STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

Petition of BNE Energy Inc. for a Declaratory Ruling for the Location, Construction and Operation of a 3.2 MW Wind Renewable Generating Project on New Haven Road in Prospect, Connecticut	Docket/Petition No. 980 March 8, 2011

Supplemental Pre-filed Testimony of D. Scott Reynolds, Ph.D.

The following pre-filed testimony supplements my pre-filed testimony filed on February 16, 2011, in connection with the above-captioned matter.

13. Did you review BNE's responses to SPC's second set of interrogatories?

Yes.

14. In your professional opinion, do you have any concerns with BNE's responses?

Yes.

15. Please identify the interrogatory responses that you are concerned about.

Please comment on each response identified.

Q61. How does the pre-construction bat sampling protocol used at the Site differ from those used at other wind energy facilities across the eastern United States?

A61: Survey protocols and analysis methods used were consistent with approaches used across the country for pre-construction wind-energy studies (e.g. Cape Vincent Wind, New York) and recommended in state (e.g. New York, Pennsylvania, Maine) guidelines and federal (draft) recommendations, as well as by scientists working in the fields of bat bio-acoustics and bat ecology (e.g. Kunz et al 2007, Arnett et al 2008,
Brintsky 2004).

Comment: This is not an accurate statement. The NYDEC, NJDEP, PAGC, and Maine DNR all have guidelines that recommend at least one year of pre-construction acoustic monitoring using elevated sampling platforms. Furthermore, the Bats and Wind Energy Cooperative (BWEC) Advisory Group (cited as Kunz et al. 2007) recommend elevated sampling

- and Gregory Johnson and Dale Strickland (both WEST, Inc. employees) are members of BWEC. Lastly, a paper published by one of the Prospect Wind authors (J. Gruver) shows that temporal variation in bat activity can be accounted for by vertical shifts in bat activity throughout the night, and that different species adjust their activity in different ways. In the conclusion to this research, he states that "[e]xclusive use of ground-based equipment can result in an incomplete picture of the activity of bats in complex forest stands." (Hayes and Gruver, 2000). Although the Prospect Wind site is not a complex forest stand, research at most wind development sites shows the same conclusion: bat activity is highly variable temporally, spatially, and vertically. By failing to account for any vertical variation and having only a limited amount of spatial sampling, it is difficult to characterize the bat activity at the Prospect Wind project site using the pre-construction bat sampling protocol designed by WEST.

Q62. Please describe the calibration methods and sensitivity settings used on the Anabat detector systems.

A62. Anabat detectors record bat echolocation calls with a broadband microphone. Calls were recorded to a compact high-capacity flash memory card; data were subsequently transferred onto a computer for analysis. The echolocation sounds were then translated into frequencies audible to humans by dividing the frequencies by a predetermined ratio. A division ratio of 16 was used for this study. Bat echolocation detectors also detect other ultrasonic sounds, such as those sounds made by insects, raindrops hitting vegetation, and other sources. Depending on the environment in which the unit was placed, a sensitivity level of 5.5 or six was used to reduce interference from these other sources of ultrasonic noise. To ensure similar detection ranges among anabat units, microphone sensitivities were calibrated using a BatChirp ultrasonic emitter (Tony Messina, Las Vegas, Nevada) as described in Larson and Hayes (2000).

Comment: The Larson and Hayes (2000) citation used by WEST is a method for determining sampling volume of a microphone, and replicating their work requires an ultrasound source that has both frequency and sound intensity controls; the BatChirp has neither. The BatChirp can be used to determine the detection range of a microphone and to adjust different microphones to have similar detection ranges, but if that was done, the adjustments and detection

ranges should have been provided in the report. Lowering the sensitivity to 5.5 or 6.0 does reduce the amount of noise, but it also substantially lowers the detection range of the microphone, making it likely that the low bat activity detected at Prospect Wind was partially due to the reduced sensitivity of their microphone.

Q64. Please explain why ground microphone systems were used to monitor bat activity when there was a meteorological tower on Site that could have sampled within the rotor swept area.

A64. Ground-based Anabat sampling has been a standard component of preconstruction acoustic bat monitoring at commercial wind-energy sites for several years. Over recent years, scientists working in this field (e.g. Kunz et al 2007, WEST) have recommended acoustic sampling within the rotor swept zone, however, this is not always possible because elevating detectors to sufficient height may not be feasible because: 1) suitable structures may not be present, or 2) because suitable structures may not be altered without risking damage to the structure or other equipment. At the Site, the second scenario was the reason why an elevated detector could not be deployed – placement of a detector (or means of elevating a detector such as a Bat Hat system) would have required lowering the meteorological tower to the ground which may have damaged meteorological instrumentation and resulted in study delay. As such, two ground based detectors were deployed at the Project – one was located in an existing forest clearing while the second was located at a proposed turbine location. This sampling design allowed for comparative analysis between bat activity at a proposed turbine location with an open canopy clearing.

A current conclusion reached by biologists working in the field of wind-energy/wildlife interactions is that bat activity indices derived from pre-construction acoustic studies show a rough correlation with post-construction fatality patterns (see final bat report and NWCC 2010). This conclusion is based on ground—based Anabat sampling.

Comment: See comment to answer to question no. 61 - ground based Anabat sampling in not a standard component of any state, federal, or NGO pre-construction monitoring program. As BNE states in its response, experts recommend sampling within the rotor swept zone. This includes the Bats and Wind Energy Cooperative Technical Advisory Group, which includes Thomas Kunz (Boston University), Robert Barclay (University of Calgary; J. Gruver worked with Dr. Barclay), and both Dale Strickland and Gregory Johnson (both WEST, Inc. employees). BNE does not provide any justification for failing to lower the met towers beyond the assumption that it "may have damaged meteorological instrumentation and resulted in study

delay". Lowering met towers to service the meteorological equipment and to attach bat acoustic detectors is a standard industry practice. NEES was the first to deploy met tower-based microphones in the spring of 2004. I have been involved in the lowering of over one hundred towers throughout my career without ever seeing damage to a single tower or piece of meteorological equipment. The fact that BNE also failed to lower the met tower at the Colebrook, CT wind site suggests that the decision to not use the met tower was a management decision based on convenience, not concern for data loss.

Q65. What factors lead to the conclusion that the Site is not located in the vicinity of concentrations of the state-listed eastern red and hoary bats?

A65. The results of acoustic Anabat surveys indicated that passes by eastern red bats (32 calls) accounted for only 1.4 % of total passes recorded and only 4.5% of all midfrequency calls (Table 2, Bat Acoustic Report). All (100%) of eastern red bat activity was recorded at station PA1 (Table 2; Figure 9). The majority of recognizable eastern red bat activity occurred between August 6 and August 19 (31.2%; Figure10), with peak activity within a 7-day period occurring between August 8 and 17, 2010 (mean of 0.64 bat passes/detector-night; Table 4). Bat calls identified to species by the SM2 detector indicated 16.6 % of calls were eastern red bats. All of the eastern bat calls were recorded at the PA1 station, which was situated in a cleared grassland area – a man-made habitat not respective of the natural landscape of deciduous forest dominating the site. These results indicate that low numbers of eastern red bats were active at the site and that the majority of activity may have been migratory, and not resident activity.

The majority of the site is comprised of dense forest. Bats active at low altitudes within the forest cover dominating the site are likely to be species such as northern long-eared bat or little brown bat which have the size and anatomy to able to maneuver between the trees and are known to forage in intact forest habitats (Lacki et al. 2007). Owing to their call structure, generally larger body size and wing shape, these bats are predicted to forage primarily in open relatively uncluttered air space (Norberg and Rayner 1987, Lacki et al. 2007). For this reason, it is not surprising that the majority of low frequency bat passes were detected at station PA1. All but one hoary bat call was recorded at station PA1. The small number of recognizable hoary bat calls recorded within the study area may be due to their relative abundance, to the conservative approach taken to determine species identification, or to not being as readily detectable by groundbased detectors. Passes by hoary bats (51 passes) comprised only 2.2% of total passes detected within the study area and 4.7% of all LF passes. All but one hoary bat call was recorded at station PA1 (see above and Bat Acoustic Report).

Comment: This is perhaps the biggest problem with the report, and one that highlights the poor methodology employed. I agree with WEST in the use of a conservative approach to call classification. After extensive justification of this approach, however, they abandon it and argue that red bats and hoary bats are not common at the site. Although they mention that their analysis is based only on the 'recognized' eastern red bats calls, they never highlight the fact that there conclusions are therefore limited to the 4.5% of the MF calls that were identified to species. Making conclusions based on only 4.5% of the available data is not scientifically acceptable by any standard. WEST and BNE further conclude that the lack of red bat calls in PA2 is consistent with the ecomorphology of this species, but they fail to state that PA2 had almost twice as much MF activity as PA1. They also fail to provide full citation for their ecomorphology analysis, but if Lacki et al. (2007) is from the Bats in Forest book, they mischaracterize that citation. Lacki et al. (2007) clearly states that red bats utilize riparian forests and forest gaps. However, they also state in that same reference that high elevation ponds are crucial habitat for forest-dwelling bats and that proximity to water may be one of the most critical factors influencing foraging activity.

WEST argues that the Anabat (PA1 and PA2) and the Wildlife Acoustics (SM2) systems were used for this study because they are complementary technologies. However, it is difficult to determine this since WEST analyzed the data in different formats. The Anabat data were analyzed by total calls and species composition; for the MF bats, that meant 704 calls, with only 32 calls (4.5%) from eastern red bats. The implied assumption is that the remaining calls are from the little brown myotis. For the SM2 data, WEST presented the results by species detected and frequency of nights detected. For red bats, that was 6 nights (16.6% of sampling period). However, because they failed to assign percent of calls to this data, it is difficult to directly

compare them. Had they done so, I am confident that the inconsistency of their methods would have been more apparent.

Based on WEST's classification criteria and the data provided, the following conclusions can be made:

- The MF call group contains two species, the eastern red bat and the little brown myotis.
- Based on the Anabat systems, MF calls make up 39% of the total bat activity at the Prospect Wind site.
- The Anabat data show that red bats make up only 4.5% of the MF calls.
- WEST does not suggest any reason why the call identification rate would differ between species, therefore the call classification rate would be a random subset of the total calls.
- Therefore, by making conclusions based on those 4.5% of identified calls, and by citing the ecomorphology of the species to explain the differences between PA1 and PA2, WEST is assuming that 95.5% of the MF calls are little brown myotis.
- However, the SM2 data show that little brown myotis make up only 2.7% of the nightly call activity.
- The SM2 data show that red bats make up only 16.7% of the nightly call activity

All of WEST's conclusions based on species-specific activity rates are based on the validity of the classification groups and the assumption that call identification rates would not differ between species. However, rather than being complementary, the Anabat and SM2 data are completely inconsistent. The same problems also exist for hoary bats, which comprise only 5% of the recognized LF calls (implying the remaining calls are big brown bats and silver-haired bats) based on Anabat monitoring, but are found on no more than 50% of the sampling nights based on the SM2 data analysis. Therefore, WEST should abandon their species-specific analysis and focus on the use of conservative species groups.

Q66. Please summarize the effort that was conducted to reach the conclusion

that the "PWRA is not in the vicinity of any known bat colonies or features likely to attract large numbers of bats."

A66. A review of publically available information, a habitat assessment and results of acoustic surveys were evaluated to reach this conclusion.

a. Overwintering habitat: There is no suitable habitat on the Project site to support overwintering bats – no caves or mines are present which could serve as hibernaculum.
The closest known hibernaculum to the Project site is located in Roxbury at the former Roxbury Iron Mine, approximately 20 miles to the northwest in Litchfield County.

Breeding Habitat The project contains forestlands and some forested wetlands which likely support tree-roosting bat species common to the region. These habitat types are not unique to the project; nor do they occur in greater abundance or quality relative to the surrounding region, based on landcover imagery and the results of the habitat analysis. Tree-roosting bat species which are likely to occur within the region are largely solitary roosting and do not generally occur in large aggregations (Harvey 1999, BCI 2010, DeGraaf and Yamaski 2001). All three species of migratory tree bat known to occur in Connecticut are not thought to be abundant (CTDEP 1999d). Silver-haired bats seem to prefer to roost in old growth high elevation coniferous forest which is a habitat type avoided by development on the Site to the extent practicable. Hoary bat also prefers coniferous forests, but will use regenerating deciduous forests, including maple, cherry, and hemlock (Godin 1983, Shump and Shump 1982). Hoary bats will roost in the dense foliage in tree crowns, and individuals will travel up to 24 miles round-trip on the first foraging flight of the night (Bat Conservation International 2010d). Hoary bats do not aggregate in large breeding colonies. Eastern red bat, perhaps the most abundant migratory tree bat in North America, prefers to roost in more exposed positions than other bats, usually on a tree branch or the stem of a leaf. This species will roost in both deciduous or evergreen trees, and generally roosts solitarily, with the exception of mothers and their young. Roost sites must be open underneath to allow easy exit and entry (Majer and Nelson 2001). The majority of the site contains a thick understory of vegetation. Red bats are typically found in lowland habitats, and the adjacent New Naugatuck Reservoir property, which is lower and has a riparian corridor associated with it, may offer more appealing roosting habitat than the Project site itself.

Comment: This response is more comprehensive than the report and yet does not answer the question, particularly concerning non-forest bat species. Based on WEST's data analysis, up to 98% of the LF calls (47% of all calls) are from big brown bats and up to 96% of all MF calls (31% of all calls) are from little brown bats. Therefore up to 77% of the bat activity at the project site are colonial bats with relatively small home range sizes. How does WEST reconcile this data with its conclusion that there are no bat colonies near the project site?

Because of the general lack of pre-existing data on bat populations at many wind development sites, the California Energy Commission's Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Develpment (CEC, 2007) states the site screening criteria should be based on "known or likely to occur" rather than merely "known". The CEC also defines "near" to refer to any distance that is within the area used by an animal in the course of its normal movements and activities. By these reasonable screening criteria, , it should have been assumed that some maternity roosts would have existed near the project site and that there are features near the project site, such as the Naugatuck Reservoir, that would act as an attractant to foraging bats. By limiting their analysis to 'known bat colonies', BNE erroneously implies that effort was made to discover such data.

Q67. Please summarize your knowledge of the role of permanent water and wetlands as attractants for bats.

A67. BNE objects to this interrogatory because it is overly broad and unduly burdensome. Subject to this objection and without waiving the same, BNE responds as follows: see numerous sources describing bat ecology (e.g. Lacki Hayes and Kurta 2007).

Comment: WEST should readily acknowledge that permanent water such as the Naugatuck Reservoir, acts as major attractants to foraging bats. Yet the report states that "the PWRA is not in the vicinity of any known bat colonies or features likely to attract large numbers of bats" despite the fact that the Naugatuck Reservoir is only 400 ft from the PWRA site. (see page 23). It may be awkward and suggest a lack of effort, but declaring this fact is not unduly burdensome.

16. Did you review the pre-filed testimony of David Tidhar in this proceeding?

Yes.

17. Would you like to respond to anything in Mr. Tidhar's testimony?

Yes. Page 2 of the testimony states that, "Wind Prospect and the two proposed turbine locations on the Site are not in proximity to high-value bat habitat, which will minimize impacts to bats." On page 3 of the testimony, Mr. Tidhar further states that West has worked closely with BNE to minimize impacts such as "not creating or locating either of the turbines near permanent standing water, and minimization of clearance areas for roads, turbines, and infrastructures." Mr. Tidhar fails to mention that river valley systems, such as the Champlain and Connecticut River, are regional 'hotspots' for Indiana myotis and eastern small-footed myotis (Chenger 2004; Britzke et al. 2006; Waltrous et al. 2006); this is particularly true near reservoirs (Chenger 2004). Given that bat species often move multiple miles in a single night, it is unclear how Mr. Tidhar can conclude that having a reservoir 400 m from a turbine is not 'near' or 'in proximity' in any functional sense of these phrases.

Page 2 of the testimony states that, "West conducted both the breeding bird survey and bat acoustic studies in accordance with the United States Fish and Wildlife draft wind turbine guidelines, tiers one through three recommended assessments." It is unclear how Mr. Tidhar reaches this conclusion given that the Advisory Committee recommends: (1) a comprehensive Site Characterization (Tier 2) that should have included documenting the species composition and size classes of canopy trees throughout the project area, including an evaluation of the presence and density of tree snags throughout the project area, (2) a full year (April through October) of acoustic monitoring (Tier 3) collected concurrently with environmental variables such as temperature and wind speed, and (3) a monitoring protocol that is adequate temporally, spatially, and topographically to adequately characterize bat activity at the site.

In regards to the first point, the BNE habitat analysis identified several deciduous tree species that dominate the project site, including white ash, sugar maple, tulip poplar, and

shagbark hickory. All of these species are used by Indiana myotis (Menzel et al. 2001; Kurta and Rice, 2002; Timpone et al. 2010) and red bats (Hutchinson and Lacki, 2000; Perry et al. 2007). In addition, the documentation of snags on the project site should have warranted additional comment and study since snags are the dominant roosting habitat of Indiana myotis and several other bat species. In regards to the third point, the survey lacked adequate sampling diversity. WEST deployed only two independent monitoring stations (PA1 and PS1 were redundant) that were relatively close to each other, and failed to deploy any monitoring near the forested wetlands where bat activity should have been much higher. Wind Prospect also failed to deploy any monitoring systems on the MET tower despite the fact that the Advisory Committee "recommends placing acoustic detectors on existing met towers, approximately every two kilometers across the site where turbines are expected to be sited." (see page 37). The Committee also states that acoustic detectors "should be placed at high positions" and "near the rotor swept zone." The acoustic monitoring protocol used at the Wind Prospect site was deficient on each of these points and all of them appear to have been avoidable with a proper sampling design. The Advisory Committee states that "[m]onitoring and research should be designed and conducted to ensure unbiased data collection that meets technical standards such as those used in peer review" (see page 14); this goal was not, in my opinion, achieved by the Wind Prospect survey.

20. Are you familiar with any existing standards, guidelines or expert opinions that may be helpful to the Siting Council in its consideration of BNE's petition? If so, please identify them.

Yes. Several states explicitly rely on the USFWS Draft Guidelines (Oregon, Washington, Montana, New Mexico, North Dakota) or the National Wind Coordinating Committee Siting Handbook (Kansas, South Dakota); most of the remaining states rely on state

wildlife agency review. Although most states have not published detailed sampling protocols, eight states have guidance documents that detail minimum requirements. None of these states recommends ground-based acoustic monitoring as a primary sampling protocol.

New Jersey DEP Guidelines (NJDEP, 2009).

Tier 4 Structures (any site with turbines taller than 250', which would include Wind Prospect) should have one full year of pre-construction acoustic monitoring and two years post-construction acoustic monitoring (01 April - Oct 15).

- Should have monitoring at the project site and a reference site that is similar in habitat and near the project site.
- Monitors should be placed on met towers or elevated at appropriate heights with two detectors sampling the horizontal plane and one in the vertical plane for each turbine.
- Monitors should face north in the fall and south in the spring to capture migratory activity.
- Report should present an estimate of the number and species of bats recorded flying through the rotor swept area of the proposed turbine

New York DEC Guidelines (NYDEC, 2007)

Guidelines recommend acoustic monitoring on met towers from April 15 - October 15. If ground-based acoustics are used, they should be for summer monitoring and should be active (hand-held) transect surveys.

- Projects near endangered bat species may require mist-netting and additional work.

Pennsylvania Wind Siting Guidelines (PAGC, 2007)

The Pennsylvania Game Commission's pre-construction monitoring requirement was developed in consultation with the BWEC Advisory Committee. For a low-priority site, the PAGC requires acoustic monitoring (July through October) using met-tower based acoustic monitors.

Vermont ANR Guidelines (VTANR, 2006)

The VTDNR recommends two years of pre-construction acoustic monitoring, with at least two monitoring stations (with a minimum of two detectors per station) for all pre-construction acoustic monitoring protocols. Each station should use elevated sampling platforms (15m and 30m) and recording should occur from April through September.

Arizona Wind Guidelines (AGFD, 2008)

The AGFD places the burden of proof with the developer for any deviations from the standardized pre-construction survey efforts.

- Projects should coordinate pre-construction monitoring during the meteorological data collection phase.

- Projects should place acoustic monitoring stations on met towers in the proposed project area (identified as two Anabat detectors; one at ground level and one ideally within the rotor swept zone but not less than 30 m high).

- Total number of sampling stations depends on size of project and habitat complexity.

- For Category 2 sites (such as Wind Prospect), they require 1-2 years of pre-construction monitoring.

- The AGFD requires developers to identify physical attractants such as riparian areas, water or forage sources, or roosting habitat that could attract and concentrate bats.

- Sampling stations should be distributed evenly over the project site to maximize the ability to collect data; when sites have habitat complexity, they should also be placed to sample varied habitats.

Maine Windpower Advisory Group (Jones, 2006)

- Recommends sampling at elevated platforms for an entire year of bat activity.

Maryland Wind Technical Advisory Group Siting Guidelines (Gates et al. 2006)

- Developer should conduct one year of monitoring at the proposed site - the monitoring should be seasonally and spatially appropriate for the project.

California Bat Working Group Survey Protocol for Wind Energy (Hogan, 2006)

- Ground-level acoustics can't adequately assess migratory activity.

- Ideally two years but minimally one year of passive acoustic monitoring to capture the spatial and temporal variation in bat activity.

U.S. Fish and Wildlife Service Wind Turbine Guidelines Advisory (USFWS, 2010)

The Wind Turbine Guidelines Advisory Committee identifies a tiered approach to the environmental review process. The first stage is a preliminary site screening, where one looks for well-known 'red flags' that would make a site clearly unsuitable for development. For bats, red flags could include knowledge that endangered species are roosting or hibernating on or in proximity to the project site. If no red flags are found, the Site Characterization (Tier 2) is

recommended. During the site characterization, the developer conducts a habitat analysis that includes documenting the presence of features that may indicate the presence of species of concern. For bats and forested habitats, these analyses are commonly conducted and the methodology (including necessary indices) is well documented. At a minimum, habitat surveys should include documenting the species composition and size classes of canopy trees throughout the project area, including an evaluation of the presence and density of tree snags throughout the project area. If a high density of large, potential roost trees are found, additional indices may be necessary to assess the likelihood that species of concern would roost on the project site.

Information from the site characterization is then utilized to develop appropriate field studies for the Tier 3 analysis. For bats, appropriate field studies identified by the Guidelines include acoustic monitoring and mist-netting. The Guidelines recommend acoustic monitoring for a full year, collected concurrently with environmental variables such as temperature and wind speed. The Guidelines state that the number of detectors needed to achieve the desired level of precision will vary depending on within-site variation. Furthermore, the "Committee recommends placing acoustic detectors on existing met towers, approximately every two kilometers across the site where turbines are expected to be sited." (see page 37). The Committee also states that acoustic detectors "should be placed at high positions" and "near the rotor swept zone." When additional sampling stations are needed at low positions, the Committee recommends using one or more mobile units to increase coverage of the proposed project area. The Committee also recommends monitoring of features identified as potentially high bat use areas within the study area to determine use of such features.

The Wind Guidelines state that "it is in the interests of wind developers and wildlife agencies to improve [pre-construction] assessments to better avoid or minimize the impacts of wind energy development on wildlife and their habitats." (see page 14). Later in that same paragraph the Committee states that "[m]onitoring and research should be designed and conducted to ensure unbiased data collection that meets technical standards such as those used in peer review." (see page 14).

Bat Conservation International (Arnett et al. 2005)

Surveys conducted in collaboration with BCI always rely on met-tower based monitoring and/or portable tower monitoring (40m high) to document migratory bat activity at proposed wind turbine sites.

In testimony to the U.S. House of Representatives Government Oversight Committee, Ed Arnett (2007) stated that there is no correlation between pre-construction monitoring and post-construction bat fatalities because most pre-construction surveys are flawed: too short in duration, flawed in design. This includes the reliance on ground-based monitoring.

Bats and Wind Energy Cooperative (BWEC)

Studies conducted by the BWEC research group in Pennsylvania (Arnett et al. 2005), Wisconsin (Redell et al. 2006), and Massachusetts (Arnett et al. 2007) always rely on elevated acoustic monitoring to document migratory bat activity. A guidance document published by BWEC

(Kunz et al. 2007) states that pre-construction acoustic monitoring should be conducted for multiple years with sampling in each major habitat. They further state that monitoring should be done at above 30m because ground monitoring does not detect bats at the rotor height.

Department of the Interior Framework Document (USDOI, 2009)

- Requires one full year of pre-construction acoustic monitoring on a met tower (April - October).

National Research Council - Environmental Impacts of Wind-Energy Projects (NRC, 2007)

- Recommends multi-year pre-construction monitoring to assess site usage and the influence of topography, habitat variation, and seasonality on bat activity.

Ontario Ministry of Natural Resources (OMNR, 2007)

The Ontario MNR Guidelines recommend elevated acoustic monitoring (25m - 110m) at multiple platforms. Data should be analyzed in species groups when species can't be readily identified and reference sites should be used when possible.

UNEP/EUROBAT Guidelines (Rodrigues, L. et al. 2008)

- Wind turbines constructed in forests may create linear corridors that attract bats near the turbines; they suggest a 200m buffer from the turbine base to the forest edge.

- Survey methods should use best technology and consideration of the height of the turbines. They recommend high altitude detectors in addition to hand-held mobile ground surveys.

- They recommend searching for any maternity colonies within 5 km of the turbines.

- Recommend ground acoustic surveys for every habitat in the study area.

- Recommend ground acoustic surveys at each planned turbine site.

21. Do you have any final comments on the influence of permanent water bodies on bat activity? If so, what are they?

Yes. Permanent water bodies generally have more bat activity than any other habitat type. In a pre-construction survey at the Maple Ridge Wind Project (Lewis County, NY) , permanent water sites had more than twice the level of bat activity as any other habitat type (including forest trails and fields) sampled (Reynolds, 2004). In addition, swamp and wetland

habitat had the highest species diversity of any sampled habitat, including forest trails and fields. (Reynolds, 2004). The lower level of bat activity seen at the Prospect Wind site may not represent a lack of bats on the project site as much at it represents the lack of sampling at high activity sites within the Project site.

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