

**Sheffield Wind Farm
Preliminary Wildlife Casualty Monitoring Protocol
September, 2006**

Introduction

Pre-construction surveys and assessments conducted for the Sheffield Wind Farm indicate that the risk of bird and bat fatalities are likely to be low, and that they are not likely to result in undue adverse impacts to local or regional wildlife populations. At the same time, some avian and bat fatalities can be expected to occur as a result of direct collisions with the proposed turbines. In order to verify that undue adverse impacts are not occurring (or, if they are occurring, that they are mitigated), UPC Vermont Wind, LLC proposes to conduct wildlife casualty monitoring within the project site during the initial period of operation. The monitoring approach proposed is adaptive, i.e., the intensity of monitoring will be adjusted in response to the numbers of fatalities that are found.

Fatality monitoring is a labor-intensive undertaking that can be expensive and time-consuming. To make the best use of resources, it is best if intensive monitoring efforts are reserved for situations where there is reason to believe that fatalities may be high, and specifically where they might exceed “undue adverse impact” thresholds. Conversely, if initial observations indicate fatalities are low, monitoring may be discontinued altogether, or possibly proceed at a less intensive level.

Toward this end, UPC Vermont Wind proposes that initially, searches be conducted in a “spot-check” manner to determine whether fatalities are occurring at levels that might be considered an “undue adverse impact”. If numbers detected reach a certain level (as determined in consultation with ANR wildlife biologists), more intensive efforts could then be tailored to address site-specific concerns, and if necessary, mitigation measures prescribed.

Objective

The objective of wildlife casualty monitoring at the Sheffield Wind Farm is to document injuries and fatalities of birds and bats, primarily during peak migration periods, as a basis for determining whether the project is causing an undue adverse impact to wildlife.

Proposed Monitoring Protocol

The following monitoring protocol is proposed:

- 1) Initially, during the first year of operation, UPC Vermont Wind will conduct standardized searches in test plots at turbines selected to represent at least 50% of

the project (i.e., at least eight of the 16 proposed turbines) during the peak periods of spring and fall migration;

- 2) If the first year's searches indicate a low likelihood of undue adverse impact, as determined in consultation with ANR, no further searches would be required;
- 3) If significant uncertainties remain regarding the potential for undue adverse impacts, as determined in consultation with ANR, searches will be continued at a similar level of intensity for a second season; these may be modified as necessary to focus on areas of greatest uncertainty;
- 4) If initial searches indicate that undue adverse impacts are likely to be occurring, UPC Vermont Wind will develop a protocol for more intensive surveys in consultation with ANR. Where possible, intensive surveys will be tailored to focus on phenomena believed to be associated with fatalities as identified in the initial searches. Examples may include seasonal patterns of wildlife movements (e.g., summer bat migration, fall songbird or raptor migration), weather conditions, or site-specific/spatial factors (e.g., specific turbine locations);
- 5) If intensive quantitative surveys are prescribed, they will include searcher efficiency trials to estimate the percentage of carcasses found by searchers, and carcass removal trials to estimate the length of time that carcasses remain detectable.
- 6) In addition to the above protocol, UPC Vermont Wind will implement an Incidental Handling and Reporting System for operations personnel to properly handle and report casualties found in the project area throughout the life of the project, incidental to any surveys that may be conducted.

Conditions at Sheffield, a mixed-age forested hilltop setting, are significantly different from the open agricultural sites in the northwest and midwest where most monitoring has occurred to date. Where searches have been conducted in the eastern forested region, researchers have found the presence of trees and undergrowth to be a significant hindrance to locating carcasses (especially bats). As a result, UPC proposes that the methods and practices used elsewhere be adapted to better suit local conditions.

Search Plot Size

For the initial surveys, fatality searches will be limited to the laydown areas that will have been cleared and graded around each turbine site. These areas will vary in size, but will generally be on the order of 300 feet in diameter, or roughly a 150 foot (50m) radius surrounding each turbine. Although larger plot sizes are often used for more intensive, exhaustive surveys in agricultural landscapes, the main purpose of the initial searches at Sheffield will be to sub-sample fatalities to give an indication of the magnitude of impact. Searching outside the cleared zone is likely to be impractical; it would greatly increase labor effort, yet yield a very low detection of fatalities.

Further, although searches often extend beyond this distance, researchers in previous studies have generally found that the majority of fatalities are found within about 50 meters (Barrios and Rodriguez 2004; Erickson et al. 2004a, 2004b, 2003, 2000; Johnson et al. 2000a and 2000b).

Search Timing and Frequency

Initial searches will be conducted at least twice per week during peak spring and fall migration periods, for a total of at least 12 searches per migration period. Searches may be timed to coincide with specific weather events such as big migration nights (clear skies, favorable winds) or alternatively to represent moonless nights or cloudy, foggy or low cloud ceiling conditions.

Standardized Searches

Plots will be searched by walking parallel transects at regular intervals. Initially, transects will be set at 6-8 meters apart in the area to be searched. A searcher will walk at a rate of approximately 45-60 meters a minute along each transect, searching on both sides out to 3-4 meters for casualties. Searcher speed may be adjusted by habitat (vegetation) and degree of slope after practice and with site familiarity. All casualties will be documented on standardized field forms, located with GPS, photographed and, if a listed species, collected and reported.

Searcher Efficiency Trials (SEEF)

Should more intensive surveys be deemed necessary after the first year of monitoring, intensive surveys will include SEEF trials conducted in the same area as the searches to estimate the percentage of avian/bat fatalities that are found by searchers. One SEEF trial will be conducted during each season (i.e., one spring, one fall). Searcher efficiency will be estimated by habitat type, (grassland, shrubs, etc., as applicable) and species. Estimates of searcher efficiency will be used to adjust for detection bias.

Personnel conducting carcass searches will not be told when or where trials will be conducted. All carcasses will be placed at random locations prior to the carcass search on the same day, and each trial carcass will be discreetly marked so it can be identified when found.

Carcass Removal Trials

Intensive searches, should they be deemed necessary, will also include carcass removal trials. One carcass removal trial will be conducted during each season (i.e., one spring, one fall), independently of the SEEF trials. The objective will be to estimate the percentage of avian/bat fatalities that disappear from study plots due to scavenging. Estimates of carcass removal will be used to adjust the number of carcasses found, correcting for removal bias.

For each trial, an agreed-upon number of carcasses comprising a variety of species and sizes, including bats if available, will be placed out near search plots (but not in plots to avoid contamination from blowing feathers, etc.). All carcasses will be checked on days 1, 2, 3, 4, 5, 7, 10, and 14, or until all evidence of the carcass is gone. On day 14, all birds, feathers or parts will be retrieved and properly discarded.

Reporting

A report will be provided after each season summarizing methods and results of monitoring. For the initial surveys the numbers of fatalities found will be summarized by date and location in table form. For intensive surveys, an estimate of the total number of wind turbine-related fatalities will be based on three components: 1) observed number of carcasses, 2) searcher efficiency expressed as the proportion of trial carcasses found by searchers, and 3) removal rates expressed as the length of time a carcass remains in the study area and is available for detection by searchers. Other factors may be reported as well, such as the proportion of casualties estimated to have fallen outside search plots (e.g., forested portions beyond the cleared area surround turbines), and the number of carcasses found where cause of death could not be attributed to the wind energy development.

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