



Amendment to the On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio

Revision: June 2012



In 2009, the Ohio Department of Natural Resources (ODNR), Division of Wildlife developed the *On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio* (dated May 4, 2009). Standardized procedures within this document have and will continue to allow the Division of Wildlife to make comparisons among proposed on-shore wind energy facilities throughout the state. Since the development of the 2009 protocol, the wind industry has expanded throughout the Midwest and the country. Accordingly, there have been several wind facilities that have conducted post-construction evaluations examining the potential impacts wind energy facilities have on wildlife. Several different methodologies have been utilized and suggested in post-construction monitoring of wind energy facilities; some have been more efficient and more statistically accurate than others. Given the importance of being adaptive to the new science provided by the existing monitoring, and evaluations of protocols, as well as a need for a more efficient methodology, the ODNR Division of Wildlife has recently reviewed the Mortality Search section of the *On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio* (dated May 4, 2009) and amended this section of the protocol.

The objectives of the post-construction monitoring in Ohio are to determine if wind energy facility operations are causing an unacceptable level of impact on wildlife, as well as evaluate potential rare events. Results from monitoring will enable ODNR Division of Wildlife to make recommendations on additional minimization or mitigation measures that, if needed, can be employed. Additionally, the ODNR Division of Wildlife will assess the predictive value of pre-construction monitoring by comparing those results with post-construction mortality, and ultimately provide Ohio-specific data to define typical or expected versus unacceptable levels of mortality to wildlife from wind energy facilities within Ohio.

The amended protocol provides the developers with two options (Options A and B) for standardized post-construction mortality search protocols. Option A includes daily searches and search distances that are twice the blade length, as specifically detailed in the *On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio* dated May 4, 2009. Option B methodology includes a smaller sample of turbines searched using the Option A protocol, and a double-sampling protocol that consists of searches on cleared plots that are sampled every 3 days and a roads and pads search that is sampled weekly (outlined in Table 1). ODNR Division of Wildlife will review site-specific data for each wind facility, when determining if the facility is eligible for both (Options A and B) post-construction monitoring protocols. Facilities requiring an HCP, have significant wildlife concerns, or areas with boundaries that encompass greater than 50% red areas (i.e., extensive

monitoring) from ODNR pre-construction monitoring maps, will likely be ineligible for Option B.

One of the two standardized protocols must be followed for a minimum of the first two years of post-construction monitoring, no other variation will be considered until there is sufficient data to evaluate the protocols. For both options, post-construction monitoring should commence immediately (within 2 weeks) following date of first operation, if operation is initiated during 1 April to 15 November. In this circumstance, the first year of post-construction monitoring may be extended over 2 calendar years (e.g., start monitoring 1 July 2011 continue to 15 November 2011, resume monitoring 1 April 2012 to 30 June 2012). If the facility begins operation during 16 November to 31 March, monitoring will begin on 1 April and continue to 15 November.

If a facility is eligible for Option B and meet all of the below listed criteria, then all search plots can change to a 3-day interval during June and July, and again from 15 October to 15 November.

Criteria for amended Option B (all must apply):

- Scavenger rate, based on a minimum of 20 samples during April and May (and again in August and September), must have an average that is greater than or equal to 5 days.
- The mean number of birds killed per turbine sampled must be less than or equal to 50% above the mean regional average (2.5; +50% = 3.75), pro-rated for 2 months of the year (critical value = 0.62), during April and May (and again in August and September).
- The mean number of bats killed per turbine sampled must be less than or equal to 50% above the mean regional average (9.6; +50% = 14.4), pro-rated for 2 months of the year (critical value = 2.40), during April & May (and again in August and September).
- If the facility as a whole, based on sampling a subset of turbines, meets all 3 criteria listed above, then any turbines with daily search requirements can be switched to searching on a 3-day interval during June and July (or from mid-October thru mid-November). The only exception would be that any individual turbine that had >5 birds/bats in total found on any sampling day on 3 or more occasions during April and May (or again in August and September) would still need to be sampled daily.

Depending on the results of the first year, ODNR Division of Wildlife will determine if post-construction monitoring will continue into the second year or be reduced (i.e., focused on time periods when higher numbers of fatalities were detected). A similar assessment and determination will be provided after the second year, if a continuation is deemed necessary.

The number of turbines searched will depend on the number of turbines at the facility, as well as the protocol option chosen (Table 1). Turbines to be searched will be randomly selected, but may include specific turbines in areas of concern if so noted by the ODNR Division of Wildlife or U.S. Fish & Wildlife Service based on pre-construction monitoring results. Turbines randomly selected should be assessed and approved by ODNR Division of Wildlife prior to initiation of post-construction monitoring. Recommendations for monitoring during additional years following may differ, as noted above, both in terms of time period, specific turbines and number of turbines searched to address potential wildlife impacts.

The results of the mortality searches should be submitted to ODNR Division of Wildlife and U.S. Fish and Wildlife Service for review. All original data forms and electronic data detailing all raw data from post-construction monitoring will be provided to ODNR Division of Wildlife. ODNR will provide a standardized blank electronic database that should be used for all Ohio post-construction projects.

Sample size and search protocols

Table 1. A comparison of the amended ODNR Division of Wildlife mortality search protocol options for the *On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio*.

Protocol	Search time interval	Search distance from turbine (m)^c	Sample size (# turbines searched)	Plots cleared ^a
Option A. 2009 ODNR ^a	daily (7d/wk)	twice blade length	Facilities with ≤10 total turbines: all searched, 11-40 turbines: 1/2 searched, minimum of 10 turbines searched, or >40 turbines: 1/4 searched, minimum of 20. And all meteorological towers.	No
Option B. 2009 ODNR ^a	daily (7d/wk)	twice blade length	10% of the total turbines, or minimum of 5 and any meteorological tower with guy wires.	No
3-day, plots cleared ^a	every 3 days (3 day interval)	1.2 times the blade length or a minimum of 60 m	= the total number of turbines in Option A minus the number of turbines in the box immediately above (3-	Yes

Roads and pads ^b	weekly	within 100 m of turbine	day search) = remaining turbines in boundary that are not searched with another method	Yes
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^a Option A (ODNR 2009 protocol) does not require clearing of searched plots, however in agricultural areas it is suggested that developers encourage landowners to plant areas within 60 meters of the turbine in either soybean or wheat crops to increase the probability of detecting carcasses. For Option B, the turbines in the 3-day search-interval sample should have the entire search plot cleared. Cleared will be defined as *vegetation maintained at a height of 4 inches or less, with less than 2% of interspersed vegetation no higher than 12 inches*. If mowing is used to clear and maintain plots, mowing should only occur within 12 hours of the last mortality search.

^b The roads and pads searches are part of a double-sampling technique and must be used in conjunction with the cleared plot searches. Including the roads and pads weekly method allows sampling to occur at all the turbines, which could capture the variability for the entire facility. The double-sampling technique will use the data collected from cleared plots used as a correction factor for the data for the roads and pads searches. In the analyses, the double-sampling technique will be used to calculate a facility-wide mortality estimate.

^c At each turbine search plot, north-south oriented transects should be established every 5 meters. The length of these transects, and perpendicular distance that transects should extend from the turbine base should be equal to 1.2 or 2 times the blade length of the turbine being searched (depending on the methods). Transects should not venture into hazardous areas, such as steep slopes or high water.

All searches should begin at first light; this reduces the number of carcasses removed by diurnal scavengers and increases the likelihood of recovering live individuals. The appropriate number of surveyors should be hired to completely search the allotted turbines by 1:00 p.m. The initial start and stop time should be recorded for each survey. Searchers should walk slowly, scanning ~ 2.5 meters on either side of the transect. When a bird or bat is encountered, the distance when the observer first detected it should be recorded. The searcher should then assess whether the individual is alive or dead. If the individual is alive, efforts should be made to release or take the animal to a licensed rehabilitator¹. If successful rehabilitation is not likely, then the individual should be humanely euthanized through cervical dislocation². For each individual (regardless of dead or alive), the site should be flagged, and returned to after the turbine search has been completed. Once relocated, a photograph should be taken of the carcass before it is moved. The carcass should be collected in individual re-sealable plastic bags, and the carcass identification number written in pencil on a piece of write-in-the-rain paper enclosed with the carcass. All information on the “Fatality Reporting Form” should be

¹ Contact the Ohio Division of Wildlife District office nearest to the site for area wildlife rehabilitators.

² If the species in question is a state or federally protected species the appropriate agency must be contacted before the individual is euthanized.

recorded. Mortalities encountered outside the bounds of an official search should be collected, and the above information recorded, but “Incidental” should be written into the notes area. These will not be used in the calculation of site mortality rates, but may (depending on species) be used in searcher efficiency or carcass removal trials. Bats within the *Myotis* family are difficult to differentiate, and should not be used for scavenging rate or searcher efficiency trials. These carcasses should be frozen and given to the ODNR Division of Wildlife at a prearranged date. If a state or federal threatened or endangered species is located, the ODNR Division of Wildlife and U.S. Fish & Wildlife Service must be contacted within 48 hours. At that time arrangements will be made for turning over the carcass to the appropriate agency. If a larger than expected mortality event occurs, ODNR Division of Wildlife and the U.S. Fish & Wildlife Service must be notified within 24 hours. For our purposes a significant mortality event will be defined as >5 birds/bats at an individual turbine, and/or >20 birds and/or bats across the entire facility.

Vegetation mapping

Vegetation mapping should be done for each of the searched turbines 3 times a year (spring, summer, and fall), regardless of search protocol. Mapping will consist of recording the GPS location, vegetation height and percent cover (1-meter transect) every 10 meters for each transect. Additional points should be taken at abrupt transition zones such as the edge of a road. An estimate of searchable area should be also provided for each searched turbine.

Searcher efficiency trials

Search efficiency trials consist of placing test carcasses at locations chosen at random to assess an individual’s ability to detect turbine mortalities. Carcasses should be placed on search plots unbeknownst to the searchers and by someone who is not actively involved in the mortality searches. Individual trials should be conducted randomly at least 200 times each year (a trial consists of the placement of an individual carcass). For those facilities that are using Option B mortality searches, the number of random trials for each protocol (daily, 3-day cleared plots, and roads and pads) should be reviewed by ODNR Division of Wildlife as part of the facilities post-monitoring study plan. Carcasses may be used for multiple trials throughout the season. Each carcass should be placed at a turbine, with distance (within the searched area) and direction selected at random. Each carcass should be discreetly marked to identify it as a trial individual. Carcasses must be similar to those expected to be encountered during the search and should vary in both species composition and stage of decomposition. After a searcher has finished his or her survey, the individual conducting the efficiency trial should attempt to recover any missed carcasses to ascertain whether they were scavenged prior to the beginning of the search.

Scavenging rate trials

In an effort to assess how quickly carcasses are removed from the site by scavengers, a minimum of 50 carcasses per year should be placed at random distances and directions. Although the number of scavenging rates will be the same for both options (A and B), for those facilities that are using Option B mortality searches, the proportion for each protocol (daily, 3-day cleared plots, and roads and pads) should be reviewed by ODNR

Division of Wildlife as part of the facilities post-monitoring study plan. Several carcasses should be placed each month, since rates are likely to change throughout the year. Each carcass should be discreetly marked to identify it as a trial individual. These carcasses should be checked daily for the first week, then every 2 days until the carcass is removed or completely decomposed. Preferably, carcasses used for scavenging rate estimation will be those collected from the site, and not surrogate species such as pigeons, starlings, or house sparrows since these have been found to be scavenged less frequently. Characteristics that should be recorded for each placed carcass include: the GPS location, vegetation height, percent cover, distance/direction from turbine, and species.

Wildlife monitoring

The amended searcher protocol does not impact the need for wildlife monitoring to include acoustic monitoring and breeding bird surveys. These survey methods should follow the *On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio* (dated May 4, 2009).

Contact

Jennifer Norris
ODNR Wind Energy Biologist
ODNR, Division of Wildlife
2045 Morse Road, Building G
Columbus, OH 43229-6693
Tel: 614 265-6349
Cell: 419-602-3141
Email: jennifer.norris@dnr.state.oh.us