any such impacts."* Earlier this year, an avian radar study published by the U.S. Fish and Wildlife Service<sup>3</sup> (USFWS) supported the concerns legislated by New York law-makers. The USFWS found high numbers of avian and bat species migrating along Lake Ontario's shoreline in 2013. One of their radar sites was located in Jefferson County, just a few miles from Galloo Island. They reported, *"At the survey locations this season, our risk analysis revealed that during a large proportion of nocturnal hours or nights overall, the numbers and densities of birds and bats flying in or near the rotor-swept zone were high."* One of the report's conclusions recommended, *"The importance of shoreline areas, as revealed by our study, highlight the need to avoid these areas as migration corridors as recommended in the Service's Land-Based Wind Energy Guidelines (USFWS 2012)."*

In contrast to the concern and recommendations of New York legislators and federal biologists, Galloo Island Wind LLC consultants and NYSDEC expressed little or no interest in assessing migrating bird and bat species impacts. In the PSS they recognized *"some level of avian and/or bat mortality associated with bird/bat collisions with the turbines (p.37)."* The sponsor also reported meeting with NYSDEC and USFWS (p.95) to plan subsequent studies, but nothing was planned to assess potential collision impacts

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<sup>1</sup> Filing No. 51, Case No. 15-F-0327

<sup>2</sup> Sections 163(c) and 164(j)

<sup>3</sup> Rathbun N. A., T. S. Bowden, R. L. Horton, D. C. Nolfi, E. C. Olson, D. J. Larson, and J. C. Gosse. 2016. Great Lakes Avian Radar Technical Report; Niagara, Genesee, Wayne, and Jefferson Counties, New York; Spring 2013. U.S. Department of Interior, Fish and Wildlife Service, Biological Technical Publication FWS/BTP-3012-2016

between birds/bats and project wind turbines. Avian risk assessment was mentioned casually with some reference to diurnal, cross island movements of Ring-billed Gulls from Little Galloo, but no specific reference was made to the biggest potential for bird and bat collision mortality – spring and fall avian migrations.

NYSDEC commented on Galloo Island Wind LLC's PSS and noted: *"The Galloo Island Wind Energy Facility's Preliminary Scoping Statement fails to mention the importance of the Atlantic flyway for migratory birds and raptors and the presence of Galloo Island within this major migratory corridor."* That was the extent of NYSDEC's interest – failing to mention – since they did not suggest or recommend studies to quantify and assess collision risk of migrating species through the project's turbine rotor zone. However, in Table 6 of the PSS the sponsor did reference two Hounsfield Wind Farm radar studies done by Stantec Consulting in 2008, during the spring and fall migrations. Other than providing the reference there was no discussion of the importance or significance of the work. Perhaps the reason for the inattention by the sponsor and NYSDEC was Stantec's misleading results and conclusion in their study reports.

Stantec Consulting, Topsham, ME prepared spring and fall avian radar studies on Galloo Island that were included as appendices in the Hounsfield Wind Farm Draft Environmental Impact Statement<sup>4</sup>. The studies sought to document and quantify the nocturnal migration habits of bird and bat species over Galloo Island in 2008, including an assessment of potential collision mortality impacts. Their spring report concluded, *"The mean passage rate at the Project area was observed to be at the high end of the range of passage rates documented at other regionally proximate, inland sites."* But they qualified this conclusion, *"However, both the high (319 m) mean seasonal flight height, as well as mean seasonal percent targets below turbine height (19), observed at Galloo are within the range of other similar and regionally based studies, and support **indications of a lowered risk of collision at the site due to the fact much of the seasonal migration occurs at elevations well above the turbine heights** (my emphasis) ."* This is in contrast with the conclusions of the aforementioned USFWS radar study of 2013 where the high numbers of migrants suggest the site should be avoided. Stantec used a bit of deception in their reporting. To suggest collision mortality would be low because only one-fifth of all migrants would be in the rotor zone is a deceptive, misleading analysis. It is not a percentage in the rotor zone that is important, rather what is most important it is the number passing in the rotor zone and the potential numbers killed.

When I examined Stantec's data and calculated numbers of birds and bats passing over the island and those traveling through the rotor zone of the proposed 2008 wind farm I found that 1.4 million avian species traveled over the island with nearly ¼ million passing through the rotor zone. Again, using Stantec's data I also estimated that there was a potential for 39,000 deaths from collision mortality. Stantec concluded that there was a low risk of collision because only 19% of targets were within the rotor zone. This is misleading. What is important is not the percent of avian species passing through the rotor zone, but what the percentage represents - the actual number of birds and bats. The actual

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<sup>4</sup> Draft Environmental Impact Statement for the Hounsfield Wind Farm, Feb. 27, 2009, Appendices 4 and 5.

numbers moving through the rotor zone and the potential numbers of collision kills are easier to comprehend and lead to a far different conclusion than what Stantec provided.

### Numbers Avian Species Migrating over Galloo in 2008

I used Stantec’s radar survey data to better quantify the numbers of migrating birds and bats that moved through the turbine rotor zone and to also gauge potential collision risk. I focused on the area occupied by turbines (e.g., rotor diameter to 125 m, maximum height of turbines), rather than the broader vertical description provided by Stantec.

The results of my examination are presented in Table 1. Again, the data was taken from Stantec’s report; I just presented them in a more meaningful form (numbers of birds & bats rather than targets/km/hr) that makes it easier to understand and assess the risks. In spring and fall, 816,462 and 543,876 birds and bats traveled over Galloo Island, respectively. This estimate of over-island migration is a simple expansion of Stantec’s passage rate, number of nights sampled, hours per night, and the east-west cross sectional length (e.g., 2.87 km) of Galloo Island at the point where the radar was located. In total 1.36 million avian species flew over Galloo during 2008 migrations. Using Stantec’s percentage of targets below 125 m, numbers of avian species flying through the rotor zone was 155,128 and 92,459 for spring and fall, respectively. In total 247,587 birds and bats traveled through the proposed Hounsfield rotor zone in 2008.

**Table 1.** Numbers of birds and bats passing over Galloo Island and through the Hounsfield Wind Farm rotor zone during spring and fall migration periods in 2008. Data from Stantec Consulting.

Parameters	Spring 2008	Fall 2008	Totals 2008
Mean avian passage rate (t/km/hr)	624	282	
No. nights	47	60	107
Mean. hrs./night <sup>5</sup>	9.7	11.2	
Island cross section @ radar(km)	2.87	2.87	
Avian species passing over Galloo Island	<b>816,462</b>	<b>543,876</b>	<b>1,360,338</b>
Percent below 125 m	19%	17%	
Avian species passing through the rotor zone	<b>155,128</b>	<b>92,459</b>	<b>247,587</b>
Wind farm blade + tower area <sup>6</sup> (m <sup>2</sup> )	40,635	40,635	
Island turbine area <sup>7</sup> (m <sup>2</sup> )	258,300	258,300	
Proportion island turbine area blocked by blades	0.157	0.157	
Avian species collision mortality index (nos.)	<b>24,355</b>	<b>14,516</b>	<b>38,871</b>

<sup>5</sup> Mean night length for beginning and ending nights of survey

<sup>6</sup> n=84, 3.0 MW WTG having a 90 meter rotor diameter and a hub height of 80 meters, for a total maximum height of 125 meters (410 feet) from blade tip to ground.

<sup>7</sup> Island cross section \* rotor diameter (2870 \* 90 = 258,300m<sup>2</sup>)

## Collision Mortality



**Bald eagle resting on northern most tip of Galloo Island, Sept. 7, 2016. Photo C.P. Schneider**

Long before wind turbine avian collision mortality became an issue, biologists were concerned with collision mortality with telecommunication towers. Large, single-night mortalities were not unusual. In one example 12,000 birds were killed in one night in 1963 at a television tower in Wisconsin<sup>8</sup>. Fatalities are most prevalent on nights with reduced visibility, i.e., new moon nights with fog, overcast and/or rain conditions. Collisions can actually be increased over what is expected from a tower located in the direct path of a migrant. On low visibility nights, lighted towers attract nocturnal migrants that can become disoriented and fly around the lighting thereby increasing the risk of collision<sup>9</sup>.

To estimate collision mortality potential for the Hounsfield project I treated the proposed 82 turbines as stationary towers in the path of migrants. The turbine rotor zone area, 258,300 m<sup>2</sup>, was calculated using the rotor diameter, total height of turbines and cross-sectional distance of Galloo Island at the radar site (e.g., 2.87 km). The surface area of turbine blades and towers totaled 40,635 m<sup>2</sup> and this represented 15.7% of rotor zone area. Of the 155,128 avian species that move through the island turbine area in the spring, 37,316 (e.g., 155,128 \* 0.157) could potentially collide with Hounsfield's 82 turbines, assuming non-avoidance. The similar estimate for fall was 92,459 birds and bats. Collectively, 247,587 birds and bats could potentially collide with the Hounsfield turbine array. This represents a maximum potential for collision. Birds and bats usually try to avoid stationary objects in their path, if they are visible. Consequently, the number of actual collisions and subsequent mortality would be less. However, moving blades may be more problematic and attractive lighting on turbines could exacerbate collision probability.

**Worst Case Scenario:** I examined subsets of Stantec's spring and fall radar studies to make a more confident, worst-case estimate of collision mortality. Following what was learned from towerkills, I used Stantec's passing rate (e.g., t/km/hr) and percentage below tower height data for +/- 3 nights of each new moon phase during the spring and fall surveys. I then retrieved sky condition data from Stantec's Table 7 and Watertown and Syracuse airport weather data for the midnight period<sup>10</sup>. I assumed complete mortality from collision for those nights around the new moon with overcast, cloudy and rainy conditions. For those new moon nights with clear skies I assumed birds and bats avoided turbines with no mortality. The results outlined in Table 2 show that for 16 new moon and adjacent nights 6,805 birds

<sup>8</sup> Erickson, W.P., G.D. Johnson and D.P. Young, Jr. 2005. A Summary and Comparison of Bird Mortality from Anthropogenic Causes with an Emphasis on Collisions. USDA Forest Service Gen. Tech. Rep. PSW-GTR-191, pp. 1029-1042.

<sup>9</sup> op. cit.

<sup>10</sup> For a few nights without local data I used Syracuse airport sky condition reports.

and bats would have collided with turbines and died. Within the +/-3 days of a new moon there were five days that Stantec did not survey and four of these had poor visibility weather conditions. Consequently, worst-case new moon mortality would have been closer to 10,000 birds and bats. As noted, this is a worst-case, minimum estimate where sky conditions would have made visual avoidance impossible. It also represented estimated mortality for just those 16 nights around the new moon and does not include additional mortality for the other 91 nights during the 2008 migration period monitored by Stantec.

In summary, collision mortality can be assessed by converting Stantec's passage rates to numbers moving through the rotor zone and predicting loss based on the probability of encountering turbine parts. The estimated 38,871 potential collision loss is large and very significant. Some may argue about avoidance and actual numbers killed, but the worst-case estimate of 6,805 killed is likely and should be a significant concern. Over the twenty year course of the Hounsfield project collision mortality would have been substantially more than the worst-case estimate of 116,000, but probably less than the ¼ million maximum estimate. Regardless, the extent of potential collision mortality for migrating birds and bats over Galloo Island is an issue that deserves continued study by Galloo Island Wind LLC in 2017.

Reporting Stantec's 2008 radar data by referring to numbers of birds and bats passing and potentially colliding with the project's turbines is much more understandable and has far greater significance than the approach used by Stantec, that suggested if most migrants fly above the rotors then risk of collision is low. I suspect if Stantec presented actual numbers and assessed collision risk it would have received far greater attention by the sponsor, resource agencies and the general public. Nevertheless, the potential for avian collision mortality was significant, not a low risk as Stantec concluded.

### **Conclusion & Recommendations:**

In the first iteration of the Galloo Island wind project, e.g. Hounsfield, there was failure to properly identify the wind turbine collision risks for avian migrants. Stantec failed to report that more than a million birds and bats flew over Galloo Island during their spring and summer migration in 2008. They also failed to report that their data showed nearly ¼ million migrating birds and bats moved through the rotor zone over Galloo and that it would be likely that thousands of birds and bats would be killed annually. Instead they reported that only 19 and 17 percent of migrants flew below turbine height, suggesting low collision risk, which I maintain was erroneous.

Based on the PSS from Galloo Island Wind and NYSDEC's comments, it seems as though the past failures will be continued. Galloo Island Wind LLC referenced the Hounsfield radar studies in their PSS, but failed to pick-up on Stantec's sleight-of-hand. They never mentioned the need for any study of collision impacts associated with migrating birds and bats. NYSDEC's only comment was the failure to mention the Atlantic Flyway. They too provided no further direction other than suggesting that Galloo Island Wind should reference the flyway in future reporting.

The time has come, however delayed, for the sponsor to include a comprehensive assessment of the spring and fall migration dynamics over Galloo and potential collision impacts into their current environmental studies plan. Galloo Island Wind LLC should conduct a 2017 spring and fall radar

assessment of the migrating avian species moving over Galloo, including an analysis of potential collision risk. Galloo Island Wind LLC should enlist the help of the US Fish and Wildlife Service's Avian Radar Team. USFWS should oversee the setup and methodology; they should review the data and data analysis and review the sponsor's final report. The sponsor should use numbers to report impacts and not passing rates and they should concentrate on numbers lost in the rotor zone and not the percentage of those migrants moving over the island. Given the same scope of potential impact, all parties should begin the process of evaluating operational constraints to the Galloo Wind project, i.e., nighttime shut-downs during spring and fall migration period.

The decision to initiate an industrial wind project at an extremely sensitive site comes with a responsibility that avoiding risks, as stipulated by New York legislators, will mean sacrificing some generation capacity. We must appreciate that we cannot mitigate killing thousands of migrating birds and bats by purchasing 200 acres of land on the mainland and mowing it each year (i.e., the principal avian mitigation for Hounsfield project). In the case of migrating birds and bats the best approach is to avoid collision mortality because it can be done easily and effectively. I sincerely hope that Apex Clean Energy/Galloo Island Wind LLC does a better job of assessing avian impacts than its previous counterpart. I also hope that both NYSDEC and USFWS recognize that putting a wind farm on Galloo Island has the potential for killing substantial numbers of migrating avian species, and therefore, they, too, should be demanding the sponsor conduct studies to provide a better picture of potential impacts and that if these impacts corroborate Stantec's data they should request constraints on night operations to avoid collision risks.

Finally, if there are any questions regarding my methods, approach and conclusions I would invite a review by the USFWS Avian Radar Team in Bloomington, MN and their assessment of Stantec's reporting.

Sincerely yours,

A handwritten signature in black ink that reads "Clifford P. Schneider". The signature is written in a cursive, flowing style with a prominent initial 'C'.

Clifford P. Schneider  
Pro Se

**Table 2.** Summary of predicted collision mortality for Galloo Island migrating avian species on new moon and adjacent nights.

Stantec Radar Studies	Moon Phase	Passing t/km/hr	Percent <125m	Wind m/s	Midnight Sky Conditions	Airport	hrs/nite	No. Passing <125m	Collision Mortality
2-May-08		466	4%	7	overcast	WAT	9.5	508	80
3-May-08		no data	no data		light rain	WAT	9.5	na	na
4-May-08		556	29%	9	clear	WAT	9.5	4396	na
5-May-08	NEW	1630	12%	7	clear	WAT	9.5	5333	na
6-May-08		985	43%	6	overcast	WAT	9.5	11548	1813
7-May-08		622	11%	10	overcast	WAT	9.5	1865	293
8-May-08		667	13%	4	clear	WAT	9.5	2364	na
								Sub-total:	2,186
31-May-08		811	32%	11	overcast	WAT	8.75	6517	1023
1-Jun-08		444	47%	10	overcast	WAT	8.75	5240	823
2-Jun-08		615	20%	8	mostly cloudy	WAT	8.75	3089	485
3-Jun-08	NEW	End Survey	no data		overcast	WAT	8.75	na	na
4-Jun-08			no data		overcast	WAT	8.75	na	na
5-Jun-08			no data		overcast	WAT	8.75	na	na
6-Jun-08			no data		clear	WAT	8.75	na	na
								Sub-total:	2,331
27-Aug-08		216	27%	5	overcast	WAT	10.5	1757	276
28-Aug-08		96	21%	8	light rain	SYR	10.5	608	95
29-Aug-08		87	21%	5	mostly cloudy	SYR	10.5	551	86
30-Aug-08	NEW	552	12%	7	clear	SYR	10.5	1996	na
31-Aug-08		375	23%	2	clear	SYR	10.5	2599	na
1-Sep-08		186	27%	3	clear	SYR	10.5	1513	na
2-Sep-08		206	24%	3	clear	SYR	10.5	1490	na
								Sub-total:	458
26-Sep-08		225.0	24%	5	overcast	SYR	12	1860	292
27-Sep-08		81.0	8%	4	fog	SYR	12	223	35
28-Sep-08		311.0	7%	7	overcast	SYR	12	750	118
29-Sep-08	NEW	198.0	26%	5	overcast	WAT	12	1773	278
30-Sep-08		165.0	17%	5	overcast	WAT	12	966	152
1-Oct-08		445.0	10%	7	rain	WAT	12	1533	241
2-Oct-08		601.0	22%	8	overcast	WAT	12	4554	715
								Sub-total:	1,830
								Annual Total:	6,805
								no. nights	16
								mean/night	425