Appendix F

Ostrander Point Wind Energy Park Acoustic Bat Monitoring Report

ACOUSTIC BAT MONITORING 2008-2009 OSTRANDER POINT WIND ENERGY PARK

DRAFT

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Table of Contents

List of Appendices

Table of Contents

List of Figures

Appendix A

List of Tables

Appendix B

1.0 Introduction

1.1 PROJECT OVERVIEW

Gilead Power Corporation ("Gilead") is a renewable energy development company that is privately owned and based in Peterborough, Ontario. Gilead is proposing to develop the Ostrander Point Wind Energy Park (the Project) in Prince Edward County, Ontario, in response to the Government of Ontario's initiative to promote the development of renewable electricity in the province.

The basic components of the Project include 12 Enercon E82 2 MW wind turbine generators with a total installed capacity of up to 24 MW, transformers included within each turbine, one on-site step-up transformer and underground electrical collector lines. This system will transport the electricity generated at the wind farm to the Hydro One Networks Inc.'s (Hydro One's) Distribution Network. The Project also includes construction access roads to the turbines as well as interconnection equipment and installations specified by Hydro One. The turbines will be situated exclusively on Crown land, known as the Ostrander Point Crown Land Block, also referred to in this report as the Study Area (Figure 1.0, Appendix A.

Gilead retained Stantec Consulting Ltd. (Stantec) to prepare a Renewable Energy Approval (REA) Application, as required under Ontario Regulation 359/09 - Renewable Energy Approvals under Part V.0.1 of the Act of the Environmental Protection Act (O. Reg. 359/09). According to subsection 6.(3) of O.Reg.359/09, the Project is classified as a Class 4 Wind Facility and will follow the requirements identified in O.Reg.359/09 for such a facility.

In addition, the Project is located on Crown land and the MNR is responsible for the management and administration of Crown land. In order to support Ontario's objective of promoting renewable energy sources, the MNR provides opportunities for Crown land to be used to develop renewable energy projects, including commercial wind power projects, via a "Commercial Wind Energy Lease". This lease grants land from the Crown issued under the Great Seal of Ontario that conveys a leasehold interest in public land for the purpose of construction, maintaining and operating a wind park. The term of the lease will generally be for 25 years with one extension for a further term of 15 years. Prior to granting a Commercial Wind Energy Lease, the MNR must review and approve the REA Application for the Project in the same capacity as the Ministry of the Environment (MOE) under O.Reg.359/09.

This Bat Report is one component of the REA Application for the Project, and has been prepared in accordance with O. Reg. 359/09, and the Ontario Ministry of Natural Resources' (MNR's) Approval and Permitting Requirements Document for Renewable Energy Projects (September 2009).

Stantec undertook acoustic bat monitoring in July, August and September 2008 and in July and August 2009. A draft Bat Report, based on the 2008 data, was provided to the Ministry of Natural Resources (MNR) in February 2009 as an appendix to the Draft Environmental Review Report (ERR) submission under the old Environmental Screening Process. This revised and final Bat Report includes data from both the 2008 and 2009 seasons.

1.2 BACKGROUND

1.2.1 Bats in Ontario

Eight species of bats are known to regularly occur in Ontario, all of which have a range that overlaps the Study Area. A brief summary the habitat preference and behavior of each species is provided below.

Big Brown Bat (*Eptesicus fuscus*): A species commonly found in buildings and around human habitation. The big brown bat commonly uses buildings for summer maternity roosts, but will also use hollow trees, rock crevices or bat boxes where available (Fenton et al., 2005). This species forages in a variety of habitats and appears to be a habitat generalist (Furlonger et al.,1987). The big brown bat is the only species that will regularly hibernate in buildings, as they appear to be tolerant of greater temperature ranges and do not require the high humidity conditions needed by other species (Gerson, 1984). They will also hibernate in caves or mines (Fenton et al., 2005) with other bat species, but in much fewer numbers. As buildings that provide hibernacula are common across the landscape, this species does not typically migrate long distances. (Barbour and Davis, 1969 and Davis et al 1968 as cited in Gerson, 1984). The big brown bat is ranked S5 (common and secure) in Ontario and is considered one of the most common species.

Hoary Bat (*Lasiurus cinereus*): The largest and fastest of the Ontario bats, the hoary bat often forages in open habitats (Salcedo et al., 1995 and van Zyll de Jong, 1985 as cited in Fenton,2005). Hoary bats are solitary roosters in the foliage of trees. This species does not hibernate; hoary bats are one of three bat species in Ontario that are long-distance migrants moving south in the late summer and fall. The hoary bat is ranked S4 (common and apparently secure) in Ontario.

Silver-haired Bats (*Lasionycteris noctivagans*): This species typically roosts under loose bark or in hollow trees (Gerson, 1984). Small nursery colonies are typically established in hollow trees (Parsons et al., 1986 as cited in Fenton, 2005). Silver-haired bats often forage over woodland lakes and streams (Barbour and Davis, 1969 as cited in Gerson, 1984). As a long distance migrant, this species moves south in the late summer and fall. The silver-haired bat is ranked S4 (common and apparently secure)in Ontario. Although widespread in the province, it is not been commonly encountered (Fenton, 2005).

Eastern Pipistrelle (*Pipistrellus subflavus*): This species usually roosts in foliage but will also use hollow trees or buildings. Eastern pipistrelles typically forge over watercourses and open habitat such as clearings and fields (Davis and Mumford, 1962 as cited in Fenton, 2005). This species hibernates in caves and abandoned mines. Like most hibernating bats, they require caves with temperatures above freezing and close to 100% humidity. In late summer and fall they will migrate to suitable hibernacula, which are also used as swarming sites during the autumn mating season (Barbour and Davis, 1969 as cited in Fenton, 2005). The eastern pipistrelle is ranked S3? (vulnerable in the province with the question mark indicating some uncertainty in the ranking) in Ontario.

Red Bat (*Lasiurus borealis*): This species roosts solitary in foliage of deciduous trees (Gerson,1984). Red bats are long-distance migrants, moving south in the late summer and fall. This species is ranked S4 (common and apparently secure) in Ontario.

Little Brown Bat (*Myotis lucifugus*): The little brown bat is a gregarious species that roosts in large numbers (Gerson, 1984). Roost sites and maternity colonies are typically located in poorly ventilated, dark sites with high temperatures (Humphrey, 1982, as cited in Gerson, 1984), including spaces in buildings such as attics. Little brown bats hibernate in caves or abandoned mines with above freezing temperatures and high humidity. Hibernacula are used as swarming sites in late summer during the breeding season (Fenton, 2005). Little brown bats are ranked S5 (common and secure) and are considered the most common bat species in Ontario (van Zyll de Jong, 1985).

Northern Long-eared Bat (*Myotis septentrionalis*): This species roosts in tree cavities or under loose bark (Foster and Kurta, 1999, as cited in Fenton, 2005). Northern long-eared bats are typically associated with wooded areas (Dobbyn, 1994). They are a hibernating species, usually using the same caves and abandoned mines as little brown bats for hibernacula and swarming sites (Barbour and Davis, 1969 as cited in Gerson, 1984). The northern long-eared bat is ranked S3? (vulnerable in the province with the question mark indicating some uncertainty in the ranking) in Ontario.

Small-footed Bat (*Myotis leibii*): The small-footed bat roosts in a variety of small crevices, usually in rock or amongst boulders but also under loose bark or tight spaces in buildings (Fenton, 2005). This species hibernates in caves or abandoned mines. It can tolerate colder temperatures and lower humidity than other cave-hibernating bats and is often found near cave entrances (Barbour and Davis, 1969, as cited in Fenton, 2005). Small-footed bats typically enter hibernacula in mid-November, later than other species (Fenton, 1972 as cited in Fenton 2005). They are ranked S2S3 (vulnerable to imperiled) in Ontario.

No bats in Ontario are considered to be at risk by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) or Committee on the Status of Species at Risk in Ontario (COSSARO).

1.2.2 Wind Facilities and Bats

Recent developments in wind power facility monitoring have raised concerns over the effect these projects may have on local and migratory bat populations. Effects to bats due to wind power facilities may be either direct (through injury or death by collision) or indirect (displacement or population declines).

Bat mortality has been documented at wind power facilities in a variety of habitats across North America. Nearly every monitored wind power facility in Canada and the United States has reported bat mortality with annual mortality varying between < 1 and 50 bat fatalities/wind turbine/year (Arnett et al., 2007). At most wind power facilities the mortality rates of bats are higher than those of birds.

The majority of bat fatalities at wind power facilities occur in the late summer and fall. The long-distance migratory bats (i.e., hoary bat, eastern red bat, and silver-haired bat) appear to be most vulnerable to collisions with moving turbine blades. Wind speed may also influence mortality rates as bat activity, and thus fatalities, appear to be higher on nights with low wind (Arnett et al., 2007).

Specific factors causing bat mortality and affecting species vulnerability to wind turbine mortality remain unclear, although recent evidence from Alberta suggests that air pressure differences in the blade vortices may be a contributing factor (Baerwald et al., 2008). Ontario specific data is relatively sparse at this time.

Little information is available on the potential indirect effects to bats from wind power facilities. At some facilities, forest clearing for turbines, access roads and transmission lines, may actually increase bat habitat by creating forest edge and clearing (Arnett et al., 2007). However, in southern Ontario wind power facilities would rarely require forest clearing.

Potential negative effects to bat habitat could result from removal of roost trees or an increase in human activity. However, no data exist to support these concerns. Arnett et al. (2007) hypothesized that noise generated by wind turbines is unlikely to influence roosting bats, but again no data exist to support the hypothesis.

1.2.3 Project Area Description

The Study Area is situated along the Lake Ontario shoreline, and sits on a low plateau of flat limestone that extends into the eastern part of Lake Ontario (Chapman and Putnam, 1984). The limestone is covered by a shallow layer of gravelly loam soil (Richards and Morwick, 1948), which is generally less than 50cm deep within the Study Area.

Vegetation within the Study Area was relatively uniform, consisting of open woodlands, shrub thickets and grasslands. Standing snags, which could act as bat roosts, were present but not numerous. Small ephemeral wet pockets occur throughout the Study Area, which flood after snowmelt or major rain events. Permanent wetlands, in the form of deciduous swamp and open marsh, occur along the southeastern boundary of the Study Area.

1.2.4 Site Sensitivity

The MNR has provided the guidance document "Guideline to Assist in the Review of Wind Power Proposals: Potential Impacts to Bats and Bat Habitats" (Working Draft, August 2007). This document outlines how to identify the site sensitivity of proposed wind power facilities. The site sensitivity helps to determine the scope of the bat monitoring program.

A review of background materials, in conjunction with an on-site evaluation, identified potential factors that would determine site sensitivity. There are no known hibernacula in the vicinity of the Study Area. The project will be located less than 1 km from the Lake Ontario shoreline. According to Table 2 of the MNR's guidelines, the corresponding site sensitivity would be Level 3 (High).

2.0 Methods

Based on a site sensitivity rating of Level 3 (High), a pre-construction monitoring program was designed and approved by the MNR that consisted of acoustic monitoring at four stations within the Study Area in July, August and September. Two of the stations were located at the existing meteorological tower; positioned at different heights. The other stations had a single detector elevated 4m high in trees.

Surveys in 2008 and 2009 were used to collect the number of nights required by the MNR's guidance document "Guideline to Assist in the Review of Wind Power Proposals: Potential Impacts to Bats and Bat Habitats" (Working Draft, August 2007): This guidance document asks for data to be collected on a minimum of:

- Five nights with suitable weather in from July 15th to 31st;
- Fifteen nights with suitable weather in August; and
- Ten nights with suitable weather in September.

Nights with suitable weather were defined as nights having air temperature above 10°C at sunset, overnight lows above 5°C, winds below 10 m/s and no precipitation.

2.1 FIELD SURVEYS

Anabat SD1 acoustic detectors (Titley Electronics PTY Ltd.) were used for the duration of the monitoring program. The detectors had programmed on/off times and stored data on removable 1 GB compact flash cards. Anabat detectors are frequency division detectors, dividing the frequency of ultrasonic calls made by bats by a factor of 16 so that they are audible to humans. The calls are then recorded for subsequent analysis. Anabat detectors were selected based upon their widespread use for this type of survey, their ability to be deployed for long periods of time, and their ability to detect a broad frequency range, which allows detection of all species of bats that could occur in Ontario.

Figure 1.0, Appendix A shows the location of the monitoring stations. The dates the detectors were deployed and taken down and the total number of operational nights at each station are provided in **Table 2.1, Appendix B**.

The three monitoring stations were distributed north to south through the Study Area to allow for assessment of activity levels at different distances from the Lake Ontario shoreline. Station "SW" was located approximately 50 m from the shoreline, Stations "MET-High" and "MET-Low" were located approximately 650 m from the shoreline, and Station "NE" was located approximately 1500 m from the shoreline (**Figure 1, Appendix A**).

The MET-high and MET-low stations were elevated on the existing meteorological (MET) tower located centrally within the Study Area. MET-low was elevated to a height of 15 m above the ground. In 2008, MET-high was elevated to 30 m. During the 2009 season, the height of this station was increased to 40 m above the ground at the request of the MNR, with the objective of obtaining data over a larger portion of the blade sweep zone of wind turbines. Photos 1 and 2 of the Photographic Log, **Appendix C**, show the MET tower stations and surrounding habitat.

The SW and NE stations were positioned in trees approximately 4 m above the ground. Acoustic detectors were cantilevered out from the canopy to increase the height and to avoid static from rustling leaves. In the case of the NE station, a dead tree was available, which avoided any concerns with rustling leaf static. The SW station (Photo 3, **Appendix C**) was situated near the lakeshore in moist habitat consisting of low dogwoods and junipers with scattered ash and dense ground cover. The NE station (Photo 4, **Appendix C**) was situated at the edge of a juniper and prickly-ash thicket in very dry habitat.

The detection range of the Anabat SD1 is variable based on the amplitude and frequency (which is dependent on the species) of the bat call. However, a conservative estimate of the Anabat's range for most frequencies, most species and under most conditions is 20 to 25m. Therefore, the MET-low stations provided detection within a band approximately 15 to 40 m off the ground. The MET-high stations provided detection within a band approximately 40 to 65 m off the ground. The NE and SW stations would provide a detection range of approximately 4 to 29 m off the ground.

Detectors were programmed to record data continuously between 7:00 pm and 7:00 am each night. Each detector system was powered by 12-volt batteries charged by solar panels and encased in a waterproof housing enabling the detector to record while unattended for the duration of the survey. The housing suspended the Anabat microphone downward to give maximum protection from precipitation. To compensate for the downward position, a reflector shield of smooth plastic was placed at a 45-degree angle directly below the microphone. The angle reflector allows the microphone to record the airspace horizontally surrounding the detector and is only slightly less sensitive than an unmodified Anabat unit.

Maintenance visits were conducted weekly to check on the condition of the detectors and download data to a computer for analysis. The sensitivity of each Anabat system was set at between six and seven to maximize sensitivity while limiting ambient background noise and interference.

2.2 DATA ANALYSIS

Potential call files were extracted from data files using CFCread© software. The default settings for CFCread© were used during this file extraction process, as these settings are recommended for the calls that are characteristic of Ontario bats. This software screens all data recorded by the bat detector and extracts call files using an automatic filter. Using the default setting for this initial screen also ensures comparability between data sets. Settings used by the filter include a maximum time between calls of 5 seconds, a minimum line length of 5 milliseconds, and a smoothing factor of 50. The smoothing factor refers to whether or not adjacent pixels can be connected with a smooth line. The higher the smoothing factor, the less restrictive the filter is and the more noise files and poor quality call sequences are retained within the data set.

A call is a single pulse of sound produced by a bat. A call sequence is a combination of two or more pulses recorded in a call file. Following extraction of call files, each file was visually inspected to ensure that files created by static or some other form of interference that were still within the frequency range of bats were not included in the data set. Call sequences were identified based on visual comparison of call sequences to reference calls provided by Chris Corben, developer of the Anabat system. Bat calls typically include a series of pulses characteristic of normal flight or prey location ("search phase" calls) and capture periods ("feeding buzzes") that visually look very different than static, which typically forms a diffuse vibration, or other interference. Using these characteristics, bat files are easily distinguished from non-bat files.

Bat call sequences were individually marked and categorized by species group, or "guild" based on visual comparisons to reference calls. Qualitative visual comparison of recorded call sequences of sufficient length to reference libraries of bat calls allows for relatively accurate identification of bat species (O'Farrell et al., 1999. O'Farrell and Gannon, 1999). A call sequence was considered of suitable quality and duration if the individual call pulses were "clean" (i.e. consisting of sharp, distinct lines) and at least five pulses were included within the sequence. Call sequences were classified to species whenever possible, using the reference calls described above. However, due to similarity of call signatures between several species, all classified calls have been categorized into four guilds for presentation in this report. This classification scheme follows that of Gannon et al. (2003) and is as follows:

- Unknown (UNKN) – all call sequences with too few pulses (less than five) or of poor quality (such as indistinct pulse characteristics of background static). These calls were further identified as either "high frequency unknown" (HFUN) for calls above 30 kHz or "low frequency unknown" (LFUN) for calls below 30 kHz;
- Myotid (MYSP) – All bats of the genus *Myotis*. While there are some general characteristics believed to be distinctive for several of the species in this genus, these characteristics do not occur consistently enough for any one species to be relied upon at all time when using Anabat recordings;

- Red bat/pipistrelle (RBEP) – Eastern red bats and eastern pipistrelles. These two species can produce calls distinctive only to each species. However, significant overlap in the call pulse shape, frequency range, and slope can also occur; and,
- Big brown/silver-haired/hoary bat (BBSHHB) – This guild will be referred to as the big brown guild. These species all have lower call frequencies and have therefore been included as one guild in this report. The hoary bat has more easily recognizable calls whereas calls of silver-haired bats and big brown bats can be difficult to distinguish. Therefore, a sub-classification of big brown/silver-haired bat (BBSH) was used to further define calls in this guild.

This guild grouping represents the most conservative approach to bat call identification (Hayes, 2000). Since some species do sometimes produce calls unique only to that species, all calls were identified to the lowest possible taxonomic level before being grouped into the list guilds. Tables and figures in the body of this report will reflect those guilds. However, since species-species identification did occur in some cases, each guild will also be briefly discussed with respect to potential species composition of recorded call sequences. Nights with unsuitable weather conditions (see Section 2.3) were rejected and not used in the analysis.

Once all the call files were identified and categorized in appropriate guilds, nightly tallies of detected calls were compiled. Mean detection rates (expressed as the number of call sequences, or “passes”, per detector per night) for the entire sampling period were calculated for each detector and for all detectors combined, providing an index of bat activity.

It is important to note that detection rates indicate only the number of calls detected and do not necessarily reflect the number of individual bats in an area. For example, a single individual can produce one or many call files recorded by the bat detector, but the bat detector cannot differentiate between individuals of the same species producing those calls. Consequently, detections recorded by the bat detector system likely over represents the actual number of animals that produced the recorded calls.

2.3 WEATHER DATA

Wind and Temperature

Wind speed and temperature data was obtained from meteorological tower (MET) located centrally within the Study Area. Weather conditions were considered unsuitable on nights with sunset temperatures below 10°C, overnight lows below 5°C or wind speeds in excess of 10m/s.

Rainfall

Unlike wind and temperature, rainfall was not recorded by the MET tower. As rainfall can vary dramatically over relatively short distances, data from the closest Environment Canada weather station (Point Petre, 15km to the west) was not considered a suitable representation of the rainfall in the Ostrander Point Study Area. Therefore, the occurrence of rain was determined by recordings of rainfall by the acoustic detectors. Static caused by rain differs from other static by being random (not cyclical like insects) and, in the case of isolated showers, occurring for short periods. Rustling leaves in strong winds would cause similar random static; however such nights would have been already rejected based on high wind speed. Recordings on the acoustic detectors provide the duration of rainfall but not the intensity or amount of rain. However, all nights with rain recorded during the monitoring period were considered unsuitable.

3.0 Results

3.1 CALL DETECTOR ANALYSIS

In 2008, Anabat SD1 detectors were deployed at the MET-High and MET-Low stations from July 28 to September 30 and at the NE and SW stations from August 14 to September 30. In 2009, Anabat SD1 detectors were deployed from July 16 to August 31 at all 4 stations. There were occasional brief periods of missing data when certain detectors did not switch on or powered down during the survey period. However, detectors were repaired or replaced as soon as possible to minimize downtime. Combined, the four detectors at the Study Area over the 2 years sampled a total of 250 detector-nights of suitable weather conditions.

A total of 5448 bat call sequences were recorded over the 250 detector-nights in 2008 and 2009 (**Table 3.1, Appendix B**). The overall mean activity for all four detectors was 21.8 call sequences/detector-night. Average activity levels at individual detectors ranged from 9.5 call sequences/detector-night at the MET-High detector to 43.1 call sequences/detector-night at the SW detector.

Appendix D provides a series of tables with more specific information on the nightly timing, number and species composition of recorded bat call sequences. Specifically, Appendix D Tables 1 through 8 provide information on the number of call sequences, by guild and inferred species, recorded at each detector in 2008 and 2009.

Mean bat activity was lowest at the most elevated detector. MET-High (9.5 call sequences/detector-night) was found to have considerably lower activity levels than the other 3 detectors, including MET-Low (23.7 call sequences/detector-night) which was at the same location but at a lower elevation.

Among the lower detectors, mean bat activity was higher closer to the Lake Ontario shoreline. The SW station, which was located closest to the shoreline, was found to have the highest activity level (43.1 call sequences/detector-night). Conversely, the NE station, located farthest from the shoreline, had the lowest activity level of the lower detectors (14.9 call sequences/detector-night). MET-Low, located centrally in the Study Area, had an activity level between that of the SW and NE detectors (23.7 call sequences/detector-night).

Figure 2.0, Appendix A shows the nightly bat activity averaged across all four detectors in 2008 and 2009. When looking at the activity across all detectors, there was considerable variation in activity between nights with no discernable pattern through the study period. The high outlier on August 5, 2008 is the result of a peak number of call sequences recorded at the MET-Low detector, on a night when it was the only detector operating.

Figure 3.0, Appendix A provides the nightly activity for each station individually. At the MET-High station, a period of nights with higher activity levels was noted from August 17 to September 9. At the MET-Low station, patterns in activity were less obvious. However, the majority of nights with higher activity (i.e. > 40 call sequences) occurred between August 22 to September 6. At the NE station, all nights with higher activity (i.e. > 40 call sequences) occurred from August 17 to September 6. At the SW station, no period of peak activity was evident however a drop in activity was noted after September 5. Overall, when looking at activity levels at individual stations, higher activity was generally noted at most detectors from mid-August into early September.

Generally, peak call activity occurred between 21:00 and 23:00, approximately 1-2 hours after dark (**Figure 4.0, Appendix A**). Activity between 00:00 and 4:00 was relatively constant, with a sudden drop in activity before dawn.

Recorded call sequences were identified to guild based on visual analysis. Because acoustic surveys at the Study Area were passive, 22% could not be identified to guild and were labeled as unknown due to very short call sequences (less than 5 pulses) or poor call signature formation (probably due to a bat flying at the edge of the detection zone of the detector or flying away from the microphone) (**Table 3-2, Appendix B**). Of the calls that were identified to species or guild, there were approximately equal numbers in the big brown/silver-haired/hoary guild (39% of all call sequences) and myotid guild (38% of all call sequences). Few calls were identified in the red bat/eastern pipistrelle guild (1%).

Figure 5.0, Appendix A depicts the proportions of call sequences of each species at each of the 4 stations. At the elevated MET-High and MET-Low detectors, a higher proportion of sequences were in the big brown/silver-haired/hoary, whereas at the lower NE and SW stations ,myotid guild made up the highest proportion of call sequences. Red bat/eastern pipistrelle, although rare at all detectors, were most common at the elevated MET-High.

3.2 WEATHER DATA

Of the nights analyzed in the 2008 and 2009 monitoring periods, the temperatures at dusk varied between 10.1 and 25.5°C with overnight lows between 9.5 and 23.7°C. Only nights with lower wind speeds were selected for data analysis, with mean nightly wind speed between 1.4 and 9.2 m/s.

For nights with suitable weather conditions, overall nightly bat activity levels were compared to mean nightly wind speeds, temperature at sunset and overnight low temperature (**Figure 6.0, Appendix A**). Statistical analysis to look for correlation between bat activity and weather parameters was undertaken. No statistically significant correlations between bat activity and different weather parameters were found. The correlation coefficient for mean nightly wind speed, temperature at dusk and overnight low temperatures were respectively 0.02, 0.15 and 0.17. A weaker correlation was observed when comparing activity of just long-distance migrants (hoary, silver-haired and eastern red bats) to weather, with correlation coefficient for mean nightly wind speed, temperature at dusk and overnight low temperatures of 0.01, 0.07 and 0.08 respectively. However, the weaker correlation is likely due to the reduced sample size. It is likely that should bat activity be compared across the entire survey period, and not just nights of suitable weather conditions, that more significant correlation between weather and bat activity would be evident.

4.0 Discussion

4.1 SPATIAL DISTRIBUTION OF BAT ACTIVITY

When comparing the activity levels between the four detectors, the SW station near the lakeshore had the highest activity levels. Activity levels became progressively lower, the farther from the lakeshore the detector was placed. The lakeshore has wetland pockets contained behind a rocky beach and the lake itself, factors that would support a high insect population to provide abundant feeding opportunities. The narrow band of tree cover along the shoreline may act as a linear landscape feature, assisting bats on successful foraging, commuting, echo-orientation and protection from predators or wind (Arnett et al., 2007). Moving away from the lakeshore, the monitoring stations become progressively drier and did not provide linear landscape features, factors that may have resulted in low activity levels.

It was also noted that activity levels were greater at the two tree level detectors and MET-Low (averaging 26.3 call sequences/detection-night) than at the higher MET-High detector (9.5 call sequences/detection-night). The higher activity at the lower stations was likely a result of foraging, rather than migratory, activity.

Recent research (Arnett et al., 2006) found that small *Myotis* species were more frequently recorded at lower heights while larger species were typically recorded at higher heights. This is consistent with the MET-High detector which had only 5% of the overall MYSP calls but 15% of the BBSH calls.

When considering the higher levels of activity at the two tree level and MET-Low detectors, it is important to acknowledge that numbers of recorded bat call sequences are not necessarily correlated with number of bats in an area. Acoustic detectors do not allow for differentiation between a single bat making multiple passes and multiple bats each recorded a single time (Kunz et al., 2007). For example, the peak observed at the MET-Low detector on August 5 (156 call sequences all occurring between 10:04 and 11:57, and then 3:02 and 4:21) consisted mostly of those classified as big brown, big-brown/silver-haired guild or low frequency unknown calls. It is possible that the majority of these calls represented a small number of feeding big brown bats.

4.2 TEMPORAL DISTRIBUTION OF BAT ACTIVITY

Considerable variability between nightly activity levels was observed throughout the survey period. This variability in activity between nights could be attributed to weather conditions. Hayes (1997), Reynolds (2006) and Arnett (2008) have reported on various acoustic surveys during the fall migration season that have documented a decrease in bat activity rates as wind speed increase and temperatures decrease. These patterns suggest that bats are more likely to migrate on nights with low wind speed (less than 4- 6 m/s) and generally favourable weather (warm temperatures, low humidity, high barometric pressure).

A simple statistical analysis of the 83 nights of sampling did not show a significant correlation between bat activity level and weather parameters. However, when looking at individual nights, peak bat activity often appears to relate to nightly weather conditions. On August 25, 2009, a drop in bat activity was observed following a sudden increase in wind speeds. Conversely, September 18, 2008 saw a jump in bat activity on a night with a drop in wind speeds. In addition, the high outlier on August 5, 2008 appeared to correspond to a night with higher dusk and overnight low temperatures. Overall, it appeared that bat activity was difficult to predict based on a single weather parameter. However, on some nights a clear relationship between higher bat activity and low wind and/or high temperatures was evident.

It would appear that by selecting only nights with suitable weather conditions, correlations between weather and bat activity were muted. An analysis of bat activity during all weather conditions, including rainy and/or higher wind nights, would have likely shown more significant relationships between weather conditions and bat activity.

Although patterns in bat activity through the study period were not pronounced, most detectors recorded higher activity from mid-August into early September. This period of higher activity may be correlated in an increase in foraging behavior, a high level of bat movement or perhaps a period of optimal weather conditions. Species composition during this period was very similar to that of the overall study period, suggesting most species experienced an increase in activity. Silver-haired bats appeared to experience the largest increase in activity during this period, with 82% of all silver-haired bat call sequence recorded from mid-August to early September. Hoary bat was the only species that was less abundant during this period; only 30% of all hoary bat call sequences were recorded from mid-August to early September. Most hoary bat call sequences were recorded earlier in August and late July, suggesting hoary bats may migrate through the Study Area earlier than silver-haired bats.

It was found that bat activity peaked 1 to 2 hours after sunset. The bimodal nighttime distribution of bat activity, with a peak shortly after dark, seems to be a consistent behavioral trend in a number of species (Hayes, 1997). A second peak, late in the night before dawn, has often been observed (Hayes, 1997 and Anthony et al, 1981). However, no such second peak was observed by the detectors at the Study Area.

4.3 SPECIES COMPOSITION

Bat calls were identified to guild within this report, although calls were provisionally categorized by species when possible during analysis. Certain species, such as the eastern red bat and hoary bat have easily identifiable calls, whereas other species, such as big brown and silver-haired bats are difficult to distinguish acoustically. Similarly, certain members of the *Myotis* genus, such as little brown bat, are far more common and have slightly more distinguishable calls than other species. The following paragraphs discuss each guild separately and address likely species composition of recorded bats within each guild.

The myotid (MYSP) guild includes 3 species in Ontario, little brown bat, northern long-eared bat and eastern small-footed bat, the first species being by far the most common. Of these, little brown bat and northern long-eared bats have calls that tend to be more distinguishable using the Anabat system. Few northern long-eared bat calls were recorded during the acoustic monitoring with no identifiable call sequences in 2008 and total of 8 call sequences (less than 1% of Myotis calls) positively identified in 2009. All northern long-eared bat call sequences were recorded at the SW or NE stations, both tree level detectors. Little brown bat call sequences were much more common with large numbers recorded at each detector. Overall, 1740 or 85% of all *Myotis* call sequences were identified as little brown bats. It is therefore likely that the majority of the calls identified to myotid guild or high frequency unknown were little brown bats. At the NE and SW detectors myotid was the most commonly detected guild, with 47% and 52% of the total call sequences at each station respectively. The myotid guild was less represented at the MET-Low detector (25% of all call sequences) and low yet at the MET-High detector (15% of all call sequences). Species in the genus *Myotis* tend to fly lower and forage in more forested areas than other bat species, so it is not surprising that activity was found to be higher at tree level detectors.

The red bat/eastern pipistrelle (RBEP) guild includes the eastern red bat and eastern pipistrelle. Eastern red bats have relatively unique calls which span a wide range of frequencies and have a characteristic hooked shape and variable minimum frequency. Eastern pipistrelles tend to have relatively uniform calls, with a constant minimum frequency and a sharply curved profile. Most calls in this guild could be identified to species, with eastern red bats (n=25) slightly more common that eastern pipistrelles (n=14). The majority of calls from this guild were recorded at either the MET-High or MET-Low, suggesting they are occurring at higher elevations. However, very few calls from this guild were recorded overall, making it difficult to identify trends with confidence.

The BBSHHB guild includes the big brown bat, silver-haired bat and hoary bat. Within this grouping, the hoary bat has easily distinguishable calls characterized by highly variable minimum frequencies often extending below 20 kHz, and a hooked profile similar to the eastern red bat. Calls of silver-haired bats and big brown bats are occasionally distinguishable, but often overlap in range and can be difficult to distinguish, especially when comparing short duration calls typical of those recorded during passive monitoring. Of the 2142 call sequences recorded in this guild, 2% were classified as hoary bats (n=40), 40% were classified as big brown bats (n=856), 3% were classified as silver-haired bats (n=62), and 55% were not distinguishable between big brown and silver-haired bats (BBSH) (n=1184). It would appear that the majority of call sequences in the BBSH ground would be big brown bats.

The BBSHHB was the most common guild detected at the MET-High and MET-Low detectors, representing 50% and 46% of the total call sequences at each station respectively. This guild had slightly less representation at the NE and SW stations (33% of total calls at both stations). When looking specifically at the long-distance migrant hoary and silver-haired bats, the majority of call sequences were recorded at the MET-High detector (70% of all hoary bat calls and 66%

of all silver-haired bat calls). The remainder of the hoary and silver-haired bat call sequences occurred at the MET-Low and NE station, with very few at the SW station.

Of the 5448 total calls recorded at the Study Area, 1205, or 22% were classified as UNKN, due to their short duration or poor quality. These calls were further identified as "high frequency" or "low frequency". For the purposes of this analysis, "high frequency" call fragments were defined as having a minimum frequency above 30 kHz, and "low frequency" calls were defined as having a minimum frequency below 30 kHz. Low frequency calls made up 57% of the calls in the UNKN guild (n=686). It is likely the majority of call sequences classified as low frequency were big brown bats. High frequency calls made up 43% of calls in the UNKN guild (n=519). It is likely the majority of these calls were little brown bats.

4.4 POTENTIAL EFFECTS

The majority of bat fatalities at wind power facilities occur in the late summer and fall, and the long-distance migratory bats (i.e., hoary bat, eastern red bat, and silver-haired bat) appear to be most vulnerable to collisions with moving turbine blades. Due to the small sample size of long-distance migratory bat call sequences recorded on the Study Area detectors, it is difficult to show trends in movement with a high degree of confidence. However, some observations in the temporal and spatial distribution of long-distance migratory bat call sequences are worth mentioning. The MET-High detector, although having the lowest overall activity, had the highest activity of long-distance migrants (1.2 call sequences/detector night or 62% of all long-distance migrant bat call sequences). The MET-Low and NE station had similar numbers of long-distance migrants with respective proportions of 19% and 15% of long-distance migrant bat call sequences. The SW station had considerably less representation with only 4% of long-distance migrant bat call sequences.

The majority of hoary bats call sequences were recorded in late July and the first half of August, with very few calls after August 20 and none in October. This data suggests that the majority of hoary bats had migrated south, beyond the Study Area, by August 20. The majority of silver-haired bat call sequences were detected in the second half of August, with a single call sequence in September on the 9th. This timing suggests that silver-haired bats may be migrating through the Study Area slightly later than hoary bats. Eastern red bat call sequences were relatively distributed throughout the monitoring period with records as early as July 22 and as late as September 18.

Risk to long-distance migratory bats seems to be related to weather conditions. Bat collision mortality rates documented at two facilities in the southwestern United States and one in Alberta negatively correlated with both wind speed and relatively humidity and were positively correlated with barometric pressure (Arnett 2005, Baerwald and Barclay 2008). The results of the bat monitoring within the Study Area did not find a correlation between weather and activity of long-distance migrants. However, by sampling only on lower wind nights, as outlined in MNR's

"Guideline to Assist in the Review of Wind Power Proposals: Potential Impacts to Bats and Bat Habitats" (Working Draft, August 2007), such correlation may have been muted.

Overall, the activity of long-distance migrants appeared to be higher at the MET-High station, detecting bats 40 to 65 m high. Long-distance migrant bats flying at elevations between approximately 35 and 125 m would be at the height of wind turbine blade sweep and thus would potentially be at a higher risk of collision. There also appeared to be a trend of higher long-distance migrant activity at further distances from the lake shore. However, due to the small sample size, trends in spatial distribution of long-distance migrants can not be identified with a high level of confidence.

Landscape features such as lakeshores, ridges or escarpments may concentrate migratory movement of bats. As such, the proposed Ostrander Point Wind Energy Park was considered to have higher site sensitivity, based on its close proximity to the Lake Ontario shoreline. Overall, the activity of long-distance migratory bats recorded by the detectors at the 4 stations did not appear to be unusually high. It was noted that activity of foraging, non-migratory bats was positively correlated with proximity to the lakeshore. This relationship is most likely related to insect abundance and linear treed habitat along the lakeshore. The majority of such foraging along the tree line is likely to occur at tree height (Arnett et al., 2006) and is not likely to frequently reach wind turbine blade sweep height.

Potential indirect negative effects could result from an increase in human activity or the removal of habitat elements, such as roost trees or wetland vegetation that support prey. Such impacts may occur throughout the Study Area, but are most likely to be significant near the shoreline where larger trees and more extensive wetland vegetation occur.

5.0 Conclusions

Results of acoustic surveys must be interpreted with caution. A conservative approach to species identification was taken, as there is considerable overlap in call frequencies among bats that occur in Ontario. Also, detections rates provide only an index of activity levels, and are not necessarily representative of the numbers of individual bats (Hayes, 2000). However, some general trends in the acoustic data appear to be evident.

Long-distance migratory bats, a group which appears to be at higher risk of collision with wind turbines, have been theorized to concentrate near the shorelines of the Great Lakes. However, despite the presence of the Lake Ontario shoreline in the vicinity of the stations, the acoustic data would suggest that activity of long-distance migratory bats was not unusually high. The majority of hoary and silver-haired bats appeared to have passed through the Study Area by the end of August. However, the eastern red bat was observed into mid-September, although in lower numbers.

Higher overall bat activity was observed at detectors that were closer to the shoreline. The activity along the shoreline was likely indicative of foraging bats and high activity levels may have been cause by multiple detections of individual bats.

Bat activity levels were much lower at the elevated detector MET-High, indicating that the majority of bat flight in the Study Area is occurring at lower elevations, below wind turbine blade sweep height.

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Appendix A

Figures

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Acoustic Bat Monitoring Station

Ontario Road Network

Property Lines

Watercourse

Study Area

PREPARED FOR:

GILEAD POWER
OSTRANDER POINT WIND PROJECT
PRINCE EDWARD COUNTY, ONTARIO

FIGURE NO. 1.0

ACOUSTIC BAT MONITORING STATIONS

Initiated: November 21, 2008
Revised: November 24, 2009

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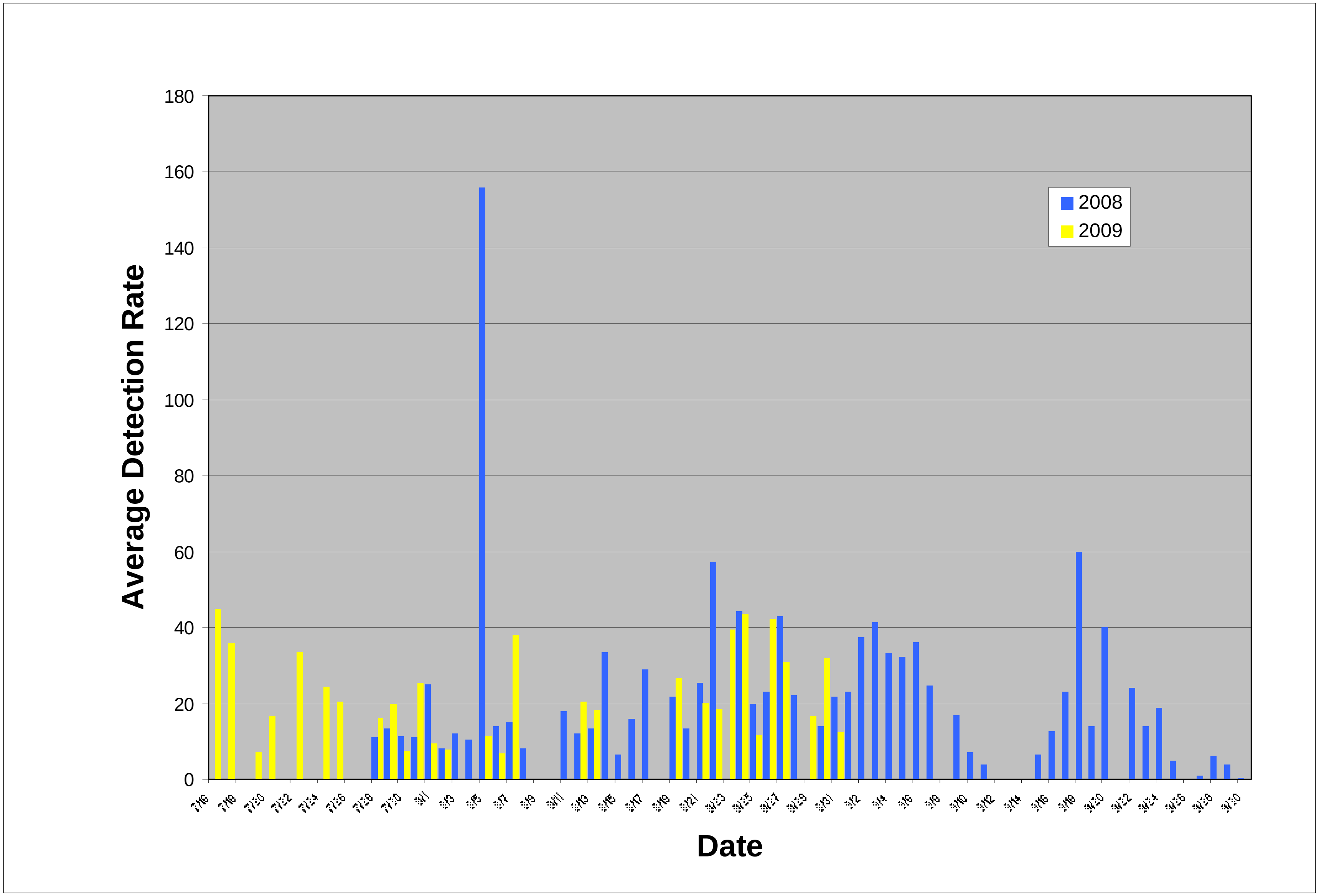

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PREPARED FOR:

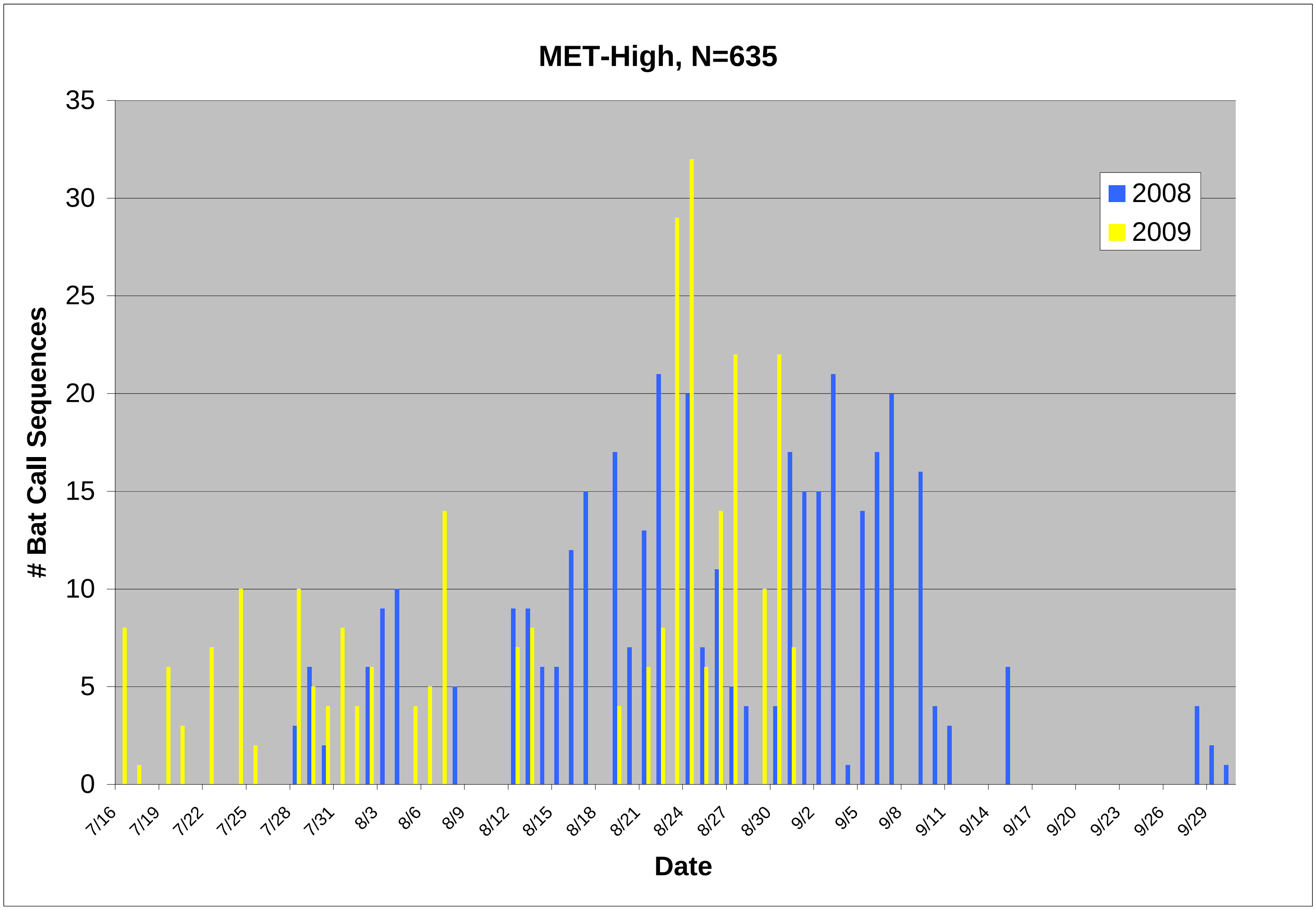
ACOUSTIC BAT MONITORING OSTRANDER POINT WIND ENERGY PARK

TITLE:

FIGURE 2 – AVERAGE NIGHTLY DETECTION RATE FOR ALL FOUR DETECTORS

DATE:

DECEMBER 2009



PREPARED FOR:

ACOUSTIC BAT MONITORING OSTRANDER POINT WIND ENERGY PARK

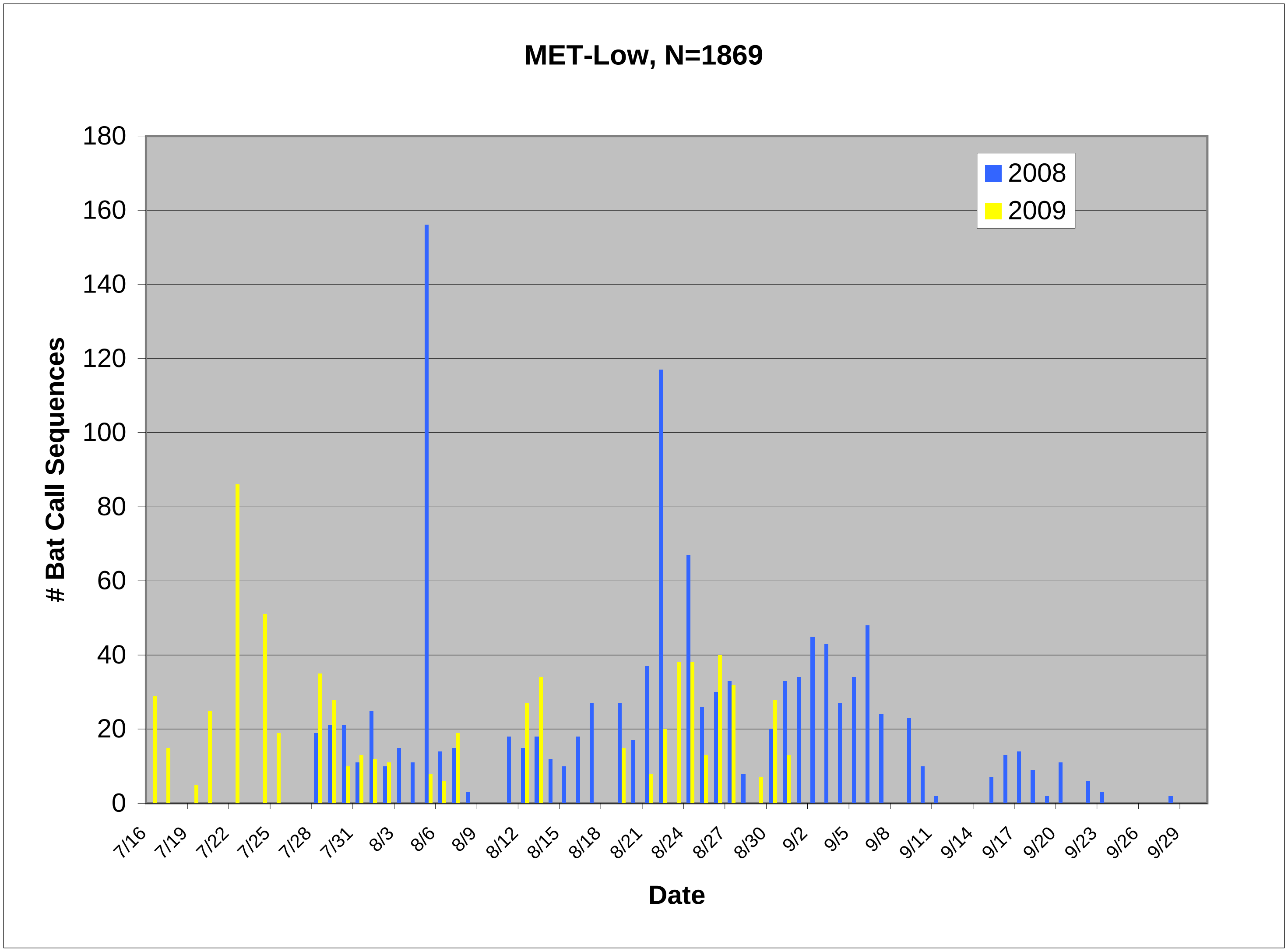
TITLE:

FIGURE 3A – NIGHTLY # OF BAT CALL SEQUENCES - MET_HIGH

DATE:

DECEMBER 2009

Stantec



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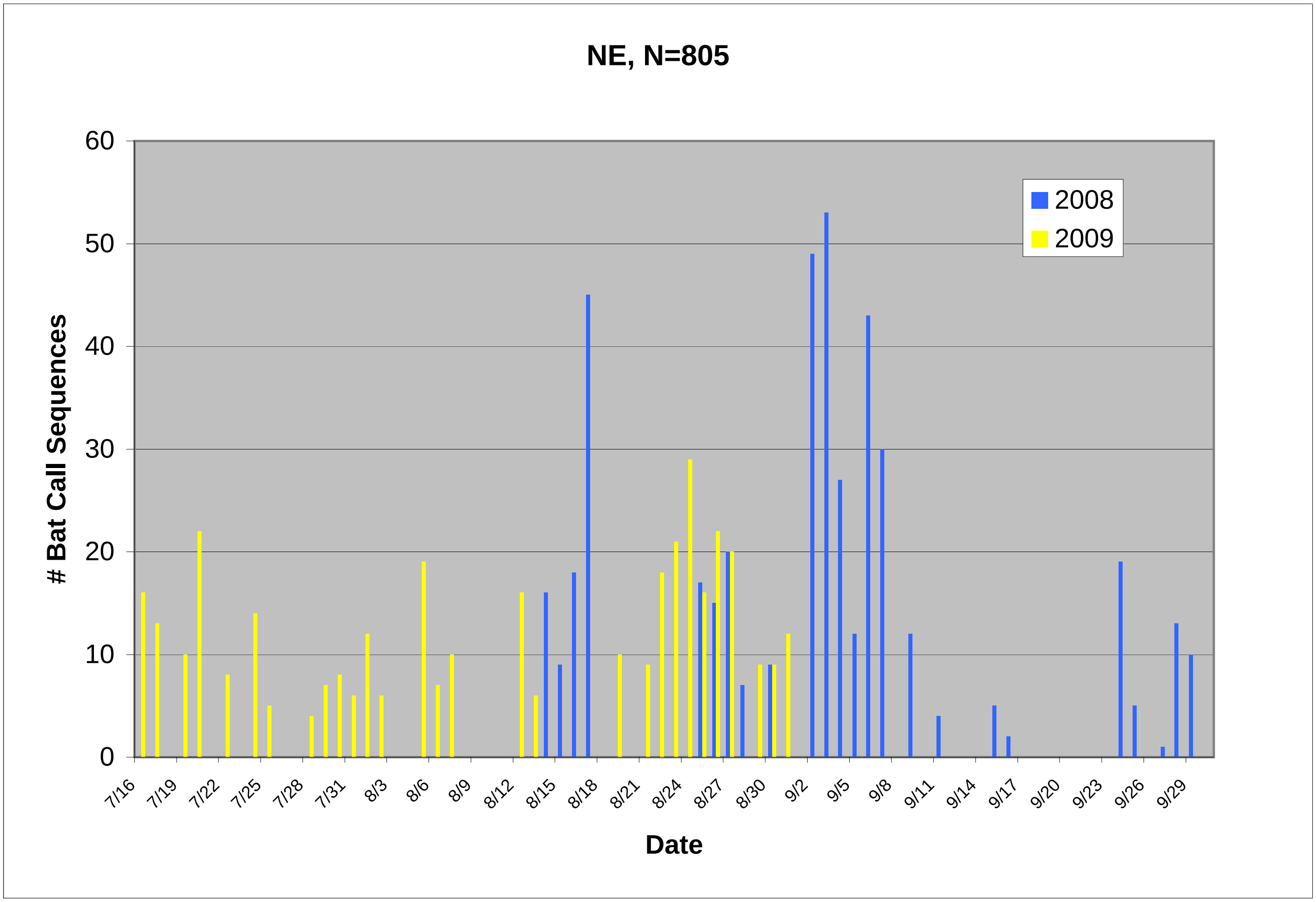
ACOUSTIC BAT MONITORING OSTRANDER POINT WIND ENERGY PARK

TITLE:

FIGURE 3B – NIGHTLY # OF BAT CALL SEQUENCES - MET_LOW

DATE:

DECEMBER 2009



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PREPARED FOR:

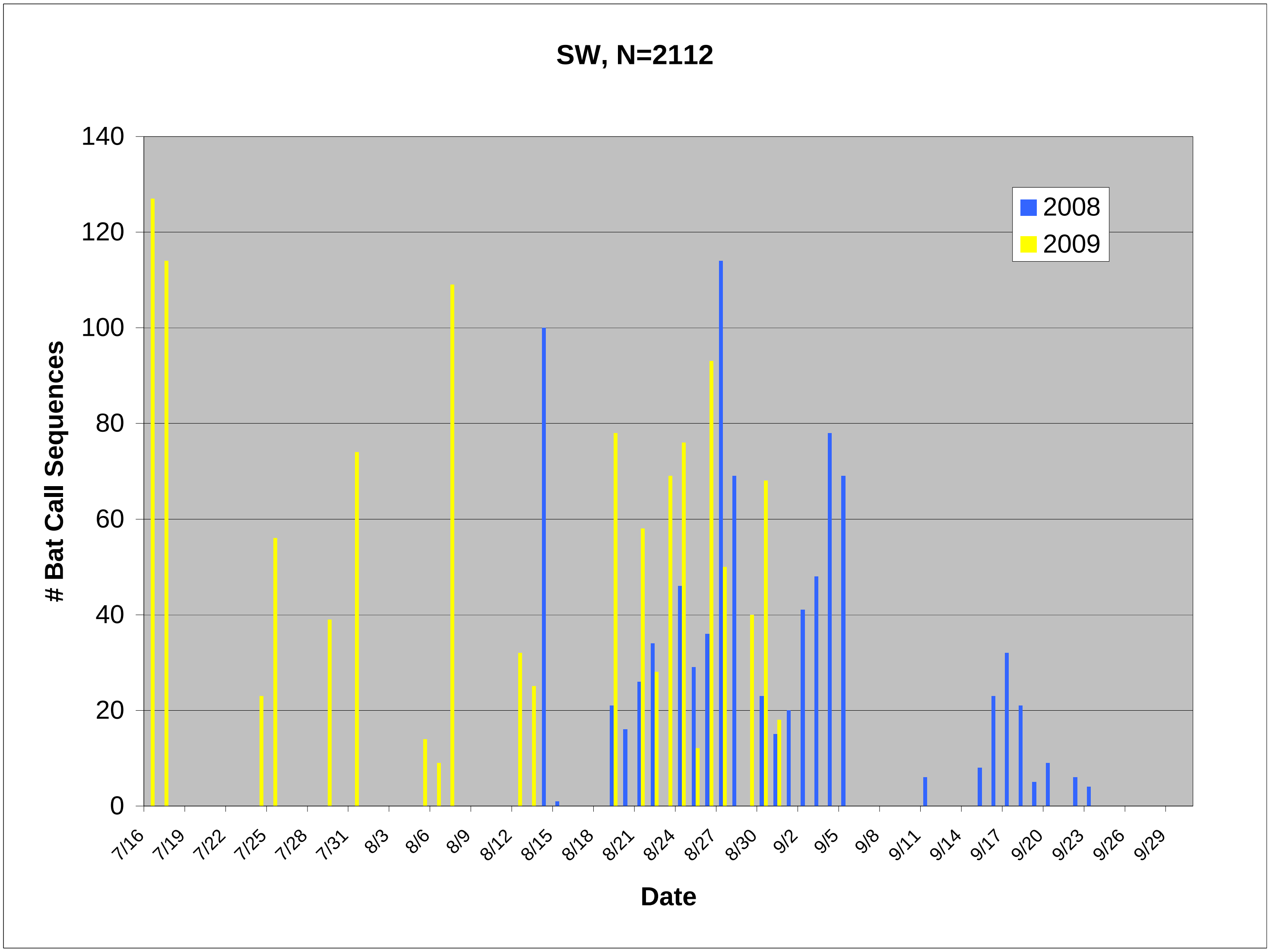
ACOUSTIC BAT MONITORING OSTRANDER POINT WIND ENERGY PARK

TITLE:

FIGURE 3C – NIGHTLY # OF BAT CALL SEQUENCES - MET_NE

DATE:

DECEMBER 2009



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ACOUSTIC BAT MONITORING OSTRANDER POINT WIND ENERGY PARK

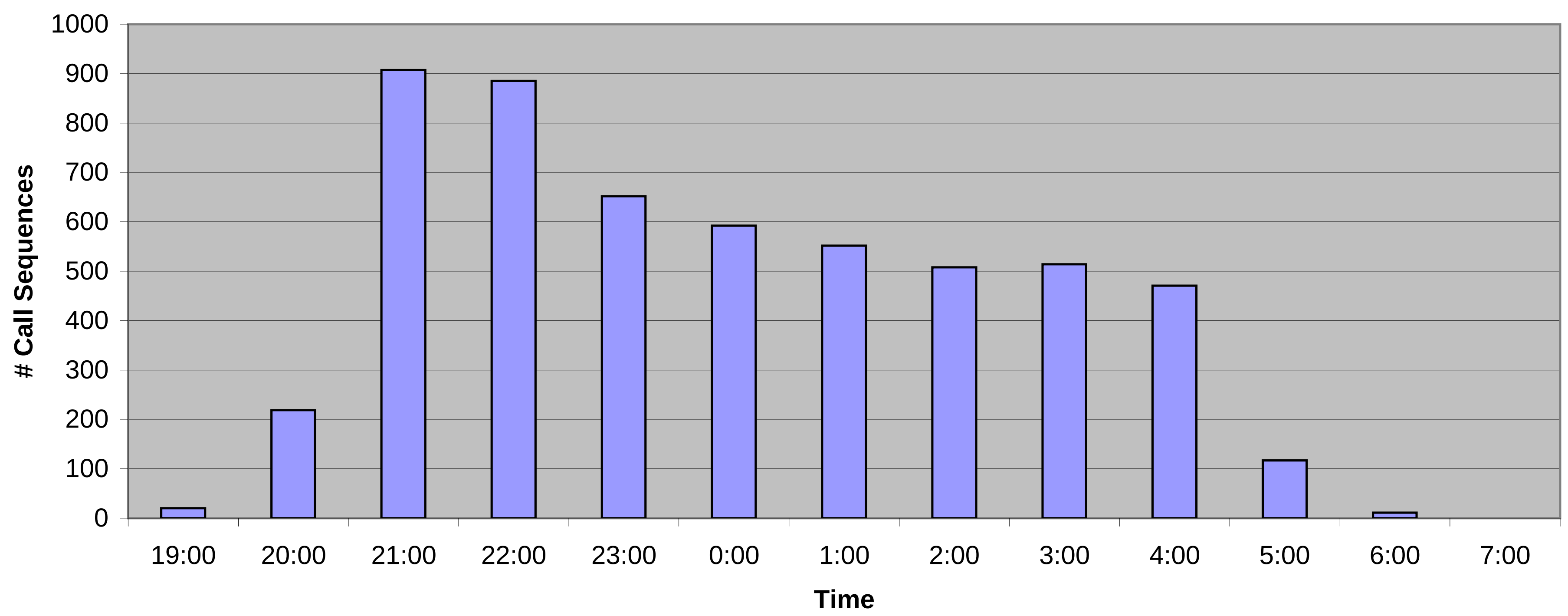
TITLE:

FIGURE 3D – NIGHTLY # OF BAT CALL SEQUENCES - MET_SW

DATE:

DECEMBER 2009

Figure 4.0. Overall timing of Bat Activity



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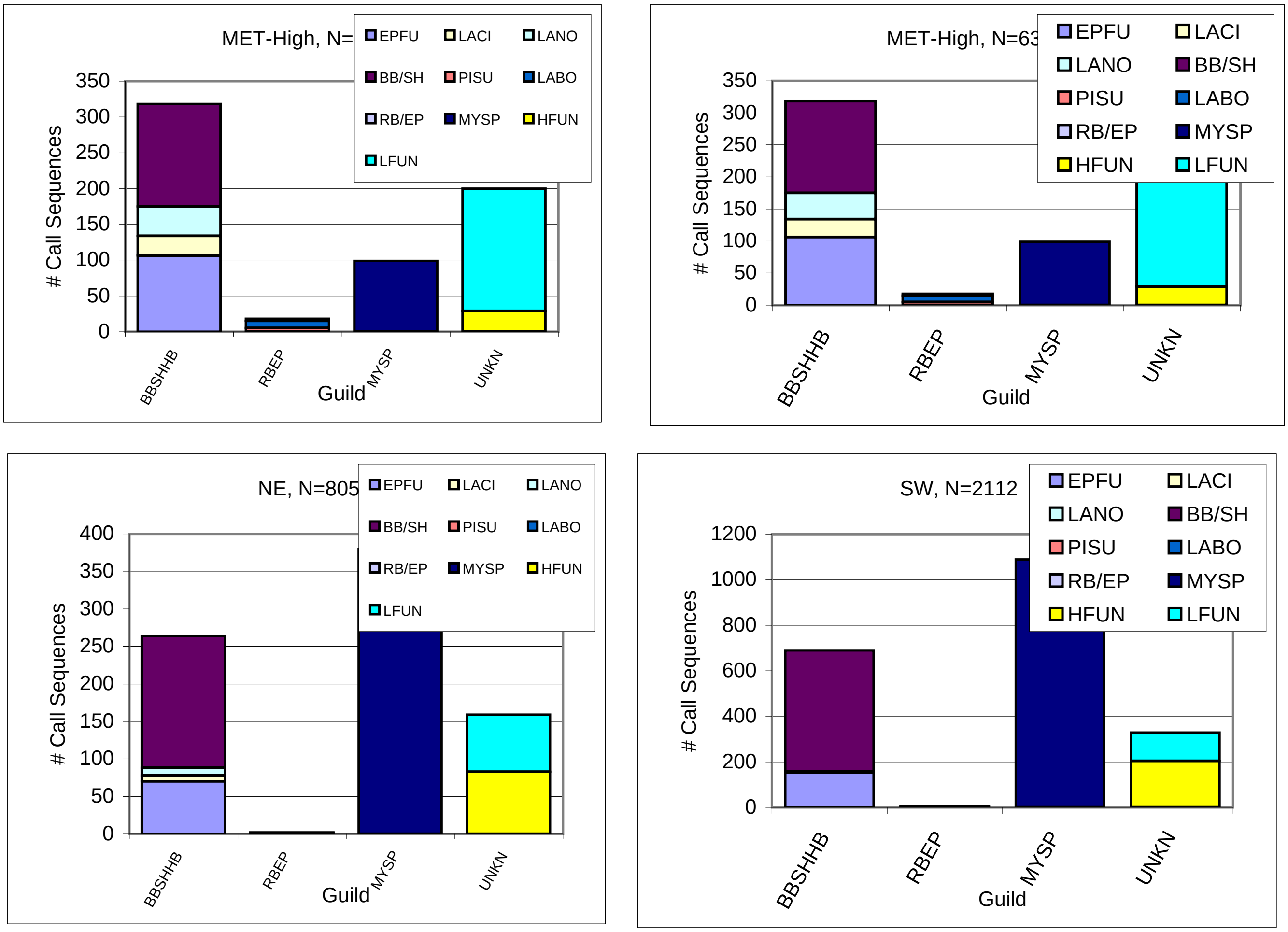
ACOUSTIC BAT MONITORING OSTRANDER POINT WIND ENERGY PARK

TITLE:

FIGURE 4 – OVERALL TIMING OF BAT ACTIVITY

DATE:

DECEMBER 2009



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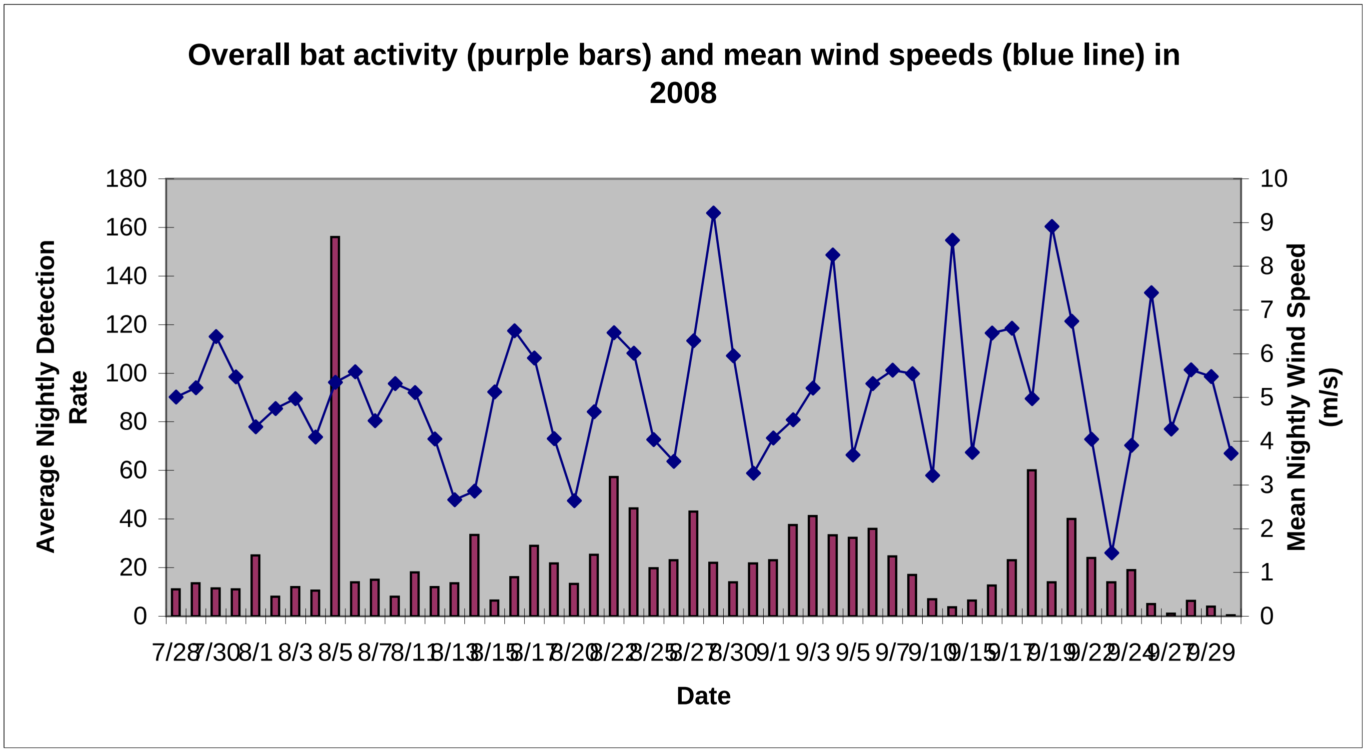
ACOUSTIC BAT MONITORING OSTRANDER POINT WIND ENERGY PARK

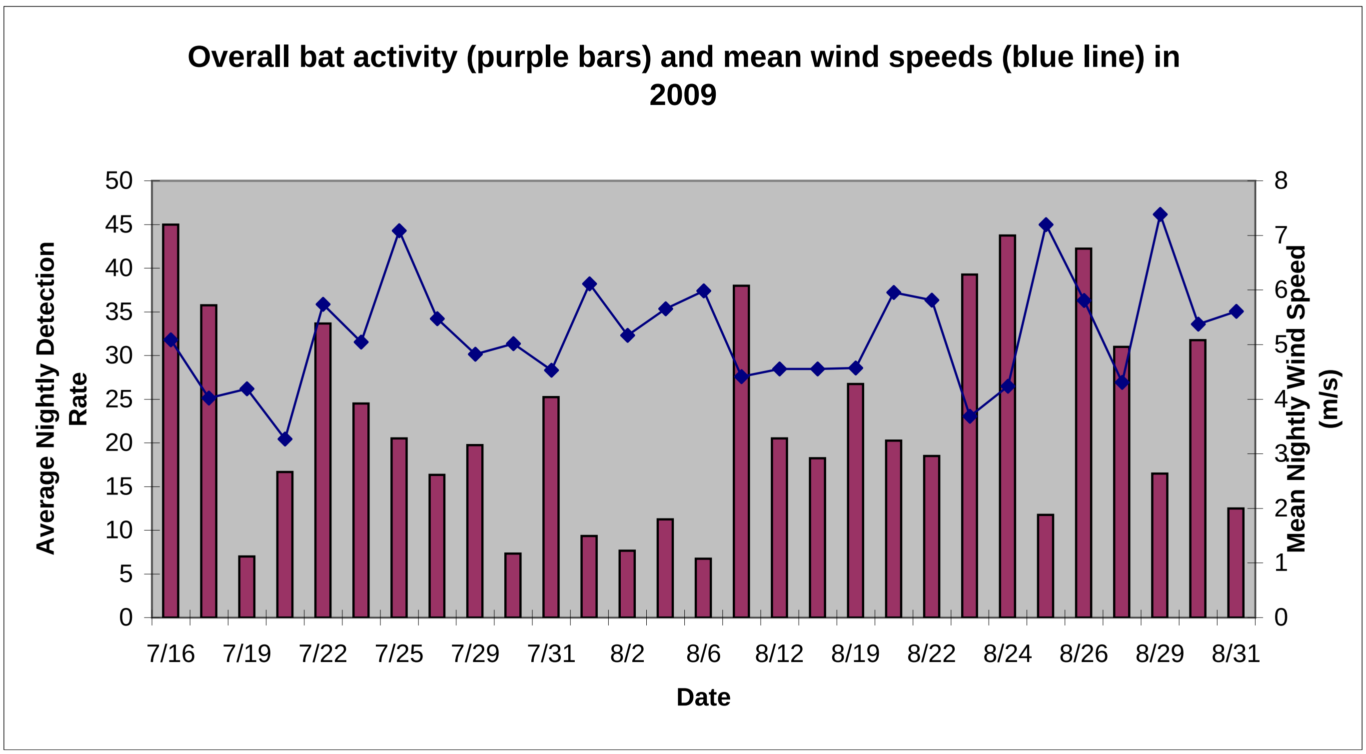
TITLE:

FIGURE 5 – SUMMARY OF SPECIES COMPOSITION AT EACH DETECTOR

DATE:

DECEMBER 2009





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ACOUSTIC BAT MONITORING OSTRANDER POINT WIND ENERGY PARK

TITLE:

FIGURE 6A – COMPARISON OF WIND SPEED AND BAT ACTIVITY

DATE:

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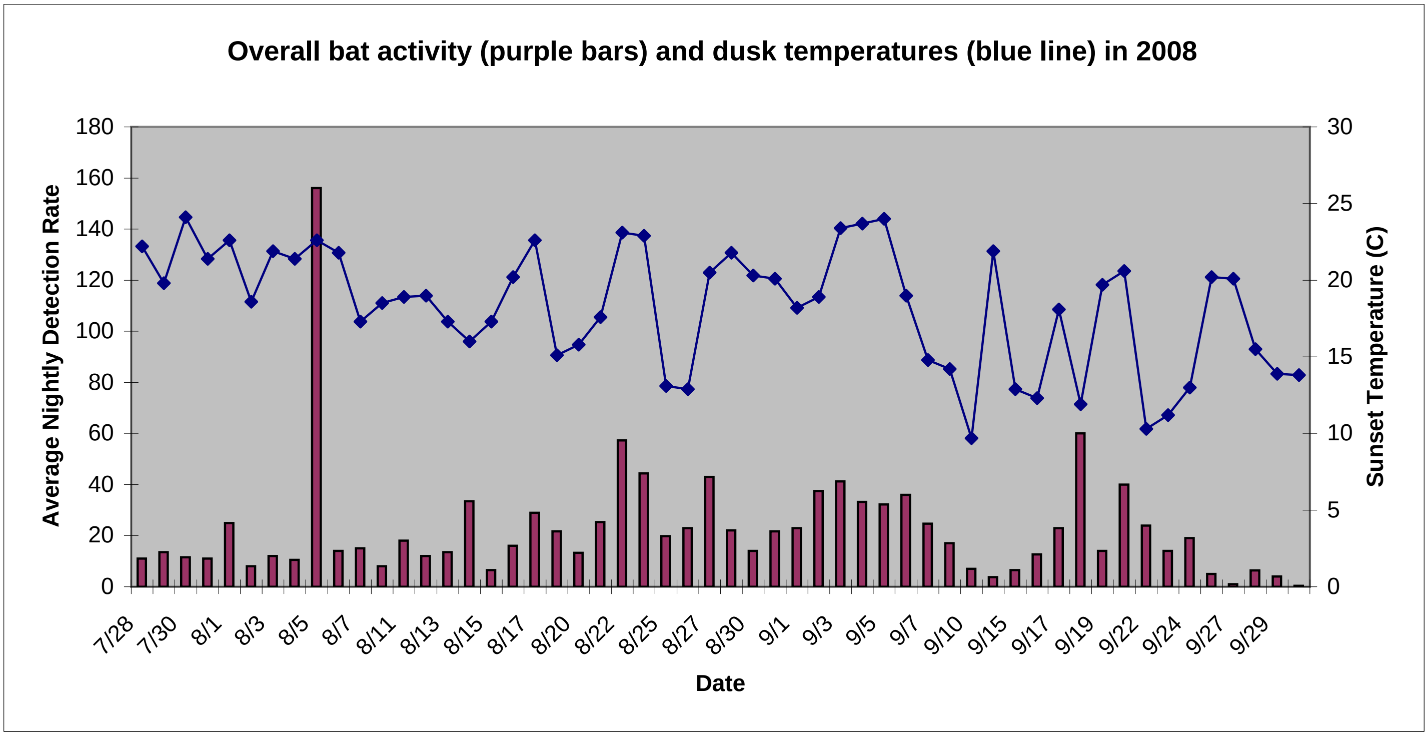

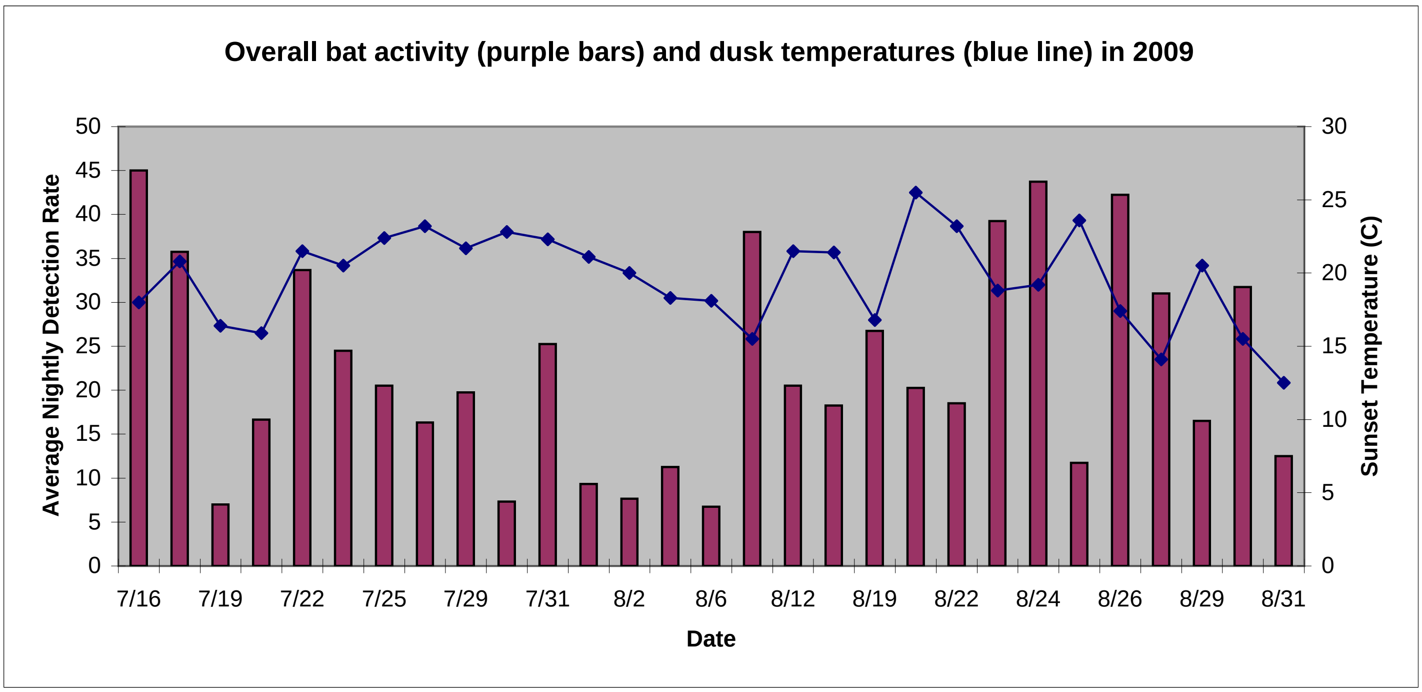

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ACOUSTIC BAT MONITORING OSTRANDER POINT WIND ENERGY PARK

TITLE:

FIGURE 6B – COMPARISON OF TEMPERATURES AND BAT ACTIVITY

DATE:

DECEMBER 2009

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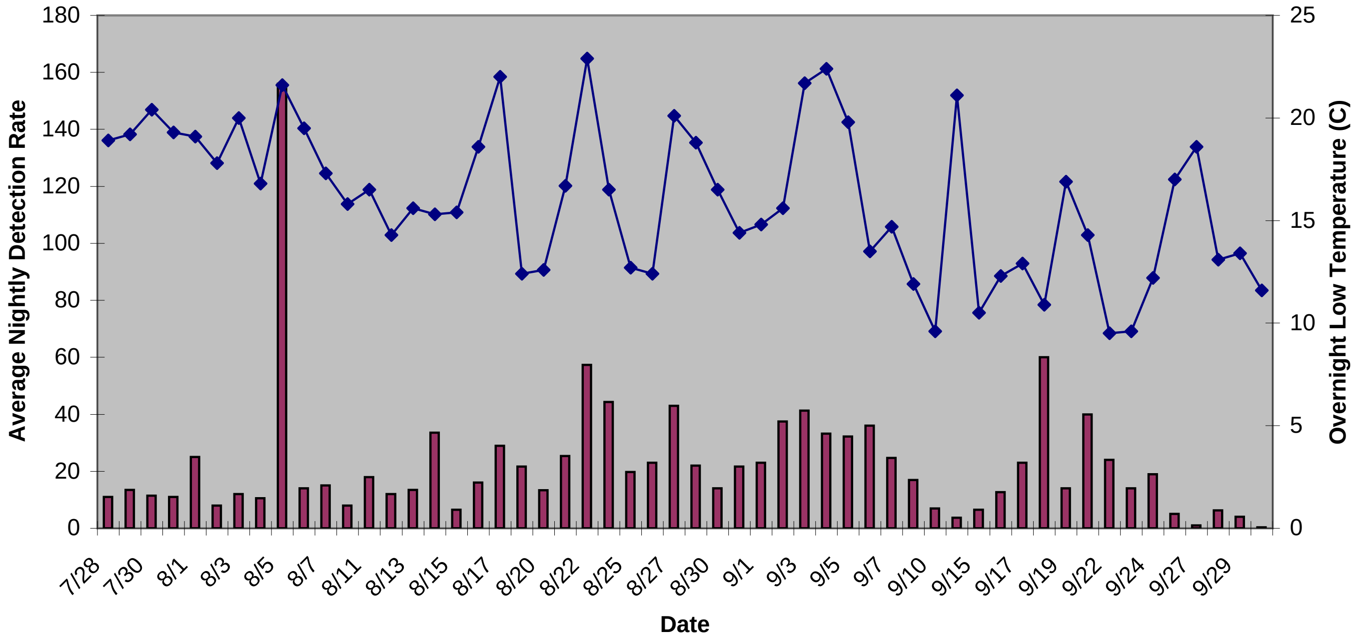
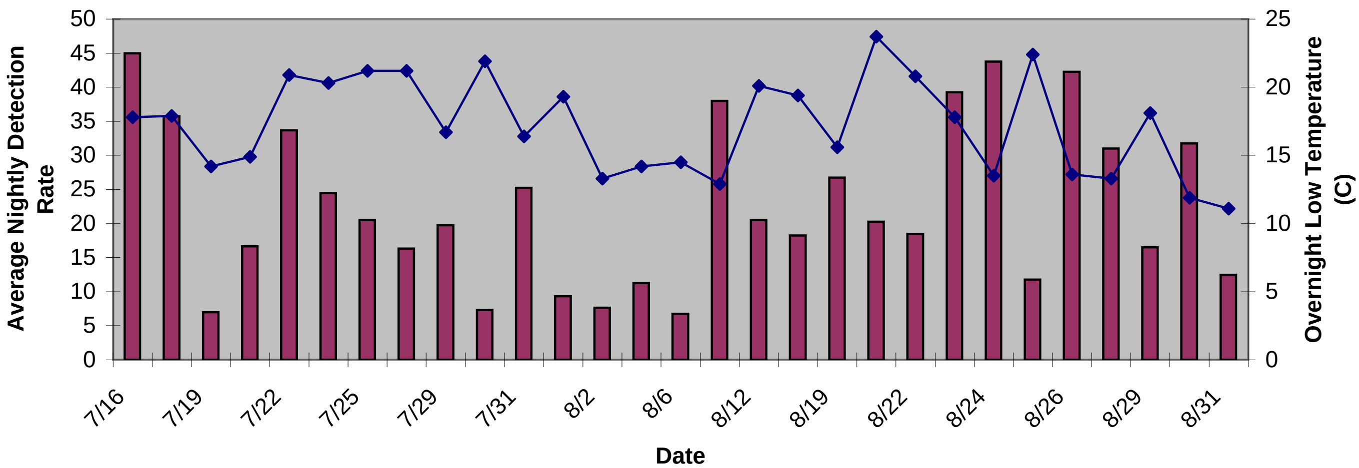
Overall bat activity (purple bars) and overnight low temperature (blue line) in 2008



Overall bat activity (purple bars) and overnight low temperature (blue line) in 2009



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ACOUSTIC BAT MONITORING OSTRANDER POINT WIND ENERGY PARK

TITLE:

FIGURE 6C – COMPARISON OF OVERNIGHT LOW TEMPERATURES AND BAT ACTIVITY

DATE:

DECEMBER 2009

Appendix B

Tables

Table 2.1: Summary of survey dates and operation nights at each acoustic bat monitoring Station					
Station	**Start Dates**	**End Dates**	**Number of Operational Nights**		
			July	**August**	**September**
MET High	July 28, 2008 July 16, 2009	Sept 30, 2008 Aug 31, 2009	14	39	14
MET Low	July 28, 2008 July 16, 2009	Sept 30, 2008 Aug 31, 2009	15	44	21
SW	Aug 14, 2008 July 16, 2009	Sept 30, 2008 Aug 31, 2009	6	29	14
NE	Aug 14, 2008 July 16, 2009	Sept 30, 2008 Aug 31, 2009	11	27	16

Table 3.1: Summary of bat detector field survey effort and results

Location	# Detector-Nights*	# Recorded sequences	Detection Rate **	Maximum # calls recorded ***
MET High	67	635	9.5	32
MET Low	80	1896	23.7	156
NE	54	805	14.9	53
SW	49	2112	43.1	127
Overall Results	***250***	***5448***	***21.8***	--

* Detector-night is a sampling unit during which a single detector is deployed overnight.

** Number of bat passes recorded per detector-night.

*** Maximum number of bat passes recorded from any **single** detector for a 12-hour sampling period.

Table 3.2: Summary of the composition of recorded bat call sequences.

Detector	Guild				Total
	Big brown guild	Red bat/ E. pipistrelle	Myotis	Unknown	
MET High	318	18	99	200	635
MET Low	870	28	481	517	1896
NE	264	2	380	159	805
SW	690	4	1089	329	2112
Total	***2,142***	***52***	***2,049***	***1,205***	***5448***
Species Composition %	39%	1%	38%	22%	

Appendix C

Summary of Acoustic Bat Data and Weather during each Survey Night

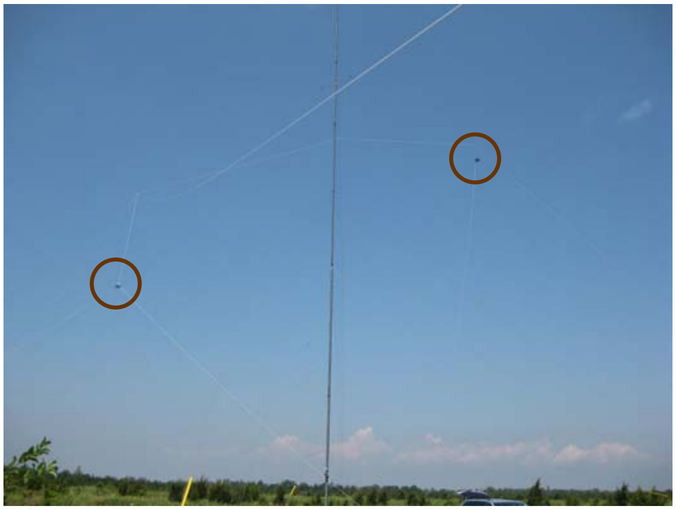

Photo 1 – MET-high and MET-low stations elevated on the meteorological tower.

Photo 2 – Open habitat with scattered junipers in the vicinity of Stations MET-high and MET-low.

Photo 3 – SW station elevated in a tree. Surrounding habitat of low dogwoods and junipers, scattered ash and dense ground vegetation characteristic of moist sites.

Photo 4 – NE station elevated in a dead tree. Surrounding habitat of juniper and prickly-ash with dry spare ground cover.

PREPARED FOR:
GILEAD POWER

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Appendix D

Summary of Acoustic Bat Data and Weather during each Survey Night

Attachment D Table 1. Summary of acoustic bat data during each survey night at the MET-High detector in 2008

		BBSHHB				RBEP			MYSP			UNKN		
Night of	Operated Okay?	big brown bat	hoary bat	silver-haired bat	silver-haired/big brown	eastern pipistrelle	eastern red bat	pipistrelle/red bat	little brown bat	northern long-eared bat	MYSP	high-frequency	low-frequency	Total
7/28/08	Y	1	0	0	0	0	0	0	2	0	0	0	0	**3**
7/29/08	Y	1	1	1	0	0	0	0	1	0	0	1	1	**6**
7/30/08	Y	2	0	0	0	0	0	0	0	0	0	0	0	**2**
7/31/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
8/1/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
8/2/08	Y	1	0	0	1	0	0	1	0	0	0	0	3	**6**
8/3/08	Y	0	2	0	0	0	0	0	1	0	0	1	5	**9**
8/4/08	Y	2	0	0	0	1	1	0	2	0	0	2	2	**10**
8/5/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
8/6/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
8/7/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
8/8/08	Y	2	1	0	0	0	0	0	0	0	0	0	2	**5**
8/11/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
8/12/08	Y	4	0	0	1	0	0	0	0	0	1	0	3	**9**
8/13/08	Y	2	0	1	2	1	0	0	1	0	0	0	2	**9**
8/14/08	Y	1	0	0	2	0	0	0	0	0	1	0	2	**6**
8/15/08	Y	0	0	0	0	0	0	0	0	0	1	0	5	**6**
8/16/08	Y	2	2	0	3	1	0	2	0	0	0	0	2	**12**
8/17/08	Y	3	2	0	5	0	0	0	0	0	0	2	3	**15**
8/19/08	Y	4	1	0	5	0	0	0	2	0	0	2	3	**17**
8/20/08	Y	1	0	0	1	0	0	0	4	0	0	0	1	**7**
8/21/08	Y	2	0	0	1	0	0	0	2	0	0	2	6	**13**
8/22/08	Y	3	1	0	5	0	0	0	2	0	1	2	7	**21**
8/24/08	Y	1	0	0	6	0	0	0	1	0	0	1	11	**20**
8/25/08	Y	1	0	0	1	0	0	0	2	0	0	1	2	**7**
8/26/08	Y	4	0	0	1	0	0	0	4	0	0	1	1	**11**
8/27/08	Y	2	0	0	1	0	0	0	1	0	0	0	1	**5**
8/28/08	Y	0	0	0	2	0	0	0	0	0	0	1	1	**4**
8/30/08	Y	0	0	0	0	0	0	0	2	0	0	1	1	**4**
8/31/08	Y	2	0	0	4	0	1	0	1	0	1	0	8	**17**
9/1/08	Y	2	0	1	4	0	0	0	3	0	1	1	3	**15**
9/2/08	Y	5	0	0	0	0	1	0	3	0	0	2	4	**15**
9/3/08	Y	3	0	2	6	0	0	0	1	0	0	0	9	**21**

Attachment D Table 1. Summary of acoustic bat data during each survey night at the MET-High detector in 2008														
		BBSHHB				RBEP			MYSP			UNKN		
Night of	Operated Okay?	big brown bat	hoary bat	silver-haired bat	silver-haired/big brown	eastern pipistrelle	eastern red bat	pipistrelle/red bat	little brown bat	northern long-eared bat	MYSP	high-frequency	low-frequency	Total
9/4/08	Y	0	0	0	0	0	0	0	1	0	0	0	0	**1**
9/5/08	Y	5	0	0	7	0	0	0	0	0	0	0	2	**14**
9/6/08	Y	6	0	0	7	1	0	0	1	0	0	0	2	**17**
9/7/08	Y	3	0	0	11	0	0	0	0	0	0	0	6	**20**
9/9/08	Y	0	0	0	9	0	0	0	0	0	0	1	6	**16**
9/10/08	Y	0	0	0	1	0	0	0	1	0	1	1	0	**4**
9/11/08	Y	1	0	1	1	0	0	0	0	0	0	0	0	**3**
9/15/08	Y	0	0	0	1	0	1	0	1	0	0	0	3	**6**
9/16/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
9/17/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
9/18/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
9/19/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
9/20/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
9/22/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
9/23/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
9/24/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
9/25/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
9/27/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
9/28/08	Y	0	0	0	1	0	0	0	0	0	0	0	3	**4**
9/29/08	Y	0	0	0	0	0	0	0	0	0	0	0	2	**2**
9/30/08	Y	0	0	0	0	0	0	0	0	0	0	0	1	**1**
By Species		**66**	**10**	**6**	**89**	**4**	**4**	**3**	**39**	**0**	**7**	**22**	**113**	**363**
By Guild		**171**				**11**			**46**			**135**		
		BBSHHB				**RBEP**			**MYSP**			**UNKN**		**Total**

Attachment D Table 2. Summary of acoustic bat data during each survey night at the MET-Low detector in 2008

Night of	Operated Okay?	BBSHHB				RBEP			MYSP			UNKN		Total
		big brown bat	hoary bat	silver-haired bat	silver-haired/big brown	eastern pipistrelle	eastern red bat	pipistrelle/red bat	little brown bat	northern long-eared bat	MYSP	high-frequency	low-frequency	
7/28/08	Y	1	0	0	1	0	0	0	7	0	1	4	5	**19**
7/29/08	Y	2	0	0	1	0	1	0	6	0	2	8	1	**21**
7/30/08	Y	5	0	0	9	0	0	0	1	0	0	3	3	**21**
7/31/08	Y	3	0	0	0	1	0	0	3	0	0	3	1	**11**
8/1/08	Y	0	0	0	3	0	0	0	8	0	8	3	3	**25**
8/2/08	Y	1	0	0	1	0	1	0	2	0	1	2	2	**10**
8/3/08	Y	0	0	0	2	0	0	0	1	0	3	4	5	**15**
8/4/08	Y	1	0	0	3	1	0	0	3	0	1	2	0	**11**
8/5/08	Y	58	0	0	21	0	0	0	0	0	1	0	76	**156**
8/6/08	Y	2	0	0	0	0	0	0	0	0	0	7	5	**14**
8/7/08	Y	1	0	0	1	1	0	0	0	0	1	9	2	**15**
8/8/08	Y	1	0	0	1	0	0	0	0	0	0	0	1	**3**
8/11/08	Y	4	0	0	0	0	0	0	0	0	3	2	9	**18**
8/12/08	Y	1	0	0	6	0	0	0	0	0	0	2	6	**15**
8/13/08	Y	2	0	0	5	0	0	0	3	0	1	3	4	**18**
8/14/08	Y	1	0	0	2	1	0	0	2	0	1	4	1	**12**
8/15/08	Y	2	0	1	4	0	0	0	2	0	0	1	0	**10**
8/16/08	Y	3	0	0	4	0	0	0	4	0	3	4	0	**18**
8/17/08	Y	3	0	0	16	0	0	0	3	0	1	1	3	**27**
8/19/08	Y	1	0	0	7	0	0	0	7	0	3	6	3	**27**
8/20/08	Y	2	0	0	1	0	0	0	11	0	2	1	0	**17**
8/21/08	Y	7	0	0	6	0	0	1	9	0	0	11	3	**37**
8/22/08	Y	62	0	0	5	0	1	0	2	0	0	0	47	**117**
8/24/08	Y	33	0	0	7	0	0	1	5	0	0	3	18	**67**
8/25/08	Y	6	0	0	3	0	1	0	3	0	5	7	1	**26**
8/26/08	Y	7	0	0	2	0	0	0	12	0	2	6	1	**30**
8/27/08	Y	3	0	0	4	0	0	0	15	0	1	7	3	**33**
8/28/08	Y	0	0	0	3	0	0	0	2	0	0	0	3	**8**
8/30/08	Y	5	0	0	3	0	0	0	6	0	0	6	0	**20**
8/31/08	Y	6	0	0	1	0	0	0	10	0	8	6	2	**33**

Attachment D Table 2. Summary of acoustic bat data during each survey night at the MET-Low detector in 2008

Night of	Operated Okay?	BBSHHB				RBEP			MYSP			UNKN		Total
		big brown bat	hoary bat	silver-haired bat	silver-haired/big brown	eastern pipistrelle	eastern red bat	pipistrelle/red bat	little brown bat	northern long-eared bat	MYSP	high-frequency	low-frequency	
9/1/08	Y	6	0	0	6	0	0	0	11	0	4	6	1	**34**
9/2/08	Y	13	0	0	6	0	0	0	15	0	1	7	3	**45**
9/3/08	Y	13	0	0	6	0	0	0	13	0	5	4	2	**43**
9/4/08	Y	4	0	0	0	0	0	0	13	0	4	4	2	**27**
9/5/08	Y	5	0	0	1	0	1	0	16	0	1	9	1	**34**
9/6/08	Y	12	0	0	18	0	0	0	8	0	1	5	4	**48**
9/7/08	Y	5	0	0	5	0	0	2	6	0	1	3	2	**24**
9/9/08	Y	6	0	0	10	0	0	0	1	0	0	1	5	**23**
9/10/08	Y	4	0	0	0	0	0	0	3	0	2	1	0	**10**
9/11/08	Y	1	0	0	1	0	0	0	0	0	0	0	0	**2**
9/15/08	Y	0	0	0	0	0	0	0	4	0	1	1	1	**7**
9/16/08	Y	2	0	0	3	0	0	0	6	0	0	1	1	**13**
9/17/08	Y	1	0	0	7	0	1	0	3	0	1	1	0	**14**
9/18/08	Y	0	0	0	1	0	0	0	5	0	3	0	0	**9**
9/19/08	Y	0	0	0	0	0	0	0	2	0	0	0	0	**2**
9/20/08	Y	0	0	0	1	0	0	0	6	0	2	1	1	**11**
9/22/08	Y	0	0	0	0	0	0	0	5	0	0	1	0	**6**
9/23/08	Y	0	0	0	0	0	0	0	2	0	0	1	0	**3**
9/24/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
9/25/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
9/27/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
9/28/08	Y	0	0	0	1	0	0	0	0	0	0	0	1	**2**
9/29/08	Y	0	0	0	0	0	0	0	0	0	0	0	0	**0**
9/30/08	Y	0	0	0	0	0	0	0	0	0	0	0	0	**0**
By Species		**295**	**0**	**1**	**188**	**4**	**6**	**4**	**246**	**0**	**74**	**161**	**232**	**1211**
By Guild		**484**				**14**			**320**			**393**		
		BBSHHB				**RBEP**			**MYSP**			**UNKN**		**Total**

Attachement D Table 3. Summary of acoustic bat data during each survey night at the NE detector in 2008.

		BBSHHB				RBEP			MYSP			UNKN		
Night of	Operated Okay?	big brown bat	hoary bat	silver-haired bat	silver-haired/big brown	eastern pipistrelle	eastern red bat	pipistrelle/red bat	little brown bat	northern long-eared bat	MYSP	high-frequency	low-frequency	Total
7/28/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
7/29/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
7/30/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
7/31/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
8/1/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
8/2/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
8/3/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
8/4/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
8/5/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
8/6/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
8/7/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
8/8/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
8/11/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
8/12/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
8/13/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
8/14/08	Y	0	0	0	0	0	0	0	3	0	3	5	5	**16**
8/15/08	Y	0	0	0	3	0	1	0	0	0	3	1	1	**9**
8/16/08	Y	1	0	0	0	0	0	0	1	0	2	12	2	**18**
8/17/08	Y	9	4	6	8	0	0	0	2	0	0	1	15	**45**
8/19/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
8/20/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
8/21/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
8/22/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
8/24/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
8/25/08	Y	0	0	0	6	0	0	0	4	0	2	4	1	**17**
8/26/08	Y	0	0	0	6	0	0	0	0	0	4	4	1	**15**
8/27/08	Y	0	0	0	5	0	0	0	6	0	4	5	0	**20**
8/28/08	Y	0	0	0	0	0	0	0	2	0	3	2	0	**7**
8/30/08	Y	2	0	0	1	0	0	0	3	0	0	2	1	**9**
8/31/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
9/1/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
9/2/08	Y	0	0	0	14	0	0	0	16	0	9	7	3	**49**
9/3/08	Y	8	0	0	24	0	0	0	6	0	7	5	3	**53**

Attachement D Table 3. Summary of acoustic bat data during each survey night at the NE detector in 2008.

		BBSHHB				RBEP			MYSP			UNKN		
Night of	Operated Okay?	big brown bat	hoary bat	silver-haired bat	silver-haired/big brown	eastern pipistrelle	eastern red bat	pipistrelle/red bat	little brown bat	northern long-eared bat	MYSP	high-frequency	low-frequency	Total
9/4/08	Y	0	0	0	8	0	0	0	5	0	8	5	1	**27**
9/5/08	Y	0	0	0	2	0	0	0	3	0	5	0	2	**12**
9/6/08	Y	14	0	0	9	0	0	0	6	0	3	3	8	**43**
9/7/08	Y	2	0	0	14	0	0	0	2	0	4	1	7	**30**
9/9/08	Y	0	0	0	6	0	0	0	0	0	0	2	4	**12**
9/10/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
9/11/08	Y	0	0	0	0	0	0	0	0	0	0	1	3	**4**
9/15/08	Y	0	0	0	1	0	0	0	3	0	1	0	0	**5**
9/16/08	Y	0	0	0	0	0	0	0	0	0	0	1	1	**2**
9/17/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
9/18/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
9/19/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
9/20/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
9/22/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
9/23/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
9/24/08	Y	0	0	0	15	0	0	0	1	0	0	1	2	**19**
9/25/08	Y	0	0	0	0	0	0	0	3	0	0	0	2	**5**
9/27/08	Y	0	0	0	0	0	0	0	1	0	0	0	0	**1**
9/28/08	Y	4	0	0	9	0	0	0	0	0	0	0	0	**13**
9/29/08	Y	1	0	0	6	0	0	0	0	0	0	0	3	**10**
9/30/08	Y	0	0	0	0	0	0	0	0	0	0	0	0	**0**
By Species		**41**	**4**	**6**	**137**	**0**	**1**	**0**	**67**	**0**	**58**	**62**	**65**	**441**
By Guild		**188**				**1**			**125**			**127**		
		BBSHHB				**RBEP**			**MYSP**			**UNKN**		**Total**

Attachment D Table 4. Summary of acoustic bat data during each survey night at the SW detector in 2008.

Night of	Operated Okay?	BBSHHB				RBEP			MYSP			UNKN		Total
		big brown bat	hoary bat	silver-haired bat	silver-haired/big brown	eastern pipistrelle	eastern red bat	pipistrelle/red bat	little brown bat	northern long-eared bat	MYSP	high-frequency	low-frequency	
7/28/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
7/29/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
7/30/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
7/31/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
8/1/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
8/2/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
8/3/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
8/4/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
8/5/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
8/6/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
8/7/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
8/8/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
8/11/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
8/12/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
8/13/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
8/14/08	Y	36	0	0	59	0	0	0	0	0	0	1	4	**100**
8/15/08	Y	0	0	0	0	0	0	0	0	0	0	1	0	**1**
8/16/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
8/17/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
8/19/08	Y	1	0	0	9	0	0	0	1	0	0	3	7	**21**
8/20/08	Y	0	0	0	6	0	0	0	0	0	0	7	3	**16**
8/21/08	Y	0	0	0	5	0	0	0	0	0	1	12	8	**26**
8/22/08	Y	0	0	0	16	0	0	0	1	0	0	2	15	**34**
8/24/08	Y	0	0	0	24	0	0	0	0	0	0	7	15	**46**
8/25/08	Y	1	0	0	13	0	0	0	5	0	1	4	5	**29**
8/26/08	Y	3	0	0	4	0	0	0	14	0	3	12	0	**36**
8/27/08	Y	3	0	0	9	0	0	0	76	0	4	20	2	**114**
8/28/08	Y	1	0	0	7	0	0	0	31	0	5	22	3	**69**
8/30/08	Y	0	0	0	1	0	0	0	13	0	2	5	2	**23**
8/31/08	Y	0	0	0	4	0	0	0	4	0	1	3	3	**15**

Attachment D Table 4. Summary of acoustic bat data during each survey night at the SW detector in 2008.

		BBSHHB				RBEP			MYSP			UNKN		
Night of	**Operated Okay?**	**big brown bat**	**hoary bat**	**silver-haired bat**	**silver-haired/big brown**	**eastern pipistrelle**	**eastern red bat**	**pipistrelle/red bat**	**little brown bat**	**northern long-eared bat**	**MYSP**	**high-frequency**	**low-frequency**	**Total**
9/1/08	Y	5	0	0	5	0	0	0	4	0	4	1	1	**20**
9/2/08	Y	3	0	0	6	0	0	0	18	0	3	7	4	**41**
9/3/08	Y	5	0	0	7	0	0	0	24	0	2	9	1	**48**
9/4/08	Y	1	0	0	3	0	0	0	57	0	3	14	0	**78**
9/5/08	Y	1	0	0	1	0	0	0	51	0	0	13	3	**69**
9/6/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
9/7/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
9/9/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
9/10/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
9/11/08	Y	0	0	0	0	0	0	0	4	0	0	1	1	**6**
9/15/08	Y	1	0	0	3	0	0	0	0	0	0	1	3	**8**
9/16/08	Y	0	0	0	2	0	0	0	15	0	0	4	2	**23**
9/17/08	Y	0	0	0	14	0	0	0	4	0	0	4	10	**32**
9/18/08	Y	0	0	0	6	0	2	0	10	0	0	0	3	**21**
9/19/08	Y	0	0	0	0	0	0	0	3	0	0	1	1	**5**
9/20/08	Y	1	0	0	0	0	0	0	1	0	2	4	1	**9**
9/22/08	Y	0	0	0	0	0	0	0	6	0	0	0	0	**6**
9/23/08	Y	0	0	0	2	0	0	0	0	0	0	0	2	**4**
9/24/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
9/25/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
9/27/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
9/28/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
9/29/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
9/30/08		0	0	0	0	0	0	0	0	0	0	0	0	**0**
By Species		**62**	**0**	**0**	**206**	**0**	**2**	**0**	**342**	**0**	**31**	**158**	**99**	**900**
By Guild		**268**				**2**			**373**			**257**		
		BBSHHB				**RBEP**			**MYSP**			**UNKN**		**Total**

Attachment D Table 5. Summary of acoustic bat data during each survey night at the MET-High detector in 2009														
		BBSHHB				RBEP			MYSP			UNKN		
Night of	Operated Okay?	big brown bat	hoary bat	silver-haired bat	silver-haired/big brown	eastern pipistrelle	eastern red bat	pipistrelle/red bat	little brown bat	northern long-eared bat	MYSP	high-frequency	low-frequency	Total
7/16/08	Y	0	0	0	0	0	0	0	3	0	0	0	5	**8**
7/17/08	Y	0	0	0	0	0	0	0	0	0	0	0	1	**1**
7/19/08	Y	0	0	0	0	1	0	0	2	0	0	0	3	**6**
7/20/08	Y	1	0	0	0	0	0	0	1	0	1	0	0	**3**
7/22/08	Y	2	0	0	0	0	0	0	0	0	0	0	5	**7**
7/24/08	Y	0	1	0	0	0	0	0	0	0	0	0	9	**10**
7/25/08	Y	1	1	0	0	0	0	0	0	0	0	0	0	**2**
7/28/08	Y	0	1	0	5	0	0	0	0	0	0	2	2	**10**
7/29/08	Y	1	0	0	0	0	1	0	0	0	0	0	3	**5**
7/30/08	Y	0	3	0	0	0	0	0	0	0	0	0	1	**4**
7/31/08	Y	1	1	0	0	0	0	0	1	0	0	2	3	**8**
8/1/08	Y	4	0	0	0	0	0	0	0	0	0	0	0	**4**
8/2/08	Y	1	2	0	1	0	0	0	1	0	1	0	0	**6**
8/5/08	Y	2	1	1	0	0	0	0	0	0	0	0	0	**4**
8/6/08	Y	2	3	0	0	0	0	0	0	0	0	0	0	**5**
8/7/08	Y	0	1	0	2	0	0	0	8	0	1	0	2	**14**
8/12/08	Y	3	0	0	2	0	0	0	2	0	0	0	0	**7**
8/13/08	Y	0	1	3	2	0	0	0	1	0	1	0	0	**8**
8/19/08	Y	0	1	0	0	0	2	0	1	0	0	0	0	**4**
8/21/08	Y	2	0	1	0	0	1	0	2	0	0	0	0	**6**
8/22/08	Y	2	0	0	3	0	1	0	1	0	0	1	0	**8**
8/23/08	Y	4	1	8	9	0	0	0	1	0	1	0	5	**29**
8/24/08	Y	5	0	7	11	0	0	0	4	0	0	0	5	**32**
8/25/08	Y	2	0	1	1	0	0	0	1	0	0	1	0	**6**
8/26/08	Y	2	0	0	4	0	0	0	6	0	1	0	1	**14**
8/27/08	Y	1	1	3	4	0	0	0	8	0	1	0	4	**22**
8/29/08	Y	0	0	5	0	0	0	0	0	0	0	1	4	**10**
8/30/08	Y	2	0	5	7	0	1	0	2	0	0	0	5	**22**
8/31/08	Y	2	0	1	3	0	0	0	1	0	0	0	0	**7**
By Species		**40**	**18**	**35**	**54**	**1**	**6**	**0**	**46**	**0**	**7**	**7**	**58**	**272**
By Guild		**147**				**7**			**53**			**65**		
		BBSHHB				**RBEP**			**MYSP**			**UNKN**		**Total**

Attachment D Table 6. Summary of acoustic bat data during each survey night at the MET-Low detector in 2009														
		BBSHHB				**RBEP**			**MYSP**			**UNKN**		
Night of	**Operated Okay?**	**big brown bat**	**hoary bat**	**silver-haired bat**	**silver-haired/big brown**	**eastern pipistrelle**	**eastern red bat**	**pipistrelle/red bat**	**little brown bat**	**northern long-eared bat**	**MYSP**	**high-frequency**	**low-frequency**	**Total**
7/16/08	Y	11	0	0	6	0	0	0	5	0	0	3	4	**29**
7/17/08	Y	5	0	0	2	0	0	0	3	0	1	1	3	**15**
7/19/08	Y	3	0	0	0	0	0	0	1	0	0	1	0	**5**
7/20/08	Y	4	0	0	1	0	0	0	8	0	3	7	2	**25**
7/22/08	Y	41	0	2	21	0	1	0	6	0	0	0	15	**86**
7/24/08	Y	19	0	0	18	0	0	0	2	0	0	3	9	**51**
7/25/08	Y	5	0	0	2	0	0	0	8	0	2	0	2	**19**
7/28/08	Y	16	1	0	5	0	0	0	4	0	0	3	6	**35**
7/29/08	Y	16	0	0	1	0	0	0	2	0	3	0	6	**28**
7/30/08	Y	4	1	0	2	0	0	0	1	0	0	1	1	**10**
7/31/08	Y	3	1	0	4	0	0	0	1	0	1	1	2	**13**
8/1/08	Y	5	0	0	2	0	0	0	2	0	0	0	3	**12**
8/2/08	Y	4	0	0	1	0	0	0	3	0	0	1	2	**11**
8/5/08	Y	1	0	0	1	0	0	0	1	0	2	2	1	**8**
8/6/08	Y	0	0	0	0	0	1	0	2	0	1	2	0	**6**
8/7/08	Y	2	0	0	0	0	1	0	11	0	1	3	1	**19**
8/12/08	Y	12	1	2	5	0	0	0	3	0	2	0	2	**27**
8/13/08	Y	10	0	1	3	4	0	1	9	0	1	2	3	**34**
8/19/08	Y	6	0	0	1	0	0	0	4	0	2	1	1	**15**
8/21/08	Y	3	0	0	0	0	1	0	3	0	0	0	1	**8**
8/22/08	Y	7	0	0	4	0	0	2	4	0	0	1	2	**20**
8/23/08	Y	11	0	0	22	1	1	0	1	0	0	0	2	**38**
8/24/08	Y	22	0	2	5	0	0	0	5	0	1	0	3	**38**
8/25/08	Y	6	0	0	0	0	0	0	3	0	2	1	1	**13**
8/26/08	Y	11	0	0	3	0	0	0	17	0	0	4	5	**40**
8/27/08	Y	8	0	0	3	0	0	0	16	0	0	3	2	**32**
8/29/08	Y	3	0	0	1	0	0	0	3	0	0	0	0	**7**
8/30/08	Y	18	0	0	1	0	1	0	3	0	1	2	2	**28**
8/31/08	Y	5	0	0	0	0	0	0	6	0	1	0	1	**13**
By Species		**261**	**4**	**7**	**114**	**5**	**6**	**3**	**137**	**0**	**24**	**42**	**82**	**685**

Attachment D Table 6. Summary of acoustic bat data during each survey night at the MET-Low detector in 2009															
		BBSHHB				RBEP			MYSP			UNKN			
Night of	Operated Okay?	big brown bat	hoary bat	silver-haired bat	silver-haired/big brown	eastern pipistrelle	eastern red bat	pipistrelle/red bat	little brown bat	northern long-eared bat	MYSP	high-frequency	low-frequency		Total
By Guild		386				14			161			124			685
		BBSHHB				RBEP			MYSP			UNKN			Total

Attachement D Table 7. Summary of acoustic bat data during each survey night at the NE detector in 2009.													
		BBSHHB				RBEP			MYSP			UNKN		
Night of	Operated Okay?	big brown bat	hoary bat	silver-haired bat	silver-haired/big brown	eastern pipistrelle	eastern red bat	pipistrelle/red bat	little brown bat	northern long-eared bat	MYSP	high-frequency	low-frequency	Total
7/16/08	Y	0	1	0	1	0	0	0	3	0	8	1	2	**16**
7/17/08	Y	1	0	0	1	0	0	0	3	0	8	0	0	**13**
7/19/08	Y	0	0	0	0	0	0	0	4	0	4	2	0	**10**
7/20/08	Y	0	0	0	2	0	0	0	5	0	14	1	0	**22**
7/22/08	Y	1	0	0	0	0	0	0	2	0	2	3	0	**8**
7/24/08	Y	0	0	0	0	0	0	0	7	0	5	2	0	**14**
7/25/08	Y	1	0	0	0	0	0	0	0	0	2	1	1	**5**
7/28/08	Y	0	0	0	1	0	0	0	1	0	0	1	1	**4**
7/29/08	Y	0	0	0	0	0	0	0	6	1	0	0	0	**7**
7/30/08	Y	1	0	0	1	0	0	0	3	1	2	0	0	**8**
7/31/08	Y	1	1	0	1	0	0	0	2	1	0	0	0	**6**
8/1/08	Y	1	0	0	0	0	0	0	7	1	2	1	0	**12**
8/2/08	Y	1	0	0	0	0	0	1	2	1	0	0	1	**6**
8/5/08	Y	2	0	4	6	0	0	0	4	0	0	1	2	**19**
8/6/08	Y	0	0	0	0	0	0	0	6	0	0	1	0	**7**
8/7/08	Y	0	2	0	1	0	0	0	6	0	0	1	0	**10**
8/12/08	Y	0	0	0	3	0	0	0	12	0	0	1	0	**16**
8/13/08	Y	0	0	0	2	0	0	0	3	0	0	1	0	**6**
8/19/08	Y	0	0	0	3	0	0	0	6	0	0	1	0	**10**
8/21/08	Y	0	0	0	2	0	0	0	7	0	0	0	0	**9**
8/22/08	Y	4	0	0	1	0	0	0	10	0	3	0	0	**18**
8/23/08	Y	3	0	0	1	0	0	0	17	0	0	0	0	**21**
8/24/08	Y	6	0	0	4	0	0	0	16	0	1	0	2	**29**
8/25/08	Y	1	0	0	2	0	0	0	11	1	1	0	0	**16**
8/26/08	Y	4	0	0	1	0	0	0	13	0	4	0	0	**22**
8/27/08	Y	1	0	0	3	0	0	0	10	0	2	2	2	**20**
8/29/08	Y	0	0	0	0	0	0	0	8	0	1	0	0	**9**
8/30/08	Y	0	0	0	3	0	0	0	3	0	2	1	0	**9**
8/31/08	Y	1	0	0	0	0	0	0	9	0	2	0	0	**12**
By Species		**29**	**4**	**4**	**39**	**0**	**0**	**1**	**186**	**6**	**63**	**21**	**11**	**364**

Attachement D Table 7. Summary of acoustic bat data during each survey night at the NE detector in 2009.

Night of	Operated Okay?	BBSHHB				RBEP			MYSP			UNKN		Total
		big brown bat	hoary bat	silver-haired bat	silver-haired/big brown	eastern pipistrelle	eastern red bat	pipistrelle/red bat	little brown bat	northern long-eared bat	MYSP	high-frequency	low-frequency	
By Guild		76				1			255			32		364
		BBSHHB				RBEP			MYSP			UNKN		Total

Attachment D Table 8. Summary of acoustic bat data during each survey night at the SW detector in 2009.

Night of	Operated Okay?	BBSHHB				RBEP			MYSP			UNKN			Total
		big brown bat	hoary bat	silver-haired bat	silver-haired/big brown	eastern pipistrelle	eastern red bat	pipistrelle/red bat	little brown bat	northern long-eared bat	MYSP	high-frequency	low-frequency	unknown	
7/16/08	Y	1	0	0	20	0	0	0	94	0	3	5	4	0	**127**
7/17/08	Y	0	0	0	2	0	0	0	98	0	4	6	4	0	**114**
7/19/08		0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
7/20/08		0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
7/22/08		0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
7/24/08	Y	0	0	0	3	0	0	0	19	0	1	0	0	0	**23**
7/25/08	Y	0	0	0	5	0	0	0	38	0	4	7	2	0	**56**
7/28/08		0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
7/29/08	Y	6	0	0	8	0	0	0	21	0	3	1	0	0	**39**
7/30/08		0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
7/31/08	Y	3	0	0	6	0	0	1	49	0	10	4	1	0	**74**
8/1/08		0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
8/2/08		0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
8/5/08	Y	3	0	0	4	0	0	1	4	0	0	2	0	0	**14**
8/6/08	Y	2	0	0	1	0	0	0	2	0	1	3	0	0	**9**
8/7/08	Y	36	0	0	42	0	0	0	24	0	0	5	2	0	**109**
8/12/08	Y	4	0	0	10	0	0	0	15	0	0	1	2	0	**32**
8/13/08	Y	4	0	0	7	0	0	0	12	0	1	0	1	0	**25**
8/19/08	Y	11	0	0	11	0	0	0	55	0	1	0	0	0	**78**
8/21/08	Y	1	0	0	12	0	0	0	44	0	0	0	1	0	**58**
8/22/08	Y	1	0	1	17	0	0	0	8	0	0	1	0	0	**28**
8/23/08	Y	5	0	0	52	0	0	0	9	0	2	1	0	0	**69**
8/24/08	Y	7	0	0	51	0	0	0	14	0	0	0	4	0	**76**
8/25/08	Y	0	0	0	5	0	0	0	5	0	2	0	0	0	**12**
8/26/08	Y	2	0	0	12	0	0	0	69	2	1	6	1	0	**93**
8/27/08	Y	3	0	1	10	0	0	0	34	0	1	0	1	0	**50**
8/29/08	Y	0	0	0	9	0	0	0	26	0	0	3	2	0	**40**
8/30/08	Y	3	0	1	30	0	0	0	29	0	3	1	1	0	**68**
8/31/08	Y	0	0	0	10	0	0	0	8	0	0	0	0	0	**18**
By Species		**92**	**0**	**3**	**327**	**0**	**0**	**2**	**677**	**2**	**37**	**46**	**26**	**0**	**1212**
By Guild		**422**				**2**			**716**			**72**			
		BBSHHB				**RBEP**			**MYSP**			**UNKN**			**Total**