

Exhibit 08-7
Chiropteran Risk Assessment
(2010)



PN 1865.006-001

June 2010

**CHIROPTERAN RISK ASSESSMENT
FOR
PROPOSED WIND ENERGY GENERATION FACILITY

HOG CREEK WIND FARM (I & II)
HARDIN COUNTY, OHIO**

**Prepared for:
Hog Creek Wind Farm, LLC
1900 Superior Avenue, Suite 333
Cleveland, OH 44114**

**Prepared by:
BHE Environmental, Inc.
11733 Chesterdale Road
Cincinnati, OH 45246-3405
www.bheenvironmental.com**

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EXECUTIVE SUMMARY

Hog Creek Wind Farm, LLC, (Hog Creek) a subsidiary of JW Great Lakes, LLC (JW) contracted BHE Environmental, Inc. (BHE) to complete a bat risk assessment for the proposed Hog Creek Wind Farm project near the towns of Ada, Dunkirk, and Dola, Hardin County, Ohio. JW has received approval from the Ohio Power Siting Board (OPSB) to construct the Hardin county North Wind Farm. Subsequently JW formed Hog Creek Wind Farm, LLC and changed the name of the Facility to Hog Creek Wind Farm I (Hog Creek I). This report assesses the risk to bats of both phases: Hog Creek I and the proposed Hog Creek Wind Farm II (Hog Creek II) addition. Hog Creek I will be comprised of 21 turbines. Hog Creek has proposed to install an additional 8 turbines east of Hog Creek I. Habitat loss will be low considering the dominant land use is agricultural and only about 2.2 percent of the land will be disturbed during construction. Minimal to no trees will be removed.

Risk to bats at Hog Creek II is expected to be similar to Hog Creek I and comparable to other wind farms in the Midwest located on agricultural lands, due to the lack of tree cover on the Project and surrounding areas. The Project area is within the range of one federally listed bat: the endangered Indiana bat (*Myotis sodalis*); however, there are no records of this species within 8 kilometers (km; 5 miles [mi]) of the proposed Project area. The closest Indiana bat maternity colony recorded is approximately 21 km (13 mi) southeast of the Project area in Lawrence Woods Nature Preserve. The closest bat hibernaculum is Ohio Caverns in Champaign County over 56 km (35 mi) southeast of the Project area. The closest hibernaculum used by Indiana bats in Ohio, Lewisburg Limestone Mine, is approximately 116 km (72 mi) southwest of the Project area.

Indiana bats are not likely to be roosting or foraging within the Project area during summer, due to the poor habitat conditions. Indiana bats are more likely to use the Scioto River and Tymochtee Creek that are 13 and 19 km (8 and 12 mi) away from the Project area as documented in Lawrence Woods Nature Preserve. However, the September 2009 documentation of a male Indiana bat fatality at a northern Indiana wind farm in an agricultural area indicates Indiana bats use agricultural areas to some degree during migration. The extent of that use is not known.

The weight of evidence indicates that Indiana bat mortality would be expected to be unlikely, due to their low population numbers, lack of preferred habitats on site, and documentation of only one Indiana bat wind farm fatality in the United States.

Furthermore, other bat species that may experience mortality at the Hog Creek Project area are widely dispersed in the US and only a very small minority of each species' population will forage in, roost in, travel through, or migrate over the Hog Creek Project area.

1.0 INTRODUCTION

JW Great Lakes Wind, LLC (JW) of Cleveland, Ohio, proposes construction of the Hog Creek Wind Farm II (Hog Creek II) wind energy generation facility in Hardin County, Ohio (Figure 1). The Hog Creek Wind Farm (Project) consists of two phases: Hog Creek Wind Farm I (Hog Creek I) and Hog Creek II. Hog Creek I (formerly known as Hardin County North Wind Farm) has already received a siting certificate from the Ohio Power Siting Board (OPSB) on March 22, 2010. Hog Creek II is a proposed eastern addition to Hog Creek I. The purpose of this document is to assess the risk to bat species as a result of the construction of the entire project (both phases combined). This Chiropteran Risk Assessment includes the additional proposed footprint of Hog Creek II and incorporates new available information into the original risk assessment.

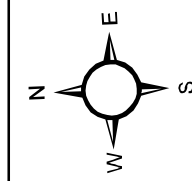
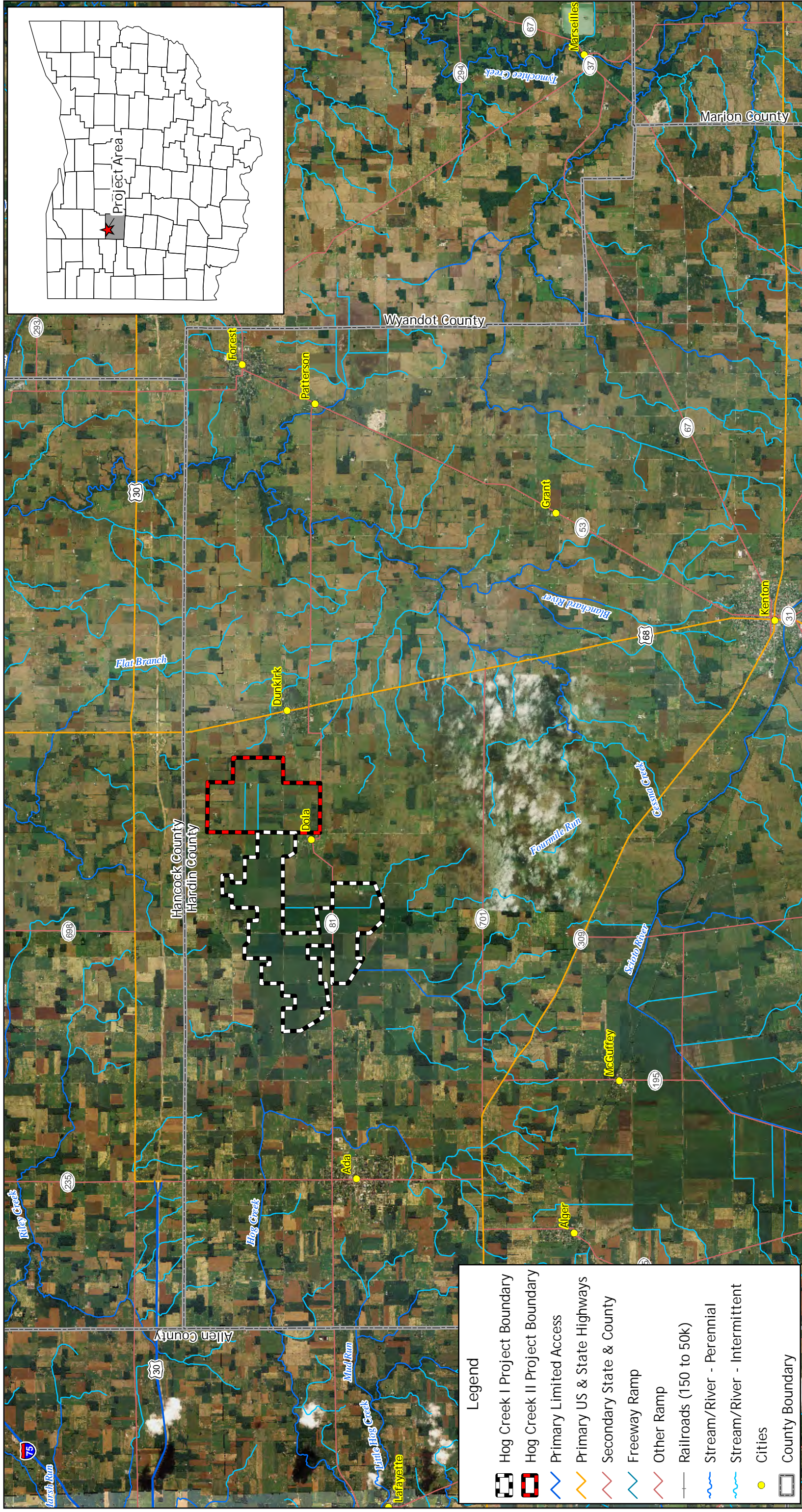
Both phases are located in northern Hardin County, near the border with Hancock County, Ohio. Hog Creek I spans 1,356 hectares (ha; 3,351 acres [ac]) between the towns of Ada and Dola. Hog Creek II spans 718 ha (1,775 ac) between the towns of Dola and Dunkirk. Combined, Hog Creek will span 2,074 ha (5,126 ac) (Figures 1 and 2). The Project area represents the maximum area considered for placement of turbines and facility infrastructure. The actual area occupied by the turbines and access roads that will comprise the facility will be a very small percentage of the Project area (about 2.2%).

In total, the Hog Creek Wind Farm will erect 29 Siemens SWT 2.3-101 wind turbines (Hog Creek I = 21 turbines; Hog Creek II = 8 turbines). The turbines will have a nameplate generating capacity of 2.3 MW, yielding a total nameplate project capacity of 66.7 MW. Hog Creek I was approved for 48.3 MW and shares part of its eastern border with Hog Creek II. Hog Creek II will generate 18.4 MW. The proposed hub height is about 100 m (328 ft) above ground level (agl). Rotor diameter will be approximately 101 m (331 ft) and individual blades will be approximately 50.5 m (166 ft) long. With the rotor tip in the 12 o'clock position, the wind turbines will reach a maximum height of approximately 150.5 m (494 ft) agl. At the 6 o'clock position, the rotor tip will be approximately 49.5 m (163 ft) agl. The turbine rotor will turn at a maximum operating speed of 16 rpm. The turbines have a nominal "cut-in speed" of 4 meters per second (m/s; 8.9 miles per hour [mph]). Wind speeds above 4 m/s will result in blade speeds of 6 to 16 rpm, depending upon wind speeds.

The turbines will be lit with red strobe-like or incandescent flashing lights. Lighting will be limited to the minimum number required by the Federal Aviation Administration (FAA) for aircraft safety.

Each turbine tower will be set upon a concrete pad with an aboveground diameter of approximately 4.5 m (15 ft). Nominally, crops and other vegetation within approximately 61m (200 ft) of each tower site will be cleared, yielding a maximum of 29,1.2-ha (2.9-ac) openings (34.8 ha or 84.1 ac of clearing for tower sites). Infrastructure (access roads, cabling, substation) will total another 27.3 ha (67.4 ac). The total cleared area required for erection of turbines will be approximately 2.2 percent of the total Project area. As tree cover is extremely sparse within the Project area and most land use is cropland, little or no tree removal is expected to be necessary for construction of turbines or access roads.

Collisions between bats and other aerial manmade structures are well documented. Numerous impacts with television towers, other communication towers, large buildings, power lines, and fences have been reported (Terres 1956, Timm 1989, Martin et al. 2005). Interactions between wind turbines and birds and bats are a known and documented



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Basemap: NAIP Aerial Imagery (2006)



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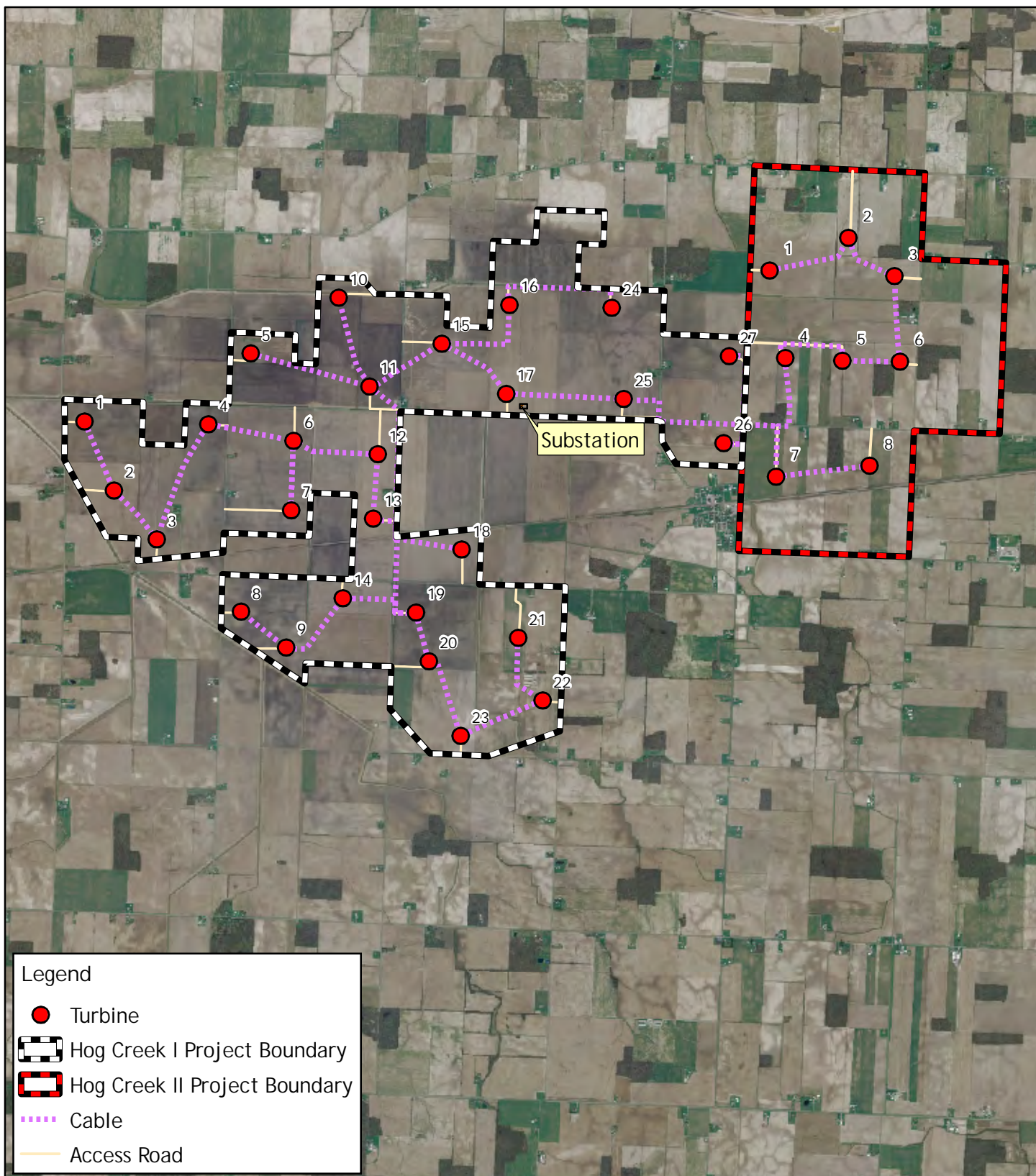
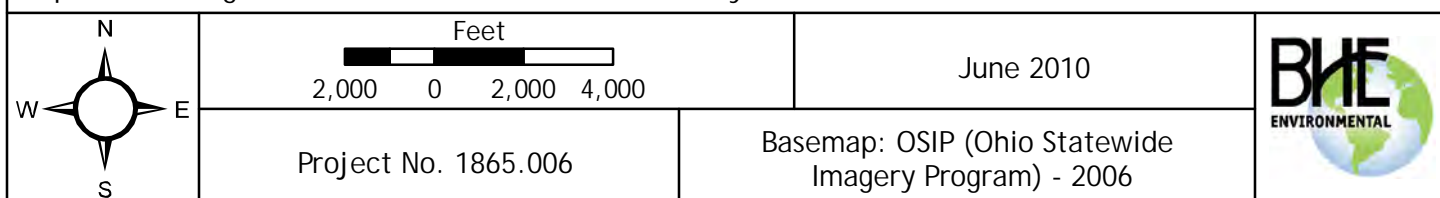


Figure 2. Project boundary and turbine layout for the Hog Creek Wind Farm I and proposed expansion, Hog Creek Wind Farm II, Hardin County, Ohio.



occurrence, as well. Utility-scale wind turbines can directly and indirectly affect bats that occur in or migrate through the wind energy generation facility. In some cases, bat collisions with wind turbine blades appear to occur at higher rates than typical Midwestern locations. At this time, such cases of higher fatality rates appear to be limited to sites located on forested Appalachian ridgelines (e.g., the Meyersdale, Pennsylvania, Mountaineer, West Virginia, and Buffalo Mountain, Tennessee wind energy generation facilities discussed later in this document; Arnett et al. 2008; Fiedler et al. 2007). However, recent mortality studies indicate mortality rates may be higher in east-central Wisconsin, as well (Drake et al. 2009, Gruver et al. 2009). Though primarily agricultural, the landscape in this part of Wisconsin is more diverse, with wetlands, dairy farm pasture, and more forested area, intermixed with croplands than the agricultural landscape of Hardin County, Ohio.

In evaluating the risk of bat mortality at this site, which is located on primarily flat, agricultural land, it is useful to consider mortalities at other operating utility-scale wind energy generation facilities in the Midwestern United States. Bat mortality studies with statistical corrections for searcher efficiency and scavenger removal have been completed at the following similar wind development sites in the Midwestern United States with row crop agriculture as the dominant land use. (Figure 3):

- 54.5 MW (33 turbines) Crescent Ridge wind power project, Bureau County, Illinois; located approximately 463 km (287 mi) northwest of the Hog Creek Project area;
- 80.1 MW (89 turbines) Top of Iowa wind power development site, Worth County, Iowa; located approximately 791 km (491 mi) northwest of the Project area;
- 20.5 MW (31 turbines) Rosiere and WPS combined wind power development site, Kewaunee County, Wisconsin; located approximately 489 km (304 mi) northwest of the Project area; and
- 236 MW (354 turbines) Buffalo Ridge wind power development site, Lincoln and Pipestone counties, Minnesota; located approximately 1,033 km (642 mi) northwest of the Project area.

This report documents design and site attributes of the proposed Hog Creek wind energy generation facility, evaluates the avenues by which bats may be affected by the Hog Creek facility, and provides a review of information pertaining to bat mortality at existing wind energy generation facilities. Based upon these data, and upon information provided by state wildlife agencies and the U.S. Fish and Wildlife Service (USFWS), we qualitatively estimate the risk of effects to bats posed by the Hog Creek facility.

2.0 DESCRIPTION OF THE PROJECT AREA

2.1 REGIONAL CONDITIONS

The following text describes the ecological region in which the proposed Hog Creek wind energy generation facility occurs. This description is useful in understanding the nature and important ecological aspects of the area.

The Project lies within the Eastern Broadleaf Forest (Continental) Ecological Province of the United States (USFS 1994). Within this Province, the Project is located in Ecoregion Section 222H—Central Till Plains, Beech-Maple (Figure 4). Of all the wind energy generation facilities

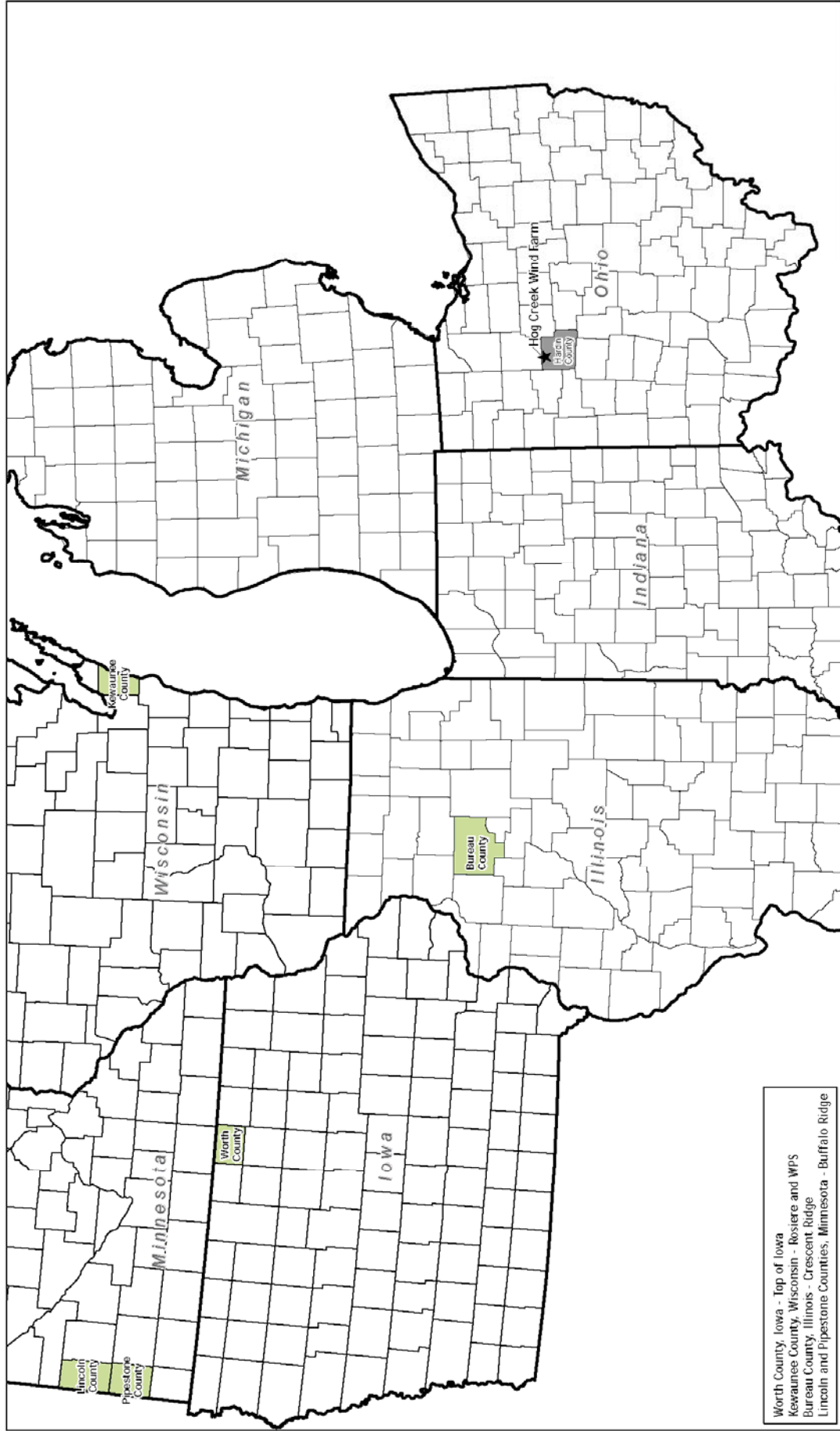
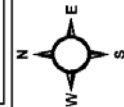


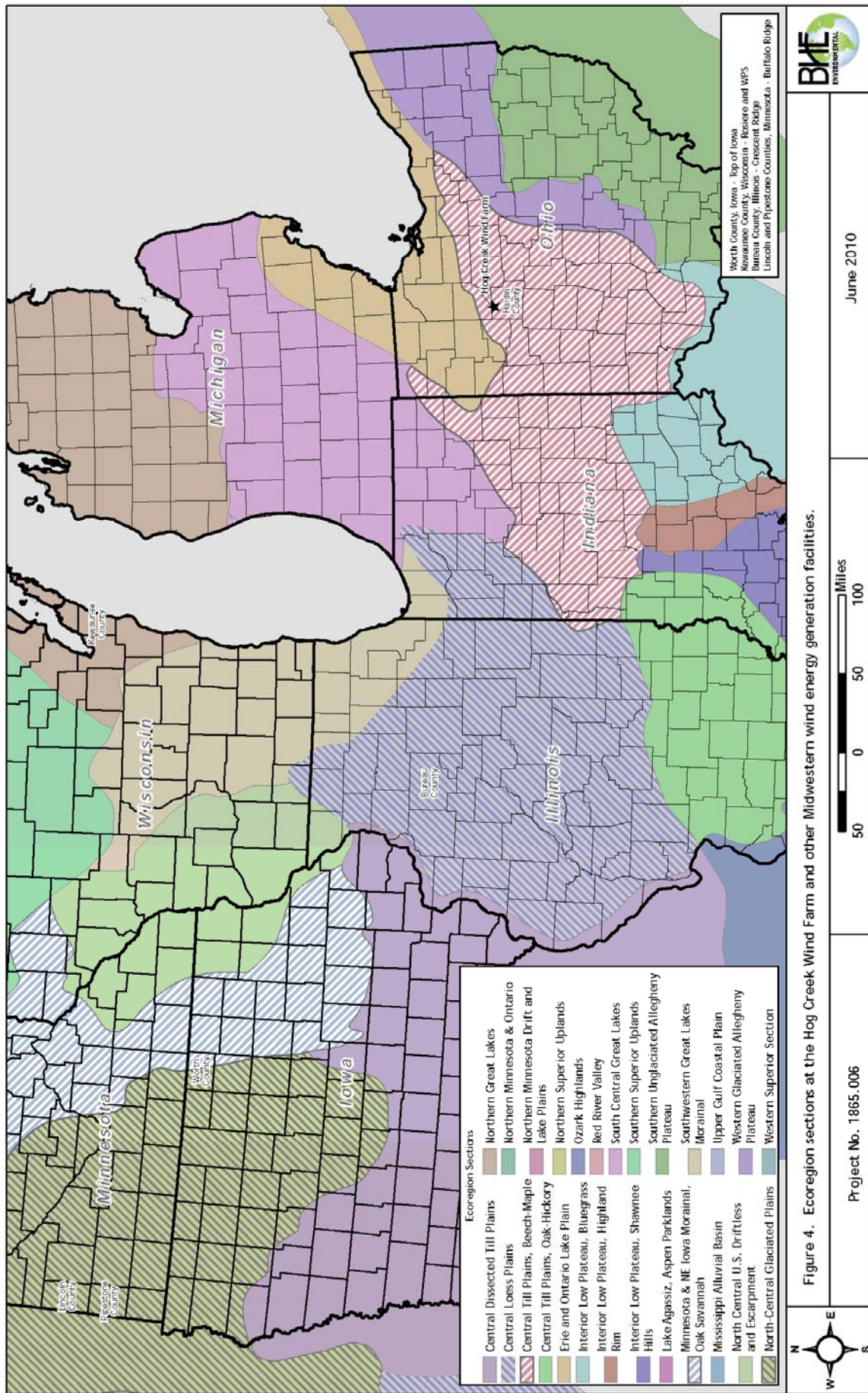
Figure 3. Nearby wind energy generation facilities at which bat mortalities studies have been completed.

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at which bat mortality studies have been completed, none are within this same Ecological Province or Ecoregion Section. Ecological aspects of Crescent Ridge, Top of Iowa, Rosiere and WPS, and Buffalo Ridge (four Midwestern operating wind energy generation facilities at which bat mortality studies have been completed) are shown in Appendix A for comparison. These wind energy generation facilities occupy areas dominated by agriculture and cropland comparable to the Hog Creek Project area.

Ecoregion Section 222H comprises part of the Central Lowlands geomorphic province and is characterized by flat to gently rolling till-plain, broad bottomlands, shallow entrenchment of drainages, and a few major river valleys. Section 222H is predominantly Wisconsinan glacial till and dominant soils include Udalfs and Aqualfs (USFS 1994).

The potential natural vegetation of Section 222H is beech-maple forests with some oak-hickory forests and bluestem prairie. Most of the land in Section 222H is now highly productive farmland, with most forest stands in small, isolated tracts less than 101 ha (250 ac) in size (USFS 1994, Appendix B).

Precipitation averages 900 to 1030 mm (35 to 40 in) per year. Mean annual temperature is approximately 10 to 13 °C (50 to 55 °F). The growing season ranges from 155 to 180 days (USFS 1994).

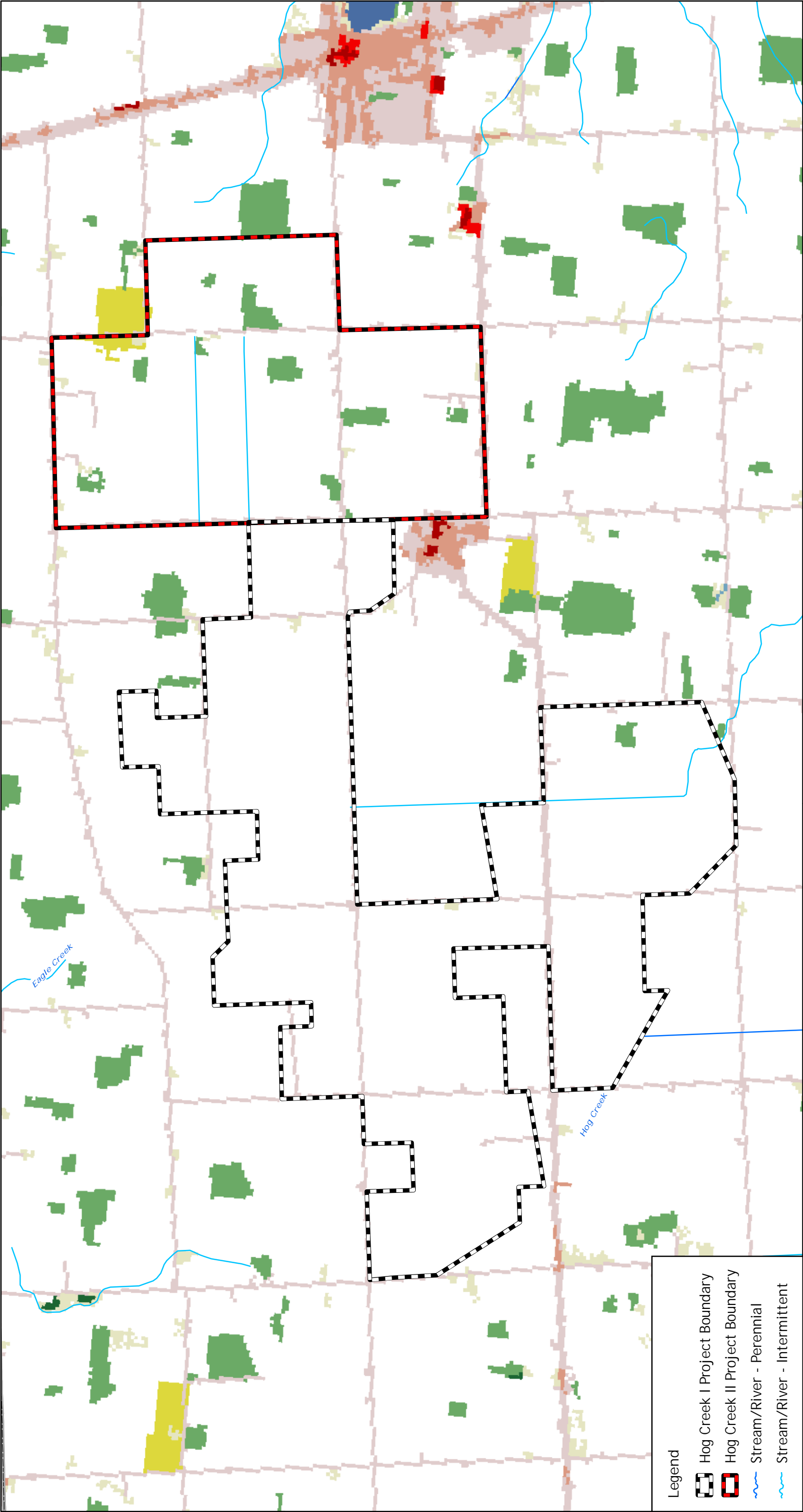
Approximately 28 percent of Hardin County is forested (12 percent coniferous, 11 percent deciduous, 3 percent forested wetlands, and 2 percent mixed forest; USGS 2001).

2.2 SITE-SPECIFIC CONDITIONS

BHE visited the Hog Creek I site on October 31, 2008 and the Hog Creek II site on, May 6, 7 and 18, 2010, and representative portions were photographed (Appendix B). Topography in the Project area is nearly flat, and land use is primarily agricultural (predominantly corn and soybeans). Project area views, from horizon to horizon, are nearly entirely farmland, with small groups of trees, tree lines, or partially treed, narrow riparian strips sometimes visible. Wooded habitat is uncommon, and occurs in residential yards, along fencerows and small, isolated woodlots. All of the woodlots are contained within the Hog Creek II Project area. The area surrounding the Project area is similar, with the majority of the landscape dedicated to row crop production. Many of the watercourses are ditched, or occur in gullies where they are isolated from their floodplains. Active tillage therefore extends in many cases nearly to the ditch's edge.

The Project area lacks significant land features such as ridgelines, river corridors, or forested expanses that may be used as landmarks by migrating bats. The quality of bat habitat at the site is low. The total Project area that includes both Hog Creek I and II is approximately 1.6 percent forested, with forested areas restricted to residential yards, small woodlots, and those along farm drains and streams. The closest heavily forested areas are along the Scioto River southeast of Kenton in central Hardin County and along Tymochtee Creek near Marseilles in southwestern Wyandot County 13 km (8 mi) and 19 km (12 mi) from the Project area respectively. Land use within the Project area is primarily agricultural (Figure 5).

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Legend

Hog Creek I Project Boundary

Hog Creek II Project Boundary

Stream/River - Perennial

Stream/River - Intermittent

Figure 5. Land cover at the Hog Creek Wind Farm I and proposed expansion, Hog Creek Wind Farm II, Hardin County, Ohio.

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0.5

0

0.5

1

Miles

June 2010

Base Map:
National Land Cover Dataset (2001)

Land Use/Land Cover

Barren Land

Developed, Low Intensity

Evergreen Forest

Open Water

Cultivated Crops

Developed, Medium Intensity

Hay/Pasture

Shrub/Scrub

Deciduous Forest

Developed, Open Space

Herbaceous

Woody Wetlands

Developed, High Intensity

Emergent Herbaceous Wetlands

Mixed Forest

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2.3 BATS

Eleven species of bats have been documented in Ohio. Except for the eastern small-footed bat (*M. leibii*) and Rafinesque's big-eared bat (*Corynorhinus rafinesquii*) each of the remaining nine species has potential to occur on the Project area (Table 1).

These nine bat species that occur in Ohio include year-round residents as well as species present only during certain seasons (Table 1). The Indiana bat (*M. sodalis*) is federally listed as endangered. The remaining eight species are not federally listed, are not proposed for listing, and are not candidates for federal listing. The Indiana bat is listed as endangered by the State of Ohio. None of the other bat species potentially present at the Project area is listed by the State of Ohio (ODNR 2009).

While the Indiana bat is the only listed bat species with potential present within the Project area. Descriptions of each species potentially present at the Project area are provided below.

2.3.1 Indiana Bat (*Myotis sodalis*)

The Indiana bat was listed by the federal government as endangered on March 11, 1967 and is listed as endangered by the Ohio Endangered Species Protection Board. Populations across the species range (as recorded from hibernacula counts) have declined since the late 1950s. Recent estimates place the total species population at approximately 468,000 (USFWS 2010). A principal cause of decline is destruction of hibernacula from collapse, flooding, or vandalism by humans. Suspected contributing factors include loss of suitable summer habitat and contamination by pesticides (USFWS 2007). A recovery plan for Indiana bats was developed in 1983 (USFWS 1983) and revised in 1999 (USFWS 1999) and in 2007 (USFWS 2007).

In winter (mid-November through March), Indiana bats hibernate in caves and abandoned underground mines. For the remainder of the year, Indiana bats roost in trees (Barbour and Davis 1969). In April and again in August-September, Indiana bats migrate between winter and summer habitat. Some individuals may travel 483 to 575 km (300 to 357 mi) between summer and winter roosts (USFWS 2007, Winhold and Kurta 2006). Others, particularly males, may roost in trees near hibernacula in summer. In Pennsylvania and New York, radio-telemetry studies indicate Indiana bats migrate between 16 to 97 km (10 and 60 mi) (USFWS 2007). Migrating bats have been documented traveling along power line and pipeline rights-of-way, along highways, hedgerows, tree lines, and along stream courses (Murray and Kurta 2004, Johnson and Strickland 2003, USFWS 2007, Verboom and Huitema 1997). Limited recovery records of banded Indiana bats from the Midwest indicate females and some males migrate north in the spring upon emergence from hibernation (USFWS 2007).

In spring, Indiana bats migrate from hibernacula to forested habitats. Upon emergence from hibernation, Indiana bats are active near the hibernaculum during a period called staging. Spring staging may occur from approximately mid-April through early May. During staging, Indiana bats emerging from hibernation roost in trees, and forage near their hibernacula. In Missouri, staging male and female Indiana bats traveled between 1.9 and 10.3 km (1.2 and 6.4 mi) from their hibernaculum nightly (Rommé et al. 2002). Females typically leave caves before males (Humphrey 1978, LaVal and LaVal 1980). Following mid-May emergence from hibernation, a single radio-tracked male followed for two weeks traveled 16 km (10 mi) in western Virginia (Hobson and Holland 1995).

Table 1. Bats potentially present within the proposed Hog Creek Wind Farm during summer, winter, and spring/fall migration.

Species	Status	Potential Seasonal Presence within the Hog Creek Project Area ¹		
		Summer	Winter	Migration
Big brown bat (<i>Eptesicus fuscus</i>)	None	Yes	Yes	Yes ²
Silver-haired bat (<i>Lasionycteris noctivagans</i>)	None	Yes	No	Yes
Eastern red bat (<i>Lasiurus borealis</i>)	None	Yes	No	Yes
Hoary bat (<i>Lasiurus cinereus</i>)	None	Yes	No	Yes
Little brown bat (<i>Myotis lucifugus</i>)	None	Yes	No	Yes
Northern long-eared bat (<i>Myotis septentrionalis</i>)	None	Yes	No	Yes
Indiana bat (<i>Myotis sodalis</i>)	Federal: endangered OH: endangered	Yes	No	Yes
Evening bat (<i>Nycticeius humeralis</i>)	None	Yes	No	Yes
Tri-colored bat (<i>Perimyotis subflavus</i>)	None	Yes	No	Yes

¹Based upon species range maps and natural history.

²Species is not migratory, and may be present during spring and fall.

Indiana bats typically arrive in summer habitat (primarily upland and riparian forests) in early to mid-May. This species roosts under exfoliating bark or in cavities of trees. Pregnant females form maternity colonies that may contain up to 100 or more adult bats (USFWS 2007). Male Indiana bats tend to roost singly or in small all-male groups (USFWS 2007). Males may occur in summer anywhere throughout the range of the species, including near hibernacula (Whitaker and Brack 2002).

Adults of this species feed exclusively on flying insects. Indiana bats forage most frequently in upland and riparian forests, but they also may forage along wooded edges between forests and croplands, and over fallow fields (Brack 1983, LaVal and LaVal 1980). They frequently use open space over streams as travel corridors.

In August, Indiana bats begin to leave summer habitat and migrate back to hibernacula. Autumn swarming occurs from approximately mid-August through September. During swarming, numerous bats fly in and out of cave entrances from dusk to dawn, while relatively few roost in caves during the day (Cope and Humphrey 1977). Indiana bats periodically use tree roosts during fall swarming (Menzel et al. 2001). In Missouri, swarming Indiana bats traveled up to 6.4 km (4 mi) from roost sites (Rommé et al. 2002). In Kentucky, male Indiana bats radio tracked during October traveled up to 2.7 km (1.7 mi) from their roost sites. Kiser and Elliot (1996) found males roosted in trees between 0.8 and 2.4 km (0.5 and 1.5 mi) from the hibernaculum.

The Indiana bat has potential to occur in Ohio year-round (Figure 6; Appendix C). The USFWS assumes the Indiana bat may occur in every county in Ohio (USFWS 2008). Most counties in Ohio with records of Indiana bats only have summer records. Those few with summer and winter records are located along the in the southern part of the state. Lewisburg Limestone Mine is the closest known Indiana bat hibernaculum, located approximately 116 km (72 mi) southwest of the Project area in Preble County, Ohio (Figure 6; Boyer, pers. comm.). The mine is a Priority II Indiana bat hibernaculum based upon the prioritization scheme outlined in the 2007 Indiana Bat Recovery Plan (USFWS 2007). The USFWS and ODNR conducted the most recent census in the hibernaculum in 2009. A total of 24,931 bats were observed hibernating in the mine, including 9,007 Indiana bats (Boyer, pers. comm.). This hibernaculum has been surveyed every other year since 1996. During the course of these surveys, the number of Indiana bats observed has decreased from 9,298 to 9,007 individuals.

Other bat hibernacula in the region include Ohio Caverns, Sanborn's Cave, and an unnamed cave near Sanborn's Cave (Lott, pers. comm.), all found in Champaign County over 56 km (35 mi) from the Project area. None of these hibernacula are known to have Indiana bats.

A search of the Ohio Natural Heritage Database in January 2009 revealed that no federal threatened, endangered or candidate bat species have been documented within the Project area (Appendix D). Though there are no records of Indiana bats in or within 8 km (5 mi) of the Project area, there were two Indiana bats captured along Wolf Creek at least 21 km (13 mi) southeast of the Hog Creek site in south central Hardin County (Boyer, pers. comm.). One of these bats was a lactating female; therefore, it is likely there is a maternity roost near the capture location. In 2009, there were additional captures of both male and female Indiana bats approximately 19 and 22 km (12 mi and 14 mi) south of the Project area. The closest confirmed Indiana bat maternity colonies are located southeast of Bellefontaine approximately 48 km (30 mi) south of the Project area (Lott, pers. comm.).

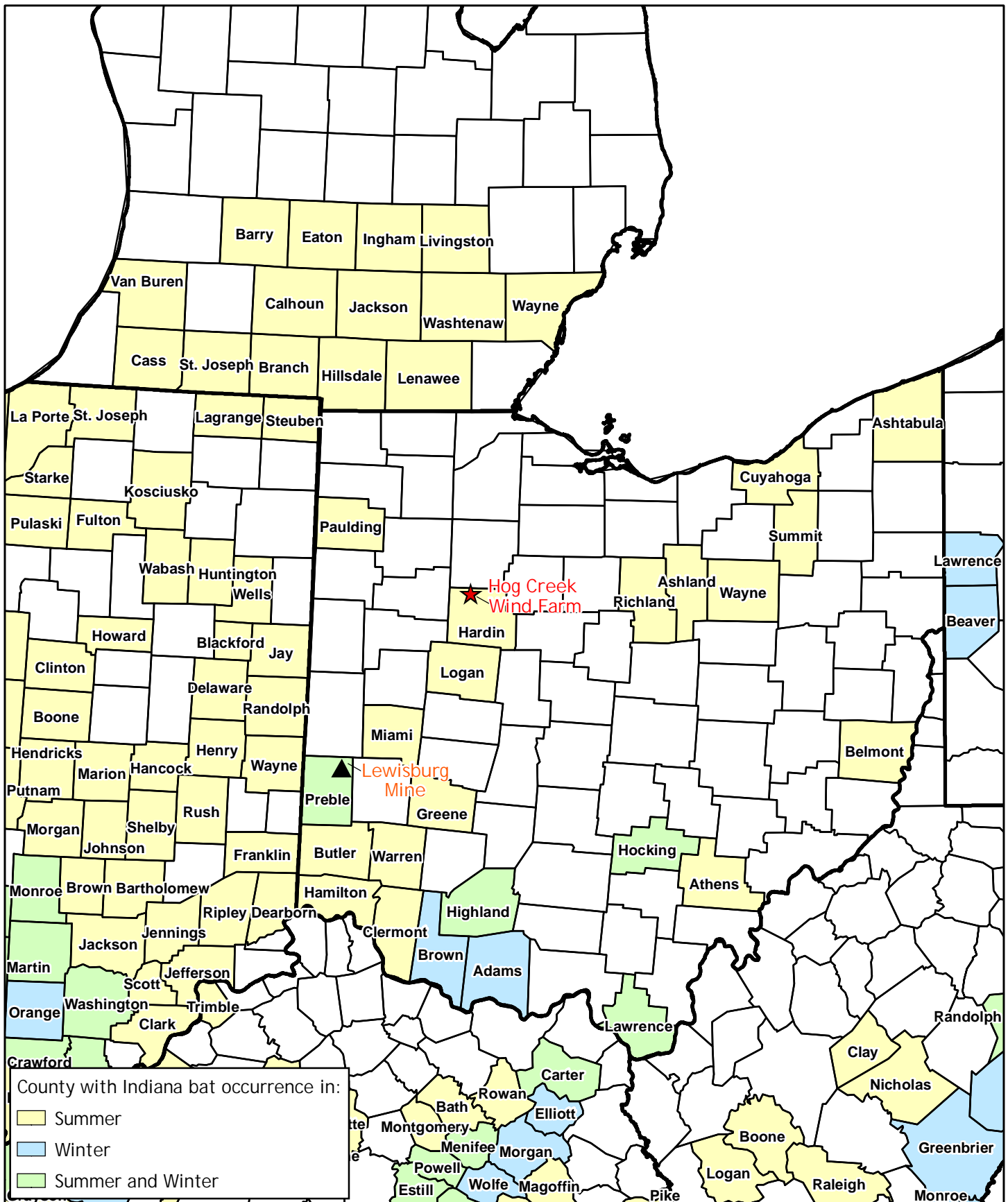


Figure 6. Counties in which the Indiana bat (*Myotis sodalis*) occurs near the Hog Creek Wind Farm I and proposed expansion, Hog Creek Wind Farm II, Hardin County, Ohio.



2.3.2 Northern Long-eared Bat (*M. septentrionalis*)

The northern long-eared bat ranges from southern Canada and the central and eastern United States through northern Florida (Appendix C). The northern long-eared bat is migratory (Table 1; Whitaker and Hamilton 1998). In winter (October/November through March/April), this species hibernates in caves and mines. It may hibernate in caves occupied by several other species. Northern long-eared bats occasionally emerge from hibernation and have been observed in flight during winter (Whitaker and Hamilton 1998).

In summer, this species typically roosts in trees (under exfoliating bark or in crevices and hollows) and in manmade structures (Harvey 1992, Foster and Kurta 1999). Foster and Kurta (1999) identified northern long-eared bats roosting singly or in small groups that averaged 17 individuals. This species forages along forested hillsides and ridges, often through dense vegetation (Harvey et al. 1999).

2.3.3 Little Brown Bat (*M. lucifugus*)

The little brown bat is abundant throughout forested areas of the United States as far north as Alaska (Appendix C). This species often forms nursery colonies in buildings, attics, and other manmade structures (Harvey et al. 1999). These colonies are often close to a lake or stream. Males are likely solitary in the summer months (Harvey et al. 1999). In late August and early September, little brown bats prepare for hibernation, and may swarm at the entrance of caves or mines (Whitaker and Hamilton 1998). Migration between summer and winter roosts may be short distances or several hundred miles (Fenton and Barclay 1980, Whitaker and Hamilton 1998). The timing of migration and hibernation depends upon local weather conditions, with northern populations hibernating from September to early May, and southern populations hibernating from November to March (Fenton and Barclay 1980). Little brown bats typically hibernate in caves and mines, and hibernacula are typically not used as summer roosts (Harvey et al. 1999, Whitaker and Hamilton 1998).

Little brown bats often forage over water where their diet consists of aquatic insects, including mosquitoes, mayflies, midges, and caddisflies. Foraging also occurs over forest trails, cliff faces, meadows, and farmland where they consume a wide variety of insects (Harvey et al. 1999).

2.3.4 Tri-colored Bat (*Perimyotis subflavus*) (formerly Eastern Pipistrelle [*Pipistrellus subflavus*])

The tri-colored bat occurs in the eastern United States, and ranges throughout Ohio (Appendix C, Barbour and Davis 1969). This species appears abundant throughout its range. Summer and winter ranges are identical. In summer, tri-colored bats have been found roosting in foliage and, rarely, in buildings. They may roost singly or in colonies of up to 30 bats (Barbour and Davis 1969). In winter, tri-colored bats hibernate in mines, quarries, caves, and rock crevices.

2.3.5 Big Brown Bat (*Eptesicus fuscus*)

The big brown bat is common throughout its range (Appendix C) from Alaska and Canada to Mexico and South America. Big brown bats do not migrate; there appears to be no difference in range from summer to winter (Table 1; Barbour and Davis 1969). They roost in rock crevices, expansion joints of bridges and dams, hollow trees, and manmade structures.

Maternity colonies containing several hundred individuals have been recorded from attics, barns, and other buildings (Harvey 1992).

2.3.6 Eastern Red Bat (*Lasiurus borealis*)

The eastern red bat occurs from southern Canada, throughout the United States, to Mexico and Central America (Appendix C, Barbour and Davis 1969). It is common in the Midwest and central states, including Ohio (Harvey 1992, Whitaker and Hamilton 1998). Eastern red bats are migratory; however, migration patterns are poorly understood. In winter, eastern red bats may hibernate in tree foliage for short periods, but arouse and forage during warm winter nights.

Like most lasiurids, *L. borealis* typically roosts in tree foliage. Individual eastern red bats may use several roost sites. Eastern red bats hang from branches or leaf petioles and are camouflaged by leaves. Adults are solitary, but females and young roost together until young become volant.

2.3.7 Hoary Bat (*L. cinereus*)

The hoary bat is widespread throughout the United States, but in eastern regions, the species' distribution varies seasonally (Appendix C, Whitaker and Hamilton 1998). Breeding individuals are known from Canada south to Arkansas, Louisiana, and Georgia (Barbour and Davis 1969). The range of the hoary bat includes Ohio (Harvey et al. 1999).

It appears that the sexes are separate during summer, with females inhabiting the northeast region (Cryan 2003, Whitaker and Hamilton 1998). Reproductive females are found in the northeast as far south as Pennsylvania and Indiana (Whitaker and Hamilton 1998). Female hoary bats give birth between mid-May and early July (Cryan 2003).

In August, this species moves south to winter habitat in southeastern and southwestern states, the Caribbean, and Central and South America (Cryan 2003, Whitaker and Hamilton 1998). In the eastern United States, hoary bats winter in northern Florida and southern Georgia, Alabama, Louisiana, and South Carolina (Whitaker and Hamilton 1998). Hoary bats apparently migrate in groups, with large numbers passing through an area over several nights in spring and fall (Whitaker and Hamilton 1998, Zinn and Baker 1979). Females precede males in spring migration. In the north, some may hibernate rather than migrate (Whitaker 1980). Hoary bats migrate north from March through April (Whitaker and Hamilton 1998).

Hoary bats roost in foliage of deciduous or coniferous trees (Barbour and Davis 1969). The species generally is solitary except during migration and when young accompany females (Mumford and Whitaker 1982).

2.3.8 Silver-haired Bat (*Lasionycteris noctivagans*)

The silver-haired bat is common in forested areas throughout much of North America, although it is characterized as a northern species (Appendix C, Whitaker and Hamilton 1998). This species typically is found in parts of its range containing stands of coniferous or mixed coniferous and deciduous forests (Whitaker and Hamilton 1998).

Silver-haired bats commonly roost in tree cavities, often switching roosts during the maternity season. Silver-haired bats typically are solitary, but may congregate in small maternity colonies usually numbering fewer than 10 individuals (Whitaker and Hamilton 1998).

Females are thought to migrate farther than males, and it is possible males remain in winter habitat year-round (Whitaker and Hamilton 1998). During migration, silver-haired bats have been found roosting in trees along a ridge (Whitaker and Hamilton 1998). Typical winter roosts for this species include trees, buildings, wood piles, and rock crevices (Harvey et al. 1999). Whitaker and Hamilton (1998) depict the species' winter range as extending as far north as the southern tip of Ohio. Occasionally silver-haired bats will hibernate in caves or mines, especially in northern regions of their range.

Silver-haired bats roost in forested areas and feed predominantly in openings such as small clearings and along roadways or streams (Whitaker and Hamilton 1998). The silver-haired bat typically leaves the roost and begins to forage relatively late, with major foraging activity peaks 3, and 7 to 8 hours after sunset (Kunz 1973).

2.3.9 Evening Bat (*Nycticeius humeralis*)

The evening bat occurs throughout the eastern United States, including a large portion of Ohio (Appendix C), and is abundant throughout its range. Evening bats are known to form large maternity colonies, often including up to several hundred individuals. These maternity colonies are generally formed in hollow trees, behind loose bark, or occasionally in buildings and attics. The evening bat is considered a true forest bat and is almost never observed in caves. Little is known about the migration patterns of this species; however, evening bats have been shown to put on high amounts of fat in the fall, a possible indication of a long migration. Banded evening bats have been found up to 547 km (340 mi) south of their initial banding sites. It is believed that evening bats remain active during the winter.

2.3.10 White Nose Syndrome

White nose syndrome (WNS) is a malady currently affecting cavernicolous bat species in eastern North America. WNS has been rapidly spreading since the first discovery during winter 2006-2007, and is currently documented in 13 states and two Canadian provinces. While Ohio does not currently have any infected hibernacula, WNS has been documented in adjacent states.

The syndrome is caused by a fungus, *Geomyces destructans*. Though not known to affect humans, this fungus is responsible for the death of over one million animals since 2007. Mortality rates in affected caves can reach 100 percent and local extirpation of several species is considered a possibility by leading researchers. While no additional bat species have been listed as threatened or endangered, there is a possibility that species hardest hit by WNS may be listed by the USFWS in the foreseeable future.

3.0 POTENTIAL EFFECTS TO BATS

Construction and operation of wind energy facilities present potential concerns regarding direct and indirect effects upon bats through three primary avenues:

- Bats may be directly affected by moving turbine blades either through collision or barotrauma.
- Construction of the turbines and associated appurtenances may degrade habitat quality through the removal of trees causing indirect effects.
- Bats may also be indirectly affected through displacement by operating turbines.

3.1 BAT MORTALITY AT WIND ENERGY GENERATION FACILITIES

Much of the information available regarding mortality caused by collisions with moving turbine blades is contained in technical reports completed for wind site owners/developers, is unpublished, and is often difficult to obtain. Anecdotal information can be found in numerous studies intended to address avian impacts, although these data have a bias in that study methods were not designed to detect bat mortality.

A report published in winter 2008 summarized 21 studies of bat mortality at 19 wind energy generation facilities across the United States and one Canadian Province. The 21 studies include five in the Pacific Northwest, one in the Rocky Mountains, three in Alberta, Canada, three in the Midwest, one in south-central United States, and six in the eastern states (Arnett et al. 2008). Average mortality in these 21 studies ranged from 0.1 to 69.6 bat fatalities per turbine per year. Methods used in these studies varied; mortality estimates were adjusted in many cases for the biases presented by searcher efficiency and removal of carcasses by scavengers during mortality monitoring studies. A majority of studies (13 of 21) used bird carcasses as surrogates for bats while conducting searcher efficiency trials and calculating scavenging rates (Arnett et al. 2008). Bat mortality has been recorded both anecdotally and in ongoing studies at other wind energy generation facilities as well.

Documented bat fatalities at North American wind energy generation facilities have been generally highest in the east (Appalachian Mountains), moderate in the Midwest, and lowest in the western states. In most cases, documented mortality was low - less than five bats per turbine per year. Nationwide, more than 93 percent of fatalities documented in the U.S. as of winter 2006 (Arnett et al. 2008) have been of six species, with hoary bats accounting for nearly one-half of all mortality:

- hoary bat (40.7 percent),
- eastern red bat (21.2 percent),
- silver-haired bat (15.4 percent),
- eastern pipistrelle (8.0 percent),
- little brown bat (6.0 percent), and
- big brown bat (2.4 percent).

"Tree bats" (hoary bats, silver-haired bats and eastern red bats) typically roost in trees during summer months and often migrate long distances to southern winter habitat. These migratory bats accounted for the great majority of mortality. Bats that roost (winter and/or summer) in caves, sometimes referred to as "cave bats," comprised the remainder.

Although mortality has been documented in all months when bats are not hibernating, a significant majority of mortality has been documented in mid-July through mid-October during the post-maternity dispersal from summer habitat to winter habitat. At the Buffalo Mountain Wind Farm in Tennessee, 70 percent of all bat fatalities occurred between August 1 and September 15 (Fiedler 2004). At Crescent Ridge, 20 of 21 bat fatalities were found in September and October. Overall, mortality appears highest between approximately July 15 and September 15. However, at the Summerview facility in Alberta, Canada, 6 percent of the 272 silver-haired bat fatalities occurred in May and June, suggesting that some mortality does occur during the spring migration period. These findings were supported at Buffalo Mountain, Tennessee, where 84 percent of the 19 silver-haired bat fatalities occurred between mid-April and early June (Arnett et al. 2008). Mortality is very low during the summer maternity

period, even when substantial numbers of bats are present at or near wind energy generation facilities (Arnett et al. 2008). In a study in Minnesota at the Buffalo Ridge Wind Power Development, researchers found bat activity as measured by ultrasound detectors during summer was not correlated with bat mortality (Johnson et al. 2003a).

To date only one study has attempted to correlate the timing of fatalities between sites. Kerns et al. (2005) conducted simultaneous fatality searches from August 1 to September 13, 2004 at the Mountaineer and Meyersdale facilities in West Virginia, and Pennsylvania, respectively. The timing of all fatalities, while periodic and highly variable during the study was highly correlated between the two sites. Additionally, the timing of hoary and eastern red bat fatalities were positively correlated for the two sites (Kerns et al. 2005).

The sites at which the highest mortality has been documented occur at approximately 840 m (2,760 ft) above mean sea level (amsl; Meyersdale, Pennsylvania), 1,025 m (3,363 ft) amsl (Mountaineer, West Virginia), and 1,010 m (3,314 ft) amsl (Buffalo Mountain, Tennessee). All three sites are located on forested Appalachian Mountain ridgelines. At this time, the greatest risk of bat mortalities is expected at sites on forested Appalachian Mountain ridgelines, though risk in east-central Wisconsin may be higher than other Midwest agricultural locations (Drake et al. 2009, Gruver et al. 2009), due to a more diverse mix of land cover types.

The presence of FAA-approved lighting on towers has been the subject of speculation regarding bat mortality. Studies completed in 2003 at the Mountaineer site (Kerns and Kerlinger 2004), in 2004 at the Mountaineer and Meyersdale sites (Arnett 2005), and in 2005 at the Buffalo Mountain site (Fiedler et al. 2007) found no significant difference in mortality at unlit towers and at towers lit by L-864-type flashing red strobe-like or incandescent lights. Similar results were documented at the Vansycle Ridge site in Oregon (Erickson et al. 2000), in northern Wisconsin (Howe et al. 2002), the Stateline project (Erickson et al. 2003a), the Nine Canyon project in Washington State (Erickson et al. 2003b), the Klondike facility in Oregon (Johnson et al. 2003b), the Summerview project in Alberta (Brown and Hamilton 2006), and the Maple Ridge project in New York (Jain et al. 2007). It also appears that mortality does not vary among the types of lighting used on wind turbines. At the Top of Iowa project, all turbines are lit with FAA lighting: 46 with non-pulsating red beacons, 37 with pulsating red beacons, and six with a combination of flashing white beacons and non-flashing red beacons. Jain (2005) found no significant difference in bat mortality among these towers.

Many of the nine species of bats with potential to be present during some portion of the year at the Hog Creek Project area have been fatalities at one or more operating wind energy generation facilities. Based upon results of mortality monitoring completed to date, hoary bats, silver-haired bats, and eastern red bats account for the majority of bat fatalities. These species accounted for approximately 77 percent of the mortality in turbine searches conducted through the end of 2006 (summary of mortality studies contained in Arnett et al. 2008). At the three project sites in the Midwest that were included in Arnett et al. (2008), these species accounted for 84.5 percent of the mortality observed. A study conducted in Bureau County, Illinois, had similar results: all of the bat carcasses recovered during mortality studies were hoary bats, silver-haired bats, or eastern red bats (Kerlinger et al. 2007). Based on these findings, we expect these three species to account for a majority of the mortality associated with the proposed Hog Creek project. Little information exists upon which to base conclusions regarding the biological significance of bat mortality at wind energy generation facilities, because total population estimates do not exist for any of the bat species known to have experienced mortality at wind energy generation facilities.

Reasonably accurate population estimates exist for the federally endangered Indiana bat, one of the most uncommon North American species. In 2009, there were an estimated 387,835 Indiana bats in existence (USFWS 2010). We mention the size of the population of this species for context. Populations of species that have experienced fatalities at wind energy generation facilities are much more common than this listed species, and may be an order of magnitude (or more) higher.

3.2 BAT COLLISION

Specific pre-construction techniques/protocols that accurately predict risk of chiropteran mortality at wind sites do not exist. Post-construction mortality monitoring remains the best source for these data. Therefore, comparison of the Hog Creek Project area to nearby similar sites with known mortality is a useful approach.

As discussed above, the highest levels of bat mortality documented to date have occurred at three wind energy generation facilities located in West Virginia (Mountaineer), Pennsylvania (Meyersdale), and Tennessee (Buffalo Mountain). These sites are mountainous with elevated topography (i.e., ridgelines), elevation (i.e., 840 to 1,025 m [2,760 to 3,363 ft] amsl), and geographic location (i.e., eastern U.S.), and are markedly dissimilar to the proposed Project site described herein. Wind energy generation facilities with lower mortality are more similar to the Hog Creek Project area (e.g., the Rosiere and WPS sites in Wisconsin; the Buffalo Ridge site in Minnesota; or the Top of Iowa site in Iowa) are located in Midwestern states, are located on flat terrain, and have been constructed in agricultural areas or other non-forested sites (e.g., short grass prairie/sagebrush, pasture; Appendix A). As discussed in Section 2.0, the Hog Creek Project area described herein has very limited tree cover with only 1.6% of the land in forest cover (Appendix B; Figure 2).

Based upon published and unpublished information available at this time, similarities in the projects discussed in Appendix A, and anticipated similarity in the behavior of bats at these sites, it is likely that mortality resulting from the Project will be most similar to that at the Crescent Ridge site in Illinois, Top of Iowa site in Iowa, the Rosiere and WPS sites in Wisconsin, and the Buffalo Ridge site in Minnesota. Annual mortality estimates based upon post-construction monitoring studies was 8.04 bats per turbine per year at Top of Iowa; 4.26 bats per turbine per year at the Rosiere and WPS sites; and 1.32 bats per turbine per year at Buffalo Ridge. Post-construction studies at Top of Iowa, Rosiere and WPS, and Buffalo Ridge, were all multi-year studies encompassing spring through fall (approximately mid-March through mid-November for each).

Mortality studies at Crescent Ridge were conducted from August through November 2005, March through May 2006, and August 2006, and the total estimate of bat mortality during the whole of the survey was approximately 9 bats per turbine (Kerlinger et al. 2007). Mortality at the Crescent Ridge facility in Illinois was highly seasonal: almost all (20 out of 21) documented bat fatalities occurred in late fall (September and October). A single bat carcass was documented in August, and no bat fatalities were documented in spring. No monitoring was completed in either year during the months of June or July, when it is reasonable to expect some mortality to take place; thus the extrapolated estimate of 9 bat fatalities per turbine may not be as accurate an estimate of annual mortality as might be found in a study that included June and July.

The Hog Creek Project is not proximate to an Indiana bat hibernaculum. The nearest known hibernaculum used by Indiana bats is the Lewisburg Limestone Mine in Preble County, Ohio

(Figure 6). The center of the Hog Creek Project area is approximately 116 km (72 mi) from the Lewisburg Limestone Mine hibernaculum.

It is reasonable to expect that the direction of flight of Indiana bats and of other species of bats utilizing the Lewisburg Limestone Mine hibernaculum in Preble County or the other nearby hibernacula in Champaign County, is not random. In summer, Murray and Kurta (2004) found that Indiana bats will choose to travel along forested corridors as opposed to non-forested corridors, even if the distance traveled is greater. If Indiana bats also choose forested corridors for migration, they will not use the Hog Creek site. However, the recent autumn documentation of an Indiana bat fatality in an agricultural area indicates at least some migratory use of unforested lands within rotor swept areas. Further research may indicate migratory use of agricultural areas is greater than expected. At this time, evidence would indicate that Indiana bat movements may occur over the Project area when migrating to the Lewisburg Limestone Mine in Preble County or the other bat hibernacula in Champaign County. However, the weight of evidence would indicate that Indiana bat mortality, if any, would be expected to be unlikely, due to their low population numbers, lack of preferred habitats, and low (one individual) documented mortality of Indiana bats.

The ODNR reports summer records of Indiana bats in Lawrence Woods Nature Preserve 21 km (13 mi) southeast of the Project area. The Ohio Natural Heritage Database has no records of Indiana bats in the Project area (Appendix D). Bats from these colonies are likely to forage along the forested streams and forests connected to such streams. No contiguous forested corridors connect these streams to waterways in the Project area. Though bats along such streams may venture out into the open fields, most tend to remain along forested waterways as insects are more abundant and trees provide protection from aerial predators.

It is unlikely that Indiana bats will occupy the Project area during summer. Habitat conditions in the Total Project area, which has limited numbers of trees (1.6% forest cover) is composed largely of open fields/agricultural land, is less than suitable for foraging or roosting bats. Indiana bats, even if present, are likely to be rare at the Hog Creek Project area during summer, and are likely to be active at heights largely below the rotor-swept area. As such, the chance of collisions between Indiana bats and turbine blades during the summer is low. Studies completed to date have documented low bat mortality during spring and summer months, even when concurrent mist net surveys and/or ultrasound acoustic detection devices indicate the presence of substantial numbers of bats (Arnett et al. 2008). Effects to Indiana bats during summer are unlikely.

Other bat species that may experience mortality at the Hog Creek Project area are widely dispersed in the US and only a very small minority of each species' population will forage in, roost in, travel through, or migrate over the Hog Creek Project area.

3.3 HABITAT DEGRADATION

The landscape within the Project area is dominated by agriculture and tree cover is sparse. Bats require forested area, suitable roost trees or roost structures (e.g., barns), and available prey among other habitat attributes. Because few of these habitat characteristics exist in the Project area, construction of the Project would be expected to have no effect on bats.

The USFWS is routinely consulted regarding potential impacts to the Indiana bat associated with a wide variety of projects. Their concerns commonly focus upon habitat modifications near hibernacula and maternity sites, and modification of proximate forested habitat. Where

such habitat modifications occur, the USFWS often recommends project-specific consultation and avoidance/conservation measures. However, the Hog Creek Project area is almost devoid of trees (Appendix B, Figure 2). Furthermore, tree clearing during construction will be minimal to none.

3.4 DISTURBANCE AND DISPLACEMENT OF BATS

Speculations have been made concerning the potential disturbance of bats by operating wind energy generation facilities, and the potential for resulting displacement of bats from otherwise suitable habitat. Data do not exist to dismiss the risk of such disturbance or displacement, but preliminary information now available supports the conclusion that wind turbines and their blades do not substantially disturb/displace bats. In 2004 at the Mountaineer and Meyersdale wind energy generation facility sites, bats were commonly observed foraging in forest openings at turbine sites. Thermal imaging equipment was used to investigate bat behavior near wind towers. Bats landed on towers, foraged near rotating blades, pursued rotating blades, and flew in patterns that appeared to indicate purposeful collision avoidance (Horn et al. 2008). The presence of bats near operating turbines was also documented at the Buffalo Ridge site in Minnesota (Johnson et al. 2003a), and the Buffalo Mountain site in Tennessee (Fiedler 2004). Based upon the best available information it appears operating turbines do not significantly disturb or displace bats, and this should especially be the case at the Hog Creek Project area because of the lack of roosting and foraging habitat.

4.0 CONCLUSIONS

A summary of the conclusions this bat risk assessment for the proposed Hog Creek wind energy generation facility in Hardin County, Ohio, is listed below.

- Risk to bats is expected to be comparable to other wind farms in the Midwest located on land dominated by agricultural monocultures, due to the lack of tree cover on the Project and surrounding areas.
- Indiana bats are not likely to be roosting or foraging during summer within the Project area, due to the poor habitat conditions. Mortality to Indiana bats during spring and fall migration to and from the Lewisburg Limestone Mine in Preble County or other bat hibernacula in Champaign County is not impossible, but expected to be a low probability.
- Habitat loss will be negligible considering the Project area is nearly all agricultural, few to no trees will be removed, and only about 2.2 percent of the area will be disturbed for construction.

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APPENDIX A

Comparison of Hog Creek to Other nearby Wind Energy Generation Facilities

Attributes of the Hog Creek Wind Farm area as compared to other Midwestern wind energy generation facilities where post-construction studies of bat mortality have been conducted.

Feature	Hog Creek (Hardin Co., OH)	Crescent Ridge (Bureau Co., IL)	Rosiere and WPS (Kewaunee Co., WI)	Buffalo Ridge (Lincoln and Pipestone Cos., MN)	Top of Iowa (Worth Co., IA)
Ecoregion (Section)	Central Till Plains, Beech-Maple Section	Central Loess Plains Section	Northern Great Lakes Section	North-Central Glaciated Plains Section	Minnesota and Northeastern Iowa Morainal, Oak Savannah Section and North-Central Glaciated Plains Section
Position	Towers to be placed in open agricultural areas	Towers located in agricultural areas	Towers located on ridges of glacial till approximately 30-60 m (98-197 ft) above the surrounding lowlands	Towers located on ridge consisting of terminal moraines and stream dissected lands	Towers located in agricultural areas surrounded by grasslands and wetlands
Approximate average elevation (above msl)	284 m (934 ft)	274 m (900 ft)	240-270 m (787-886 ft)	546-610 m (1,791-2001 ft)	366-396 m (1,200-1,300 ft)
Vegetative cover	Primarily corn and soybeans	Primarily corn and soybeans	Pasture and agricultural land	Primarily corn, soybeans, pastures, and grasslands	Primarily cropland
No. of turbines	29 (2.3 MW)	33 (1.65 MW)	31 (0.66-MW)	354 (0.75-MW)	89 (0.90-MW)
Turbine string(s)	29 turbines spread across 2,134 ha (5,273 ac) in an irregular array	Irregular array along 9-mile ridge, installed in 2 phases.	14 WPS turbines in 3 rows within 1.5 km (0.9 mi) of one another; 17 MGE turbines in 2 irregular clusters approximately 3.5 km (2.2 mi) apart	Phase 1: 10 turbine strings each with 3 - 20 turbines spaced at 91-183 m (298-600 ft) intervals (73 turbines total)	89 turbines spread across 865 ha (2,137 ac) in an irregular array
				Phase 2: 26 turbine strings each with 2 - 12 turbines spaced at 100-200 m (328-656 ft) intervals (143 turbines total) Phase 3: 36 turbine strings each with 2-13 turbines spaced at 250-500 m (820-1640 ft) intervals (138 turbines total)	
Hub height	100 m (328 ft)	78 m (256 ft)	65 m (213 ft)	Phase 1: 36 m (118 ft) Phase 2 and 3: 50 m (164 ft)	72 m (237 ft)
Rotor diameter	101 m (331 ft)	82 m (269 ft)	47 m (154 ft)	Phase 1: 33 m (108 ft) Phase 2 and 3: 46 and 48 m (151-157 ft)	52 m (171 ft)
Max. rotor height	150.5 m (494 ft)	119 m (390 ft)	89 m (292 ft)	Phase 1: 53 m (174 ft) Phase 2 and 3: 74 m (243 ft) or 73 m (240 ft)	98 m (322 ft)
Min. rotor height	49.5 m (162 ft)	37 m (121 ft)	42 m (138 ft)	Phase 1: 19.5 m (70 ft) Phase 2 & 3: 26 m (85 ft) or 27 m (88 ft)	46 m (151 ft)
Rotor swept area	8,012 m ² (86,240 ft ²) per turbine; 232,348 m ² (2,500,973 ft ²) total	5,281 m ² (56,844 ft ²) per turbine; 174,273 m ² (1,875,859 ft ²) total	1,735 m ² (18,675 ft ²) per turbine; 53,785 m ² (578,937 ft ²) total	Phase 1: 855 m ² (9,203 ft ²) per turbine; 62,437 m ² (672,066 ft ²) total Phase 2: 1,735 m ² (18,675 ft ²) average per turbine; 248,105 m ² (2,670,580 ft ²) total Phase 3: 1,735 m ² (18,675 ft ²) average per turbine; 239,430 m ² (2,577,203 ft ²) total	2,124 m ² (22,863 ft ²) per turbine; 189,036 m ² (2,034,767 ft ²) total
Operating rotor rpm	16	14.4	28.5	Phase 1: 14 to 50 Phase 2 and 3: 16 to 30	15 or 22

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Attributes of the Hog Creek Wind Farm area as compared to other Midwestern wind energy generation facilities where post-construction studies of bat mortality have been conducted.

Feature	Hog Creek (Hardin Co., OH)	Crescent Ridge (Bureau Co., IL)	Rosiere and WPS (Kewaunee Co., WI)	Buffalo Ridge (Lincoln and Pipestone Cos., MN)	Top of Iowa (Worth Co., IA)
Turbine cut in speed	4 m/s (8.9 mph)	3.5 m/s (7.9 mph)	4.0 m/s (8.9 mph)	Phase 1: 4.0 m/s (9 mph) Phase 2 and 3: 3.6 m/s (8 mph)	Data not available
Lighting	Per FAA regulations	10 of 33 turbines lighted	Data not available	Phase 1: no lighting Phase 2: 6 turbines lighted Phase 3: 69 turbines lighted	46 of 89 towers lighted
Bat species in the region (bats listed for all sites other than Hardin County North are those species detected in mortality searches. Percent of total detected mortality is indicated).	Big brown Silver-haired Eastern red Hoary Little brown Northern long-eared Indiana Evening Tri-colored	Hoary (38.1%) Eastern red (28.6%) Silver-haired (28.6%)	Eastern red (37.5%) Hoary (34.7%) Silver-haired (18.1%) <i>Myotis</i> spp. (8.3%) Big brown (1.4%)	Hoary (67%) Eastern red (17%) Silver-haired (3%) Big brown (3%) Eastern pipistrelle (2%) Little brown (2%)	Hoary (28%) Eastern red (23.5%) Little brown (23.5%) Silver-haired (11.8%) Big brown (10.5%) Eastern pipistrelle (2.6%)

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APPENDIX B

Photographs of the Hog Creek Project Area

Photographs taken by BHE Environmental, Inc. during Site Visits to Hog Creek I and Hog Creek II

October 31, 2008 Site Visit to Hog Creek I



Photo 1. Grassy vegetation along rail road through the project area.

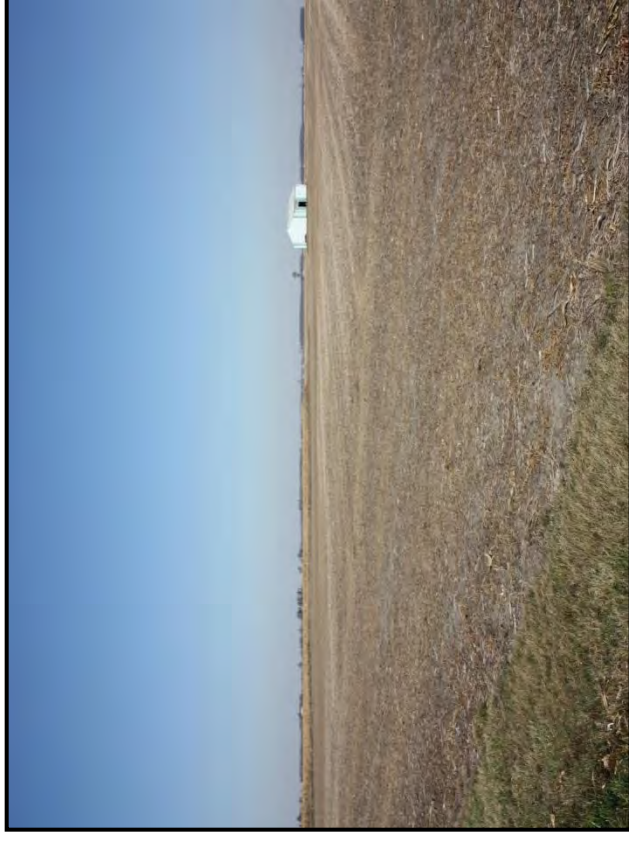


Photo 2. Typical agricultural land use.

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Photo 3. Typical agricultural land use.

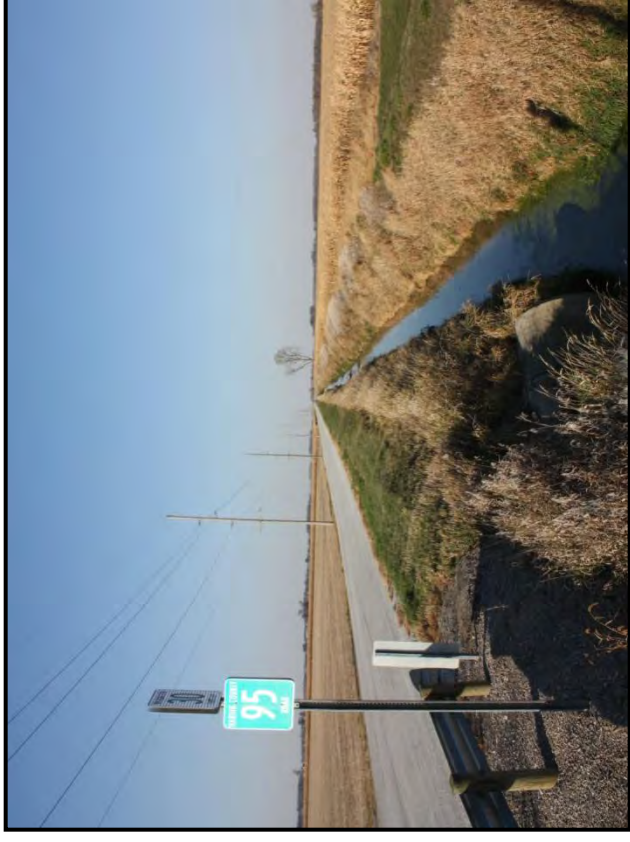


Photo 4. Typical degraded, channeled/grassy watercourse.



Photo 5. Shrubby vegetation along a road.



Photo 6. Typical degraded, channeled/grassy watercourse.

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Photo 7. Typical degraded, channelized/grassy watercourse and typical isolated woodlot.



Photo 8. Typical isolated woodlot and trees clustered in a yard.



Photo 9. Trees clustered in a yard.

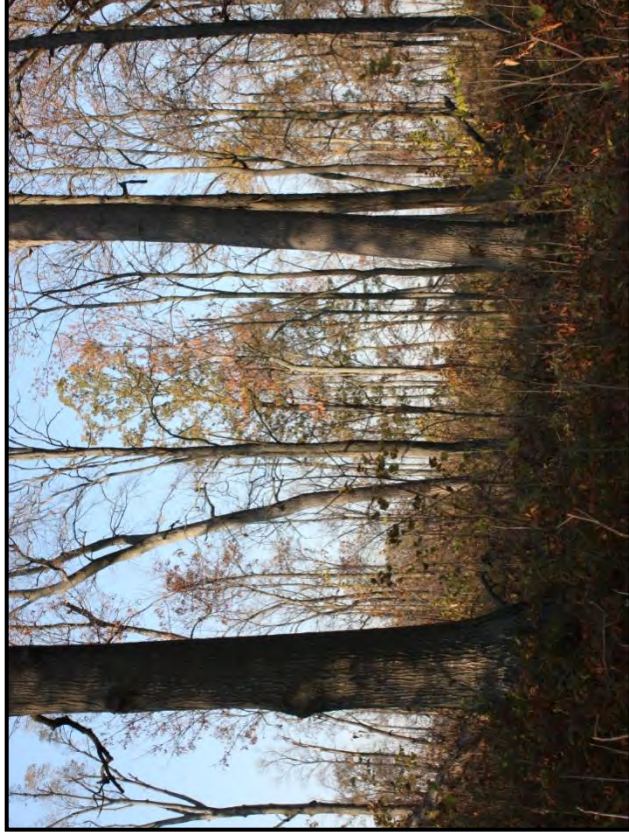


Photo 10. Typical woodlot.

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May 18, 2010 Site Visit to Hog Creek II



Photo 11. Typical agricultural land use.

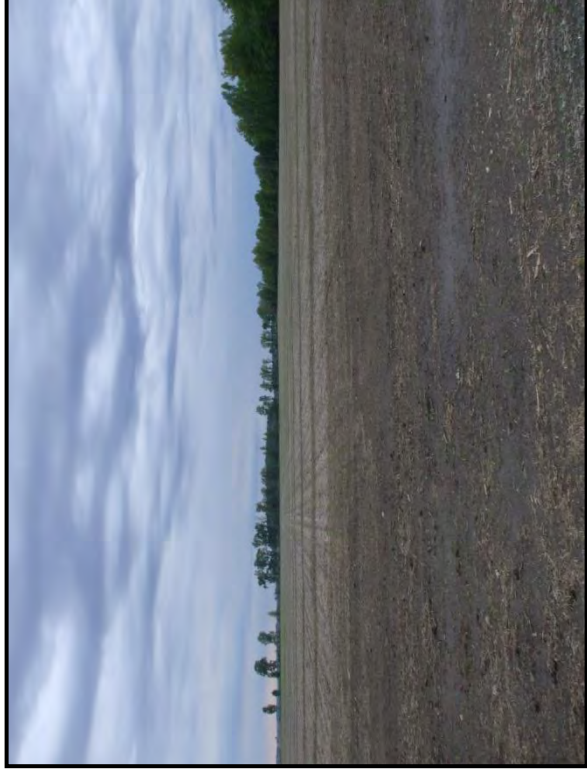


Photo 12. Typical tree line and woodlot edge along an open agricultural field.



Photo 13. Typical degraded, channelled/grassy watercourse.



Photo 14. Typical degraded, channelled/grassy watercourse.

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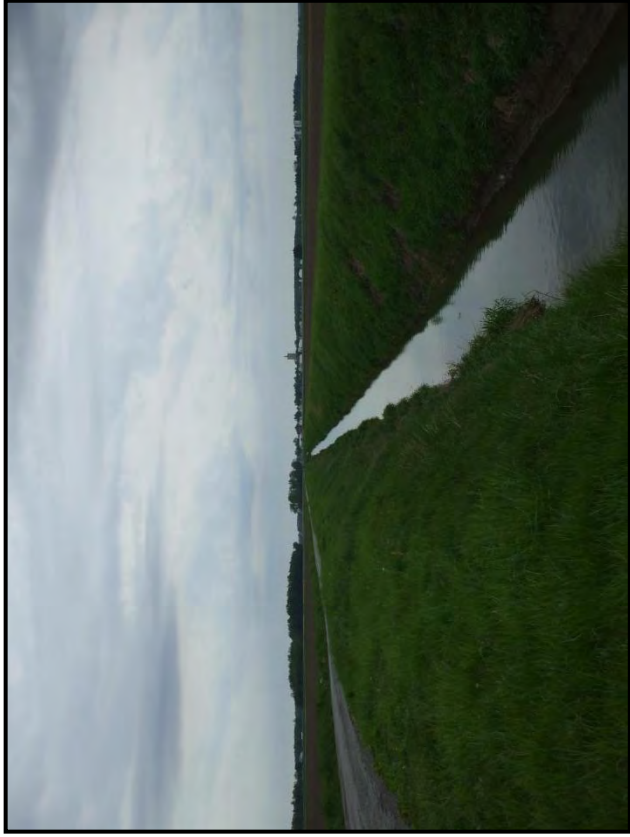


Photo 15. Typical degraded, channelled/grassy watercourse.



Photo 16. Typical isolated woodlot.



Photo 17. Typical tree line.



Photo 18. Typical tree line.

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Photo 19. Young woodlot with open canopy.



Photo 20. Woodlot with low understory density.

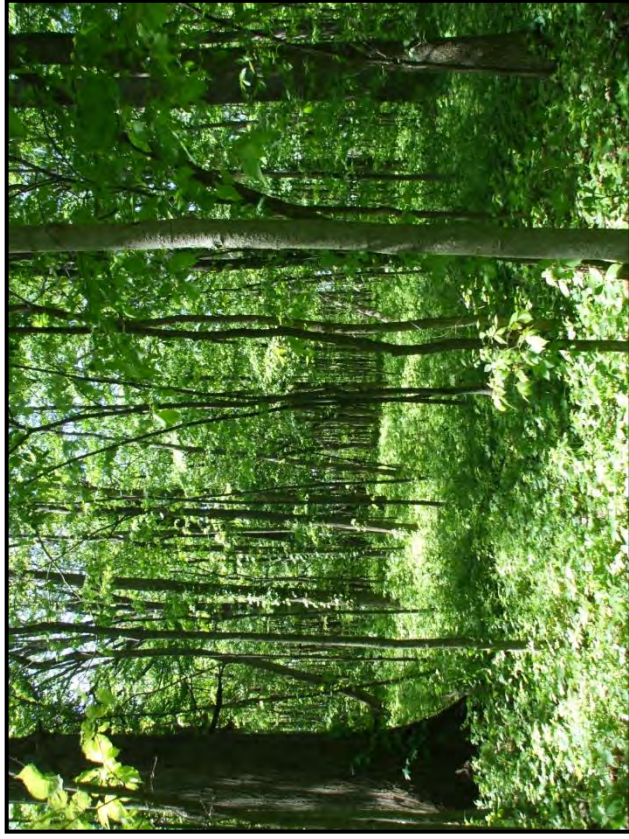


Photo 21. Typical woodlot.

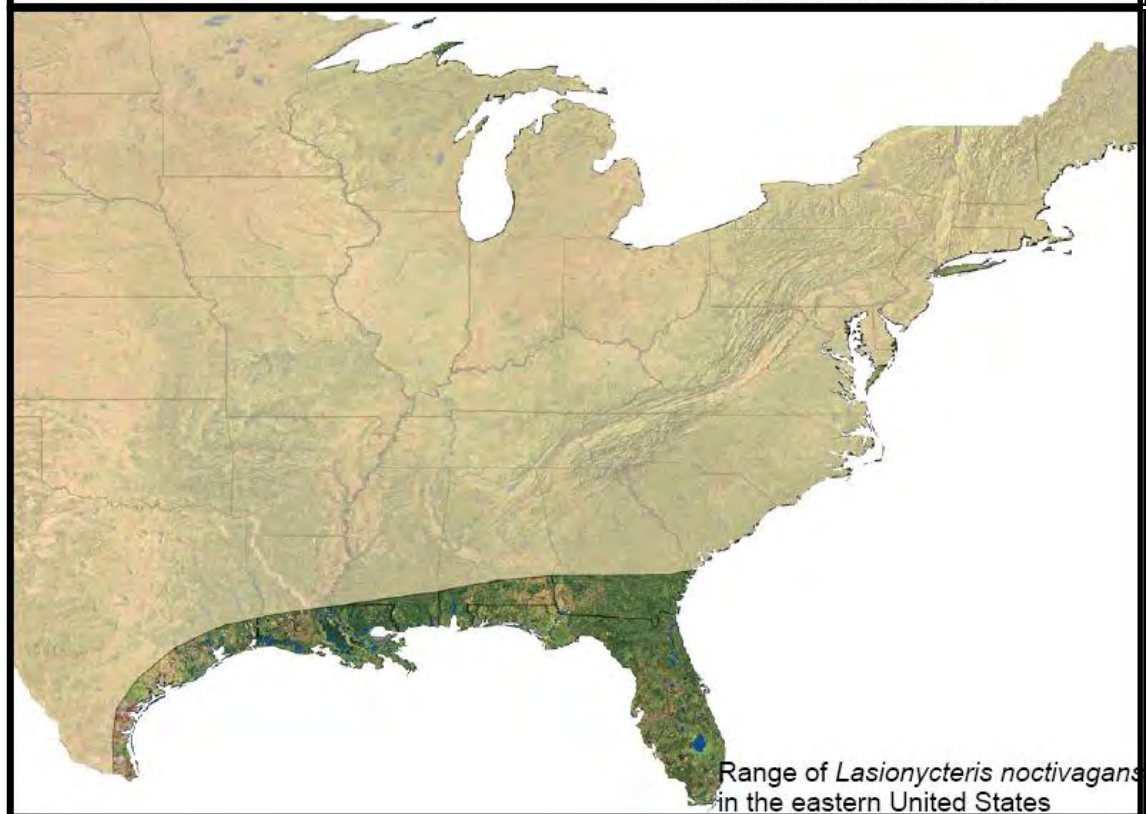


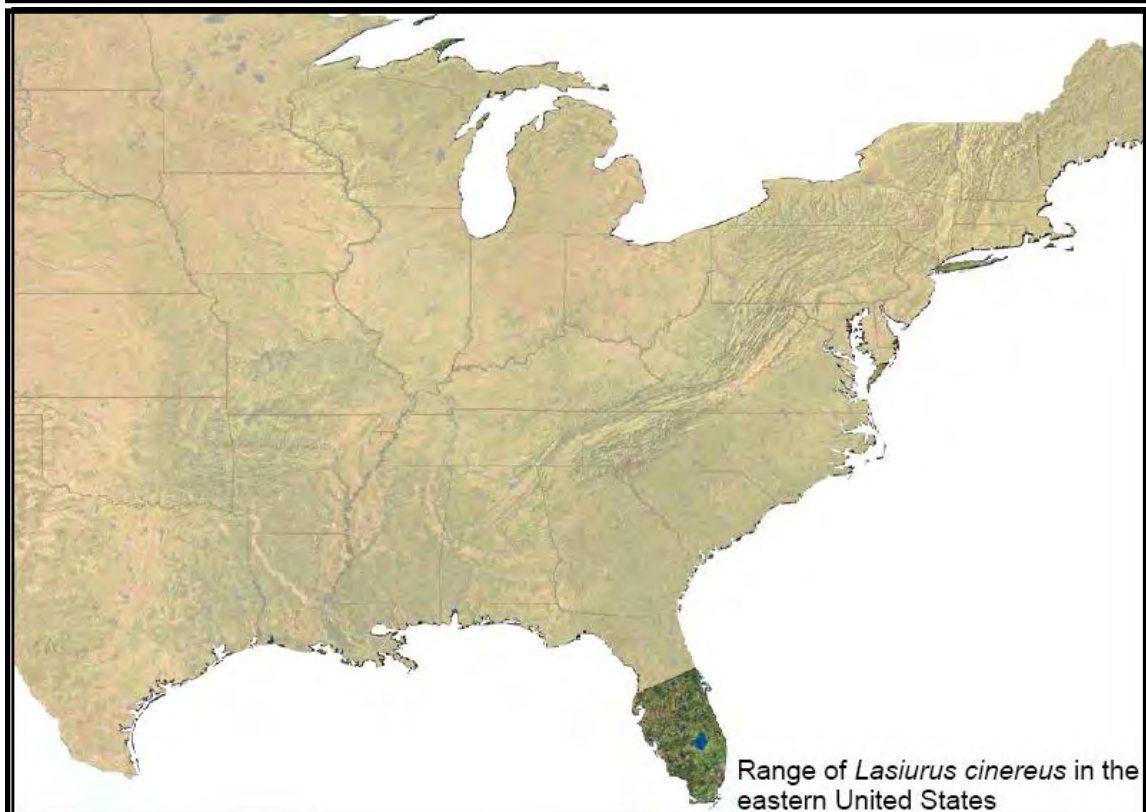
Photo 22. Farm track through woodlot.

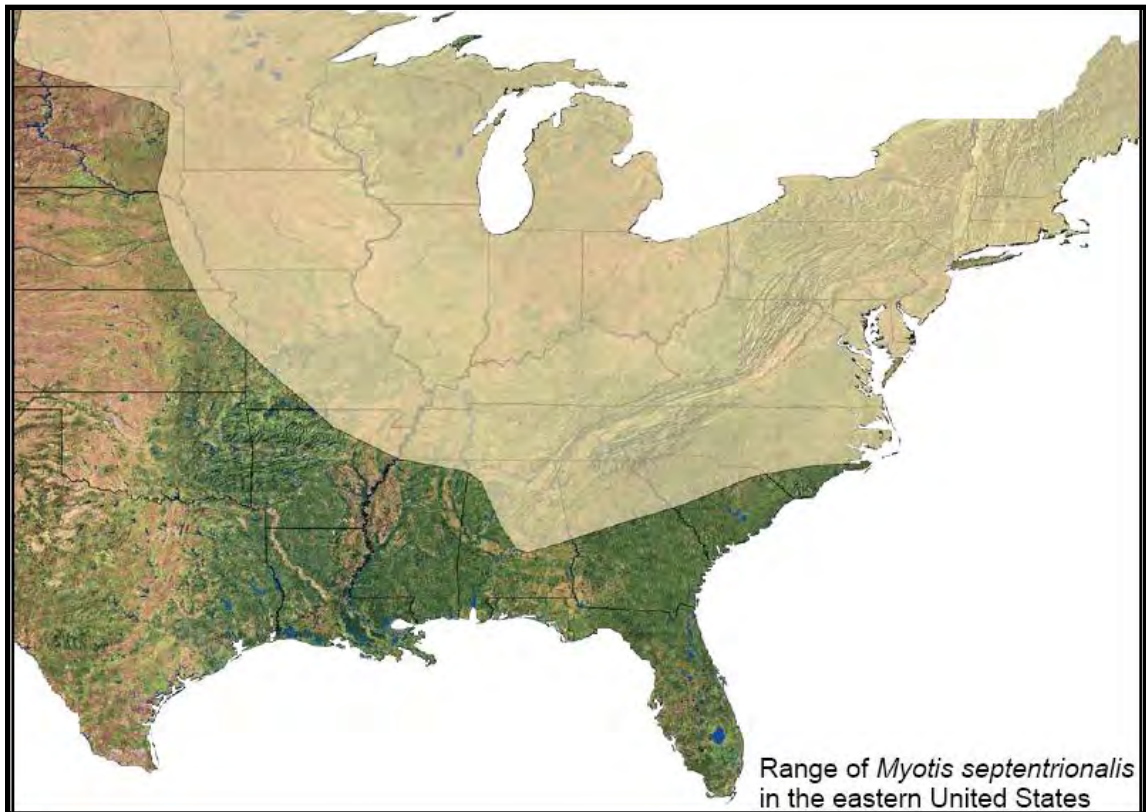
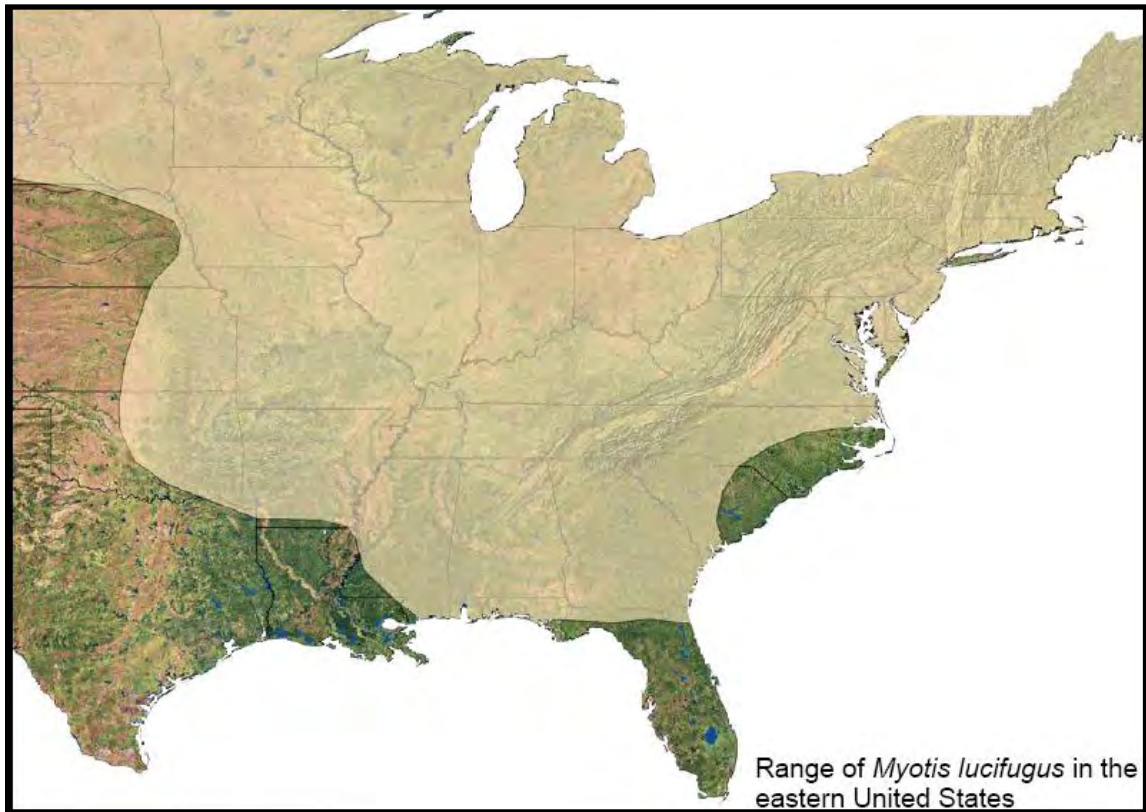
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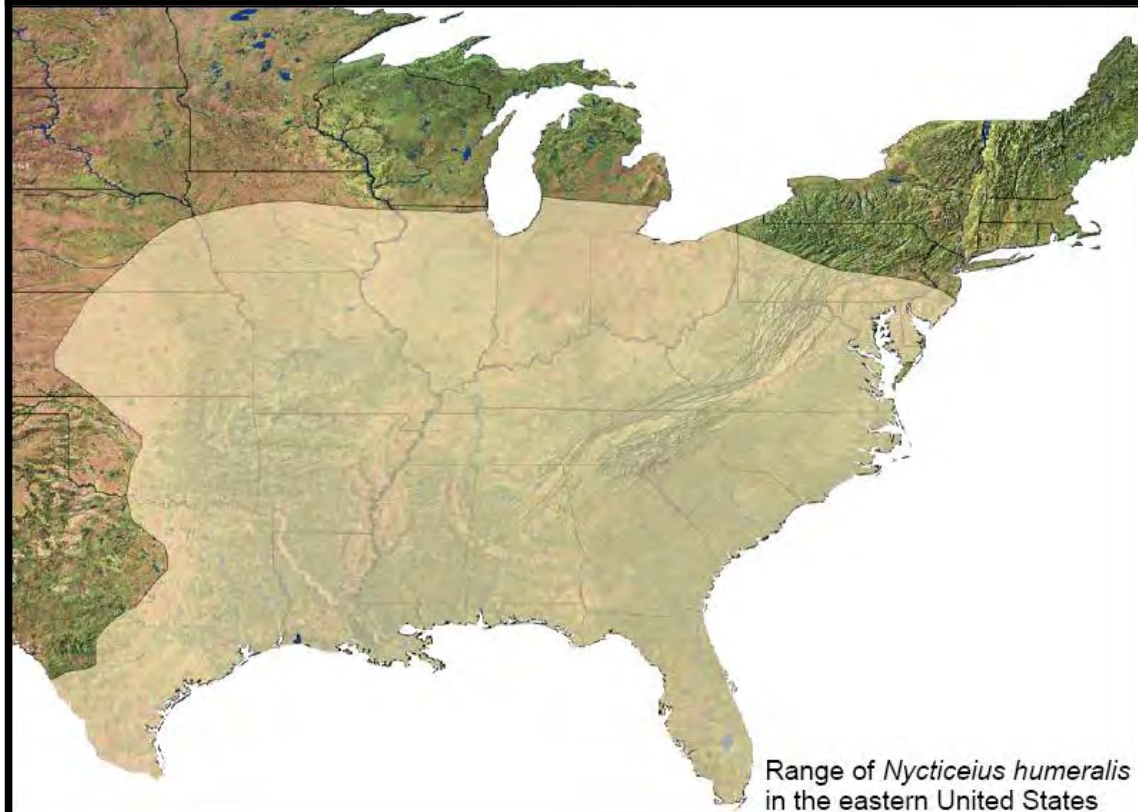
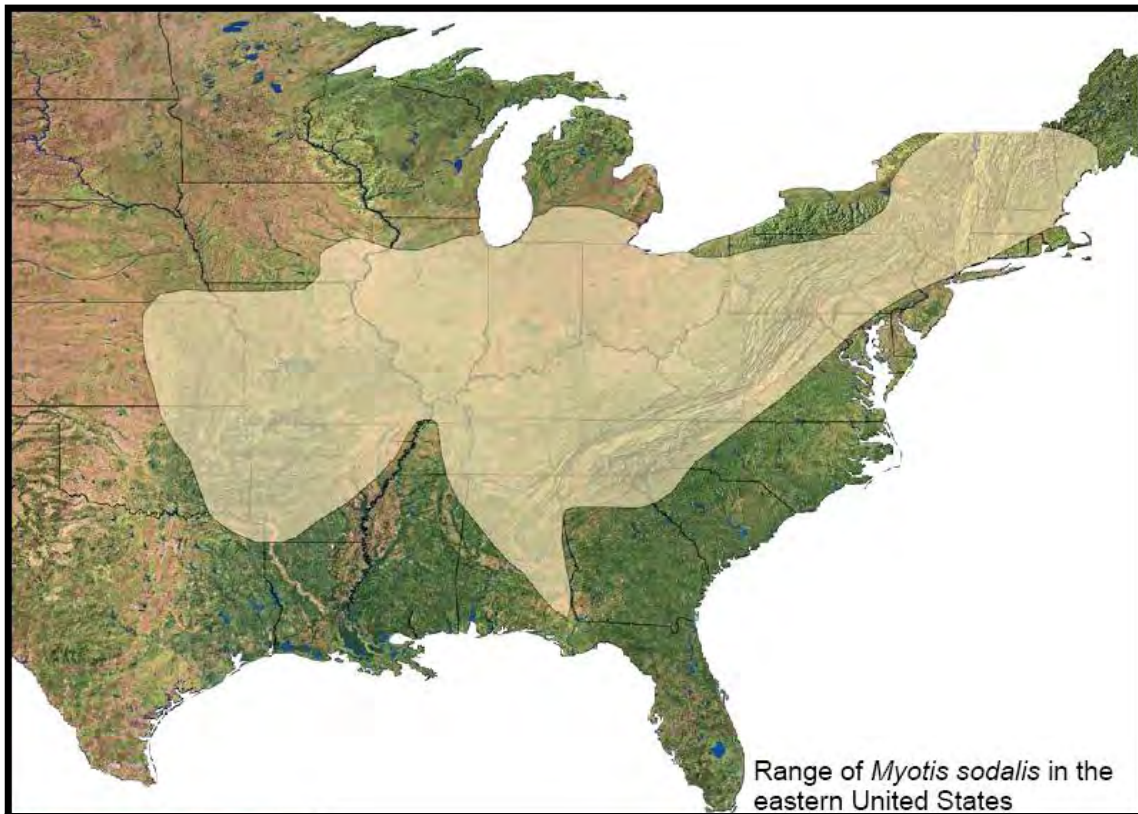
APPENDIX C

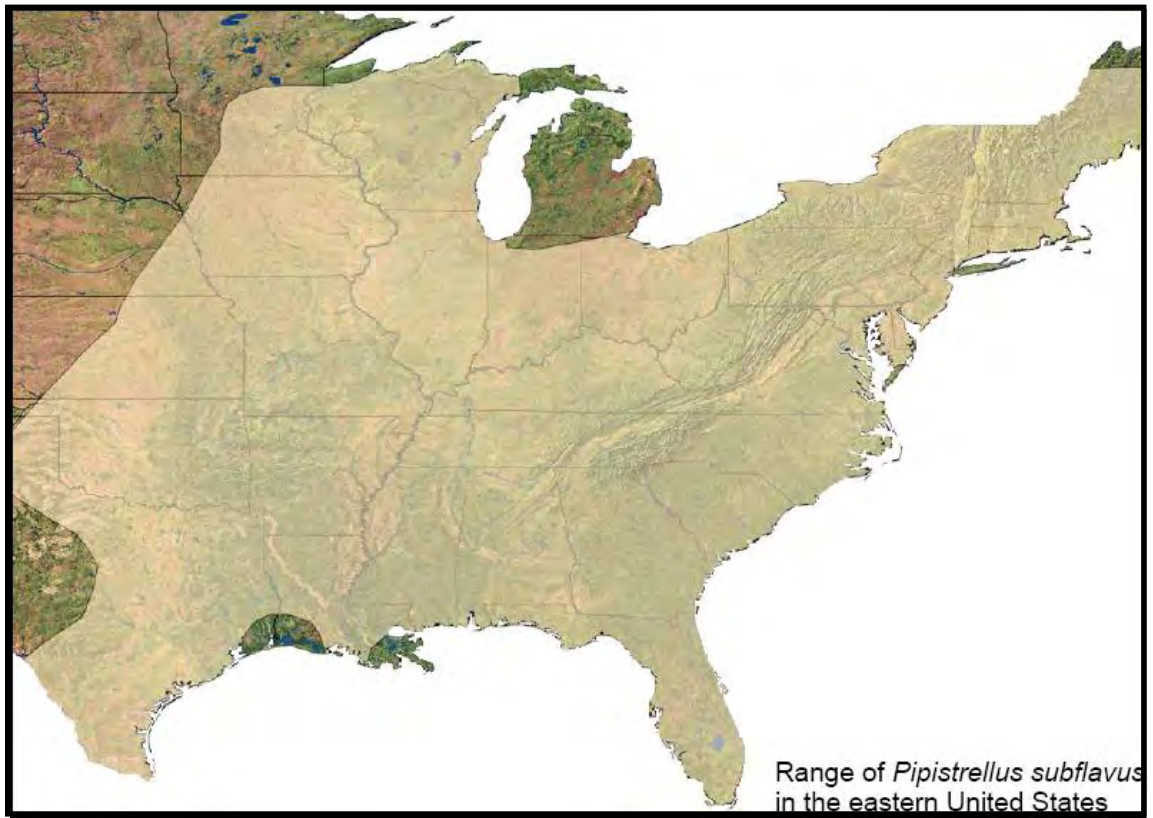
Bats of the Hog Creek Project Area: Range Maps











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APPENDIX D
Agency Queries

HOG CREEK I=



May 14, 2010

Ohio Department of Natural Resources
Division of Natural Areas and Preserves
Attn: Brian Mitch
2045 Morse Road
Building F-1
Columbus, OH 43229

**RE: Natural Heritage Database Search and Request for Natural Resources Data Update
for the Hog Creek Wind Farm (formerly the Hardin County North Wind Farm) Expansion**

Dear Mr. Mitch:

BHE Environmental, Inc.'s client has been completing scoping for a study area located in Hardin County, Ohio as depicted on the attached aerial photo. The project area is located entirely within Hardin County, but the 5 mile surrounding area included in this request includes Hancock County to the north. BHE's client is considering this area for expansion of its Hog Creek Wind Farm that has received a siting certificate from the Ohio Power Siting Board. This expansion called Hog Creek 2 proposes to erect 8 wind turbines on approximately 1500 acres. Land disturbance to construct the facility is estimated at less than 25 acres.

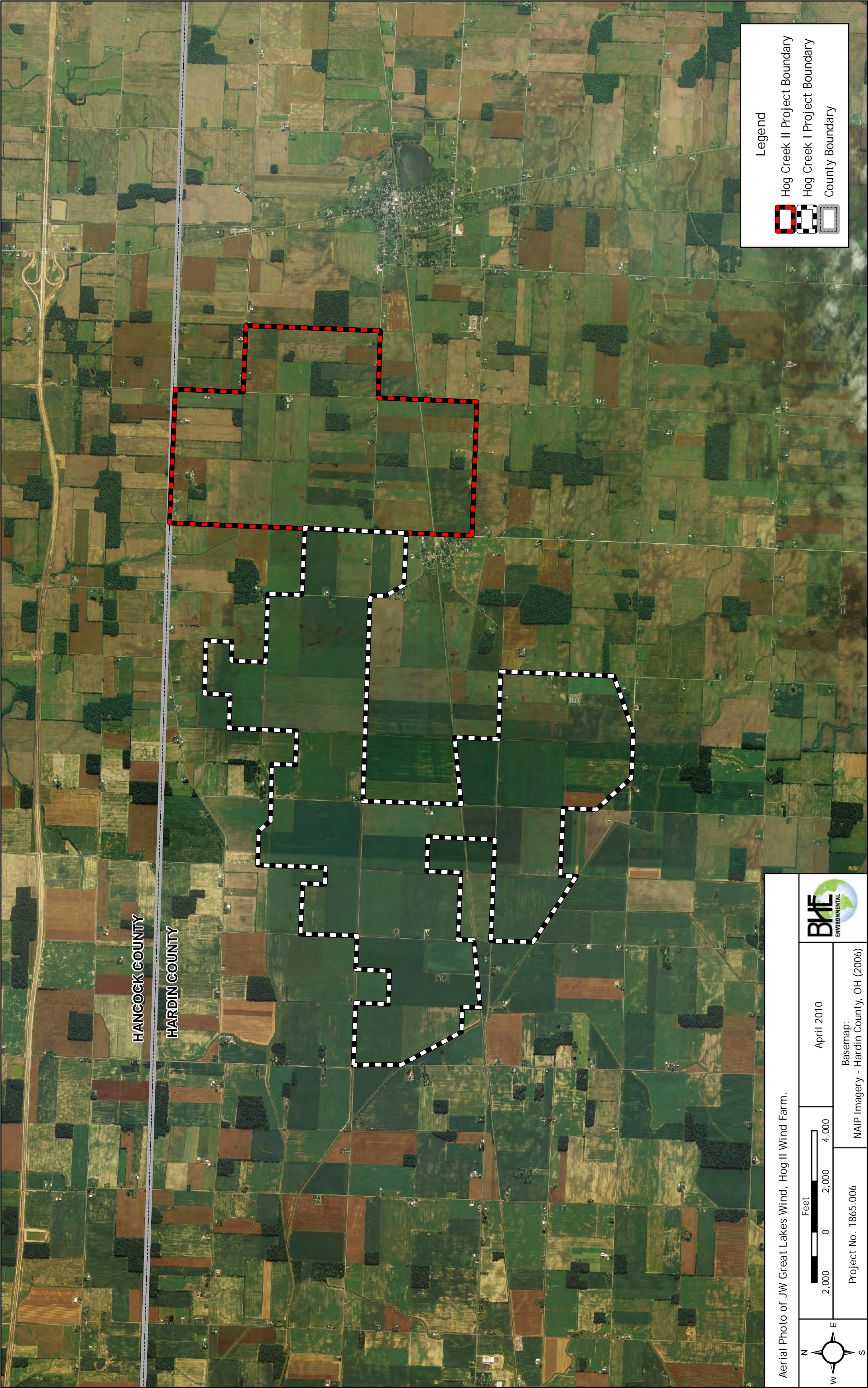
We know that prior coordination and database requests have been made for the adjacent project area (shown on attached map), but would like to have the most up to date data to assure any permit applications reflect the most recent information. Therefore, we would like to request a Natural Heritage database search for federally and state-listed species, protected wildlife, unique habitats, natural areas, and other ecologically sensitive resources on and within **5 miles** of the study area. We would also like to request your comments on the same and any other sensitive natural resources on and within **5 miles** of the study area from the other ODNR divisions, as well as any other general information about the study area that you feel may be pertinent.




If possible, please provide us with hard copies as well as latitude/longitude locations so that we may include this information on environmental constraints base maps that will be produced for the project. I have also provided GIS shapefiles and a map of the project boundary to help expedite the process.

Please contact Mike Sponsler at 614-856-4681 or msponsler@bheenvironmental.com if you have any questions about this data request. Thank you in advance for your timely response.

Sincerely,

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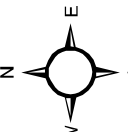




Legend


Hog Creek II Project Boundary
Hog Creek I Project Boundary
County Boundary

Aerial Photo of JW Great Lakes Wind, Hog II Wind Farm.




Project No. 1865.006

Feet



2,000 0 2,000 4,000

Basemap:
NAIP Imagery - Hardin County, OH (2006)



April 2010

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From: [Mitch, Brian](#)
To: [Mike Sponsler](#)
Subject: 10-0152; Hog Creek Wind Farm Expansion
Date: Tuesday, June 15, 2010 2:16:51 PM
Attachments: [oledata.mso](#)
[image001.gif](#)
[10-0152.jpg](#)



ODNR COMMENTS TO Mike Sponsler, BHE Environmental, 5300 East Main Street, Suite 101, Columbus, Ohio 43213.

Project: The project involves the installation of 8 wind turbines on approximately 1500 acres. The new turbines would be an expansion to the existing Hog Creek Wind farm which has already received a siting certificate from the Ohio Power Siting Board.

Location: The proposed expansion area is located within Hardin County, adjacent to the existing Hog Creek Wind Farm.

The Ohio Department of Natural Resources (ODNR) has completed a review of the above referenced project. These comments were generated by an inter-disciplinary review within the Department. These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the National Environmental Policy Act, the Coastal Zone Management Act, Ohio Revised Code and other applicable laws and regulations. These comments are also based on ODNR's experience as the state natural resource management agency and do not supersede or replace the regulatory authority of any local, state or federal agency nor relieve the applicant of the obligation to comply with any local, state or federal laws or regulations.

Rare and Endangered Species: The ODNR, Division of Natural Areas and Preserves, Natural Heritage Database contains the following animal data for this project, including a five mile radius, as shown on the attached map. There are no rare plants located directly within the project area. A five mile search around the proposed project boundary was not performed for rare plants. No managed areas were found within the five mile radius.

1. Great Blue Heron Rookery
2. Great Blue Heron Rookery
3. *Pleurobema sintoxia* - Round Pigtoe, SC
Pleurobema clava - Clubshell, E, FE
Villosa fabalis - Rayed Bean, E
Toxolasma lividus - Purple Lilliput, E
Orconectes virilis - Northern Crayfish, SC
4. *Lasmigona compressa* - Creek Heelsplitter, SC
5. Breeding Amphibian Site
6. *Uniomerus tetralasmus* - Pondhorn, T

Our inventory program has not completely surveyed Ohio and relies on information supplied by many individuals and organizations. Therefore, a lack of records for any particular area is not a statement that rare species or unique features are absent from that area.

Fish and Wildlife: The ODNR, Division of Wildlife (DOW) has the following comments.

This proposed expansion is completely encompassed within the original project boundaries that were previously provided to DOW. The wildlife surveying which was conducted for the original project boundaries incorporated this additional area. The DOW provided comments on the original project boundaries in our memo dated September 30, 2009.

This project is in an extensively agricultural area, and thus lacks suitable stop-over or breeding habitat for most species. The results from the applicant's pre-construction monitoring showed no indication that this site would pose an unacceptable level of risk to wildlife. JW Great Lakes is also a signatory to the Cooperative Agreement indicating their willingness to work with the DOW to address any unexpected mortalities.

Currently the DOW has no post-construction mortality information from any turbines located within the state, and even though we believe this is low risk we would like to see a post-construction study included as a condition of the permit. As a signatory of the Cooperative Agreement JW Great Lakes has agreed to undertake minimization measures if the number of mortalities exceeds a threshold established by the DOW. This information will also validate DOW's current protocols, which will hopefully allow DOW to predict potential impacts of future projects. The post-construction study must be conducted in accordance with the "*On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio*." These call for two years of monitoring with the potential for the second year to be reduced (focusing on the period of time when mortalities were observed the previous year) or eliminated at the discretion of the DOW.

The Natural Heritage Database (NHD) has records near the project area for the round pigtoe (*Pleurobema sintoxia*), a state mussel species of concern, the clubshell (*Pleurobema clava*), a state and federally endangered mussel, the rayed bean (*Villosa fabalis*), a state endangered and federal candidate mussel species, the creek heelsplitter (*Lasmigona compressa*), a state mussel species of concern, the pondhorn (*Unio merus tetralasmus*), a state threatened mussels species, and the purple lilliput (*Toxolasma lividus*), a state endangered mussel. If there is a history of mussels near the proposed project area, it may be necessary for a professional malacologist approved by the DOW to conduct a mussel survey in the project area. If no in-water work is proposed, the project is not likely to impact these species.

The project is within the range of the copperbelly water snake (*Nerodia erythrogaster neglecta*), a state endangered and federally threatened species, and the Eastern massasauga (*Sistrurus catenatus*), a state endangered and a federal candidate snake species. Due to the habitat requirements of these species, the project is not likely to impact these species.

The NHD has a record within the project area for a breeding amphibian site. Depending on the type of work to be done near the location of the breeding amphibian site, consultation with the DOW during construction of this project may be necessary to reduce impacts to this breeding amphibian site.

The NHD has a record near the project area for the Northern crayfish (*Orconectes virilis*), a state species of concern. Due to the status of this species, the project is not likely to impact this species.

The NHD has records near the project area for a great blue heron rookery. The results from the applicant's pre-construction monitoring showed no indication that this site would pose an unacceptable level of risk to wildlife. JW Great Lakes is also a signatory to the Cooperative Agreement indicating their willingness to work with the DOW to address any unexpected mortalities. Therefore, the project is not likely to impact this species.

ODNR appreciates the opportunity to provide these comments. Please contact Brian Mitch at (614) 265-6378 if you have questions about these comments or need additional information.

Brian Mitch, Environmental Review Manager
Ohio Department of Natural Resources
Environmental Services Section
2045 Morse Road, Building F-3
Columbus, Ohio 43229-6693

Office: (614) 265-6378

Fax: (614) 262-2197

brian.mitch@dnr.state.oh.us

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Hancock, Wyandot &
Hardin Cos., 10-0152

project
area

3

2

4

5

6

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From: [Mitch, Brian](#)
To: [Mike Sponsler](#)
Cc: Donald.Rostofer@puc.state.oh.us
Subject: 10-0152; Hog Creek Wind Farm Expansion Amphibian Breeding site
Date: Thursday, June 24, 2010 11:00:43 AM

Mike,

The amphibian breeding site listed in our comments dated June 15th, 2010 regarding the Hog Creek Wind Farm Expansion Project came from the Ohio EPA Pool Breeding Amphibian Database. The site was sampled 3 times in 1996 by OEPA and the following species were observed:

Ambystoma jeffersonianum

A. maculatum

A. texanum

A. spp.

Rana pipiens

Based on the location of this breeding site in relation to the proposed wind farm, ODNR does not believe there will be adverse impacts to this resource as a result of the proposed wind farm expansion.

Please let me know if you have any additional questions.

Brian Mitch, Environmental Review Manager

Ohio Department of Natural Resources

Division of Engineering

Environmental Services Section

2045 Morse Rd., Building F-3

Columbus, OH 43229-6693

Office: (614) 265-6378

Fax: (614) 262-2197

brian.mitch@dnr.state.oh.us

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From: Megan_Seymour@fws.gov
To: [Endres, Peter](#)
Cc: [Almady, Joseph](#); [Lott, Keith](#); [Mike Sponsler](#)
Subject: Re: Follow up and proposed scope
Date: Tuesday, April 20, 2010 1:56:14 PM
Attachments: [graycol.gif](#)
[pic03548.gif](#)
[ecblank.gif](#)
[HG2 Wildlife study plan.docx](#)


Thanks for checking in with us Pete. I agree that the document attached does reflect the pre-construction discussion for the proposed expansion of the Hog Creek Wind Farm we had last week. I believe Keith noted that the proposed expansion area was included in the original project boundary that you provided to us for analysis when the Hardin wind project was first evaluated. This is the primary reason no additional surveys were requested. Also, as indicated on the call, as currently proposed the same post-construction protocols would apply to these 8 turbines as apply to the original project (cut-in speeds and post-construction monitoring). Based on this, we have no general objections or substantial comments.

As I did mention on the call, the Service is evaluating the need to and appropriate methods of addressing the potential take of migratory Indiana bats at wind power sites in agricultural settings. As these discussions progress I will keep you informed as to what our recommendations may be, as they may apply to this project.

We look forward to reviewing your application. Please contact me if you have any questions.

Sincerely,
Megan

Megan Seymour
Wildlife Biologist
U.S. Fish & Wildlife Service
4625 Morse Rd.
Suite 104
Columbus, OH 43230
(614) 416-8993 ext. 16
(614) 416-8994 fax

 "Endres, Peter" <Endres@juwi.com>

"Endres, Peter"
<Endres@juwi.com>

04/15/2010 05:59 PM

To "Megan_Seymour@fws.gov"
<Megan_Seymour@fws.gov>, "Lott, Keith"
<Keith.Lott@dnr.state.oh.us>
cc Mike Sponsler
<msponsler@bheenvironmental.com>,
"Almady, Joseph" <almady@juwi.com>
Subject Follow up and proposed scope

Keith and Megan,

Thank you again for your comments and participation on the call yesterday. We understand

from the conversation that neither ODNR nor USFWS have any general objections to the proposed siting for the additional eight turbines in the Hog Creek Wind Farm.

We have prepared the attached scope of work that we intend to complete to support the OPSB application for the Hog Creek expansion.

Please advise with any comments or objections to the proposed scope of work.

Thank you,
Pete

Peter K. Endres
Director, Project Development US

juwi Wind US Corp. • 1900 Superior Avenue, Suite 333 • Cleveland, Ohio 44114-2148
• USA
office +1.216.344.9305 • fax. +1.216.344.9306
mobile +1.216.538.5420 • endres@juwi.com • www.juwi.com

juwi • Energy is here

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Hog Creek Wind Farm, Phase 2 Wildlife Study Plan

- Vegetation/habitat survey of project and surrounding one-quarter mile area as per OPSB rule.
 - o Habitats will be identified.
 - o Search for presence of T&E plant species and habitats with emphasis on woodlots and wetlands.
 - o Woodlots on site will receive a pedestrian survey; woodlots in the one-quarter mile buffer will receive a pedestrian survey where access is allowed. Where access is not allowed, roadside observations will be made with an emphasis on use by raptors.
 - o Wetland habitats, if any, on-site will receive a pedestrian survey for sensitive plant species.
- Animal life/major species survey of project and surrounding one-quarter mile area as per OPSB rule.
 - o Visual and aural signs for wildlife such as tracks, dens, nests, scat, songs, drumming will be recorded.
 - o Search for presence of T&E animal species and habitats with emphasis on woodlots and wetlands.
- Per our teleconference April 14 2010 (juwi, BHE, Keith Lott, Megan Seymour), no additional wildlife monitoring beyond what's been completed for the first phase will be conducted
- Results of the Hog Creek 2 survey will be used to supplement/update previous surveys and reports for inclusion with the OPSB application

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HOG CREEK I

(formerly named Hardin County North Wind Farm)



June 24, 2009

Ohio Department of Natural Resources
Division of Natural Areas and Preserves
Attn: Butch Grieszmer
2045 Morse Road
Building F-1
Columbus, OH 43229

RE: Natural Heritage Database Search update for the Hardin County North Wind Farm

Dear Mr. Grieszmer:

BHE Environmental, Inc.'s client has been completing scoping for a study area located in Hardin County, Ohio as depicted on the attached USGS topographic map (study area is located entirely within Hardin County). BHE's client is considering this area for development of a wind power electric generating plant and associated facilities and will encompass approximately 3,400 acres.

We know that prior coordination and database requests have been made for the project but would like to have the most up to date data to assure any permit applications reflect the most recent information. Therefore, we would like to request a Natural Heritage database search for federally and state-listed species, protected wildlife, unique habitats, natural areas, and other ecologically sensitive resources within 5 miles of the study area. We would also like to request your comments on wildlife species likely to be present within 5 miles of the study area and any other general information about the study area that you feel may be pertinent.

If possible, please provide us with hard copies as well as latitude/longitude locations so that we may include this information on environmental constraints base maps that will be produced for the project. I have also provided GIS shapefiles and a map of the project boundary to help expedite the process.

Please contact Mike Sponsler at 614-856-4681 or msponsler@bheenvironmental.com if you have any questions about this data request. Thank you in advance for your timely response.

Sincerely,

Mike Sponsler
Director

Cc: P. Endres

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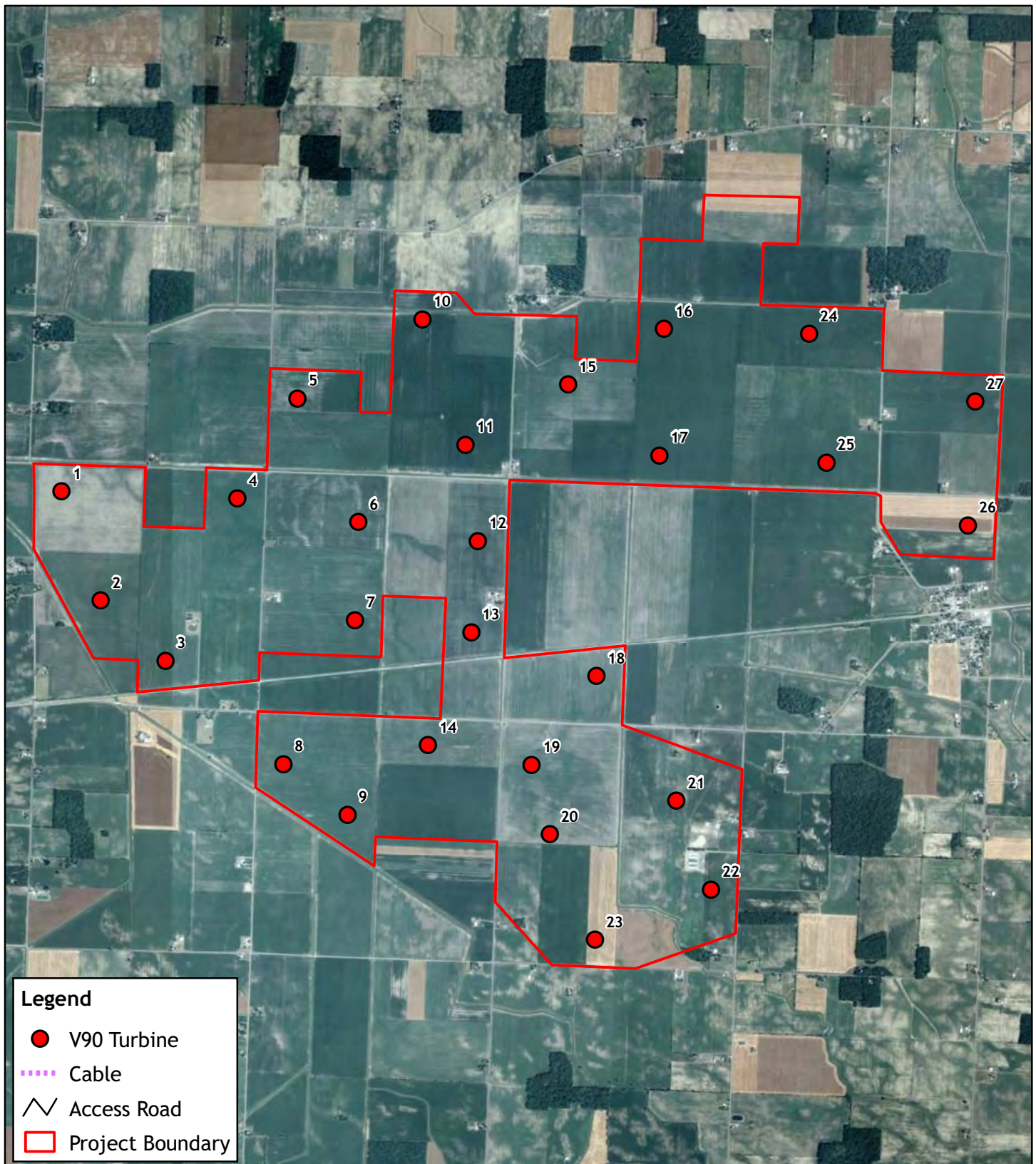
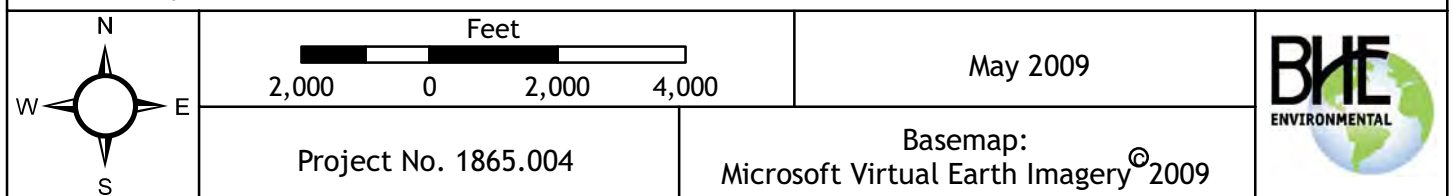


Figure 1. Project boundary based on V90 turbine layout for JW Great Lakes Wind, Hardin County North Project, Ohio.



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Ohio Department of Natural Resources

TED STRICKLAND, GOVERNOR

SEAN D. LOGAN, DIRECTOR

Division of Natural Areas & Preserves

Steven D. Maurer, Chief

2045 Morse Road, F-1

Columbus, OH 43229-6693

Phone: (614) 265-6453 Fax: (614) 267-3096

July 15, 2009

Mike Sponsler
BHE Environmental, Inc.
5300 E. Main St., Suite 101
Columbus, OH 43224

Dear Mr. Sponsler:

After reviewing our Natural Heritage maps and files, I find the Division of Natural Areas and Preserves has no records of rare or endangered species within 5 miles of the BHE Environmental, Inc. Hardin County North Wind Farm project #1865.004. The site is located in Secs. 8, 9, 10, 16, 17, 18, 20, and 21, Washington Twp., Hardin Co., Ada and Dunkirk Quadrangles.

There are no existing or proposed state nature preserves within 5 miles of the project site. We are also unaware of any unique ecological sites, geologic features, breeding or non-breeding animal concentrations, state parks, state forests, scenic rivers, or wildlife areas within 5 miles of the project area.

Our inventory program has not completely surveyed Ohio and relies on information supplied by many individuals and organizations. Therefore, a lack of records for any particular area is not a statement that rare species or unique features are absent from that area. Although we inventory all types of plant communities, we only maintain records on the highest quality areas.

Please contact me at (614) 265-6409 if I can be of further assistance.

Sincerely,

A handwritten signature in black ink, appearing to read "Butch Grieszmer", is written over a horizontal line.

Butch Grieszmer, Data Specialist
Resource Services Group

ohiodnr.com



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Ohio Department of Natural Resources

TED STRICKLAND, GOVERNOR

SEAN D. LOGAN, DIRECTOR

Division of Wildlife
David M. Graham, Chief
2045 Morse Rd., Bldg. G
Columbus, OH 43229-6693
Phone: (614) 265-6300

February 1, 2010

To all interested parties,

As a signatory to the ODNR Voluntary Cooperative Agreement JW Great Lakes (JWGL) has committed to working with the Division of Wildlife (DOW) to minimize potential impacts to Ohio's wildlife resources at their proposed Hardin North wind energy facility. In spring 2009 the DOW provide wildlife surveying recommendations to JWGL. These recommendations are based upon available habitat within the project area, potential focal areas of bird and bat activity, migratory corridors, staging areas, or Audubon Important Bird Areas. Based upon a review of the project boundaries and accompanying site visit, the DOW determined that this project would require the "minimum" level of surveying effort. These recommendations included surveys for protected species of raptor (bald eagle, northern harrier, osprey, and peregrine falcons) nests, and acoustic monitoring to document bat activity. Typically these surveys also include breeding bird surveys, but because JWGL agreed to site their turbines within active agricultural lands, which are not considered suitable habitat for most species of bird, and away from patches of forest, these were waived.

The "On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocols for Commercial Wind Energy Facilities in Ohio" stipulates that signatories to the Cooperative Agreement whose proposed projects are located with areas categorized as requiring the "minimum" level of surveying effort have the option to forgo conducting acoustic monitoring of bats. In exchange the developer agrees to undertake operational curtailments to minimize the likelihood of impacts to bats. JWGL has agreed to feather (i.e., not operate) their turbines when wind speeds are ≤ 4 meters/second (as measured within the rotor-swept area) from dusk to dawn, July 1 to October 31 annually, for the lifetime of the facility.

Given this stipulation, and the lack of suitable habitat within the project boundary, the DOW feels as though this site poses a minimum threat to Ohio's wildlife resources. After reviewing the proposal submitted by JWGL and the responses provided by BHE regarding the Hardin North wind energy facility, the DOW has no further objection to this application. Additionally, JW Great Lakes and the DOW have agreed to work cooperatively to address any unexpected wildlife conflicts.

Sincerely,

Keith Lott

Wind Energy Wildlife Biologist
Ohio Department of Natural Resources Division of Wildlife
419-602-3141



July 14, 2009

Ms. Angela Boyer
U.S. Fish and Wildlife Service
6950 American Parkway
Suite H
Reynoldsburg, OH 43068-4127

RE: Data Update for a Study Area in Hardin County, Ohio.

Dear Ms. Boyer:

BHE Environmental, Inc.'s client has been completing scoping for a study area located in Hardin County, Ohio as depicted on the attached USGS topographic map (study area is located entirely within Hardin County). BHE's client is considering this area for development of a wind power electric generating plant and associated facilities and will encompass approximately 3,400 acres.

We know that prior coordination and database requests have been made for the project but would like to have the most up to date data. Therefore, we would like to request any data your agency can provide regarding rare/sensitive habitat or natural features and communities within 0.25 miles of the study area. In addition, please provide information regarding federally listed endangered, threatened, and candidate species and critical habitat that may be present within the study area proper or within 0.25 miles of the study area. We understand recent Indiana bat captures have occurred in Ohio as part of wind farm siting studies. Please advise whether this data is relevant to JW's proposed project area.

If possible, please provide us with hard copies as well as latitude/longitude locations so that we may include this information on environmental constraints base maps that will be produced for the project. It would be greatly appreciated if we could get a quick response to this request. I have provided GIS shapefiles of the project boundary to help expedite the process.

Please contact Mike Sponsler at 614-856-4681 or msponsler@bheenvironmental.com if you have any questions about this data request. Thank you in advance for your timely response.

Sincerely,

Mike Sponsler
Director

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United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
4625 Morse Road, Suite 104
Columbus, Ohio 43230
(614) 416-8993 / FAX (614) 416-8994

September 18, 2009

TAILS # 31420-2009-TA-1035

Mr. Jim O'Dell
Ohio Power Siting Board
180 East Broad St.
Columbus, OH 43215-3793

Re: Hardin County North Wind Farm, 09-277-EL-BGN

Dear Mr. O'Dell:

This is in reference to the proposed Hardin County North Wind Farm, to be located entirely in Washington Township, Hardin County, Ohio. This application was submitted by JW Great Lakes Wind, LLC, and seeks issuance of a Certificate of Environmental Compatibility and Public Need. The project involves the installation of up to 50 MW of wind power capacity, including between 19-27 wind turbines (depending on model selected), access roads, electrical infrastructure, construction staging areas, and an operations and maintenance facility. The project area is dominated by intensive agriculture. No forested areas exist within the project boundary. Several channelized streams/drainage ditches exist within the project area, and may be impacted by culvert crossings, authorized by a Nationwide Permit. No wetlands exist within the project area aside from those areas within the channel of the ditches.

The Service received your August 17, 2009 letter requesting our review of the application for informational completeness, and we submit this letter in response.

The U.S. Fish and Wildlife Service (Service), JW Great Lakes Wind, LLC, their representatives, and the Ohio Department of Natural Resources (ODNR) have been involved in site planning and review of the proposal for approximately two years. We have participated in multiple meetings, we conducted a site visit on July 18, 2008, and engaged in multiple discussions and e-mails regarding proposed wildlife (bird and bat) survey protocols for this project. We submit this information to you to document that JW Great Lakes Wind, LLC has been working collaboratively with the Service to address potential wildlife, habitat, and natural resource issues in advance of applying to the Ohio Power Siting Board for certification.

As noted above, we agree that the bird and bat surveys implemented by JW Great Lakes Wind, LLC were sufficient to document wildlife use of the project area. All agreed-upon surveys have been completed as requested by ODNR and the Service, and reports summarizing the results of those surveys were included in the application package. Wildlife habitat within the project area is extremely limited by the intensive agricultural nature of the project area. There are no woodlots, grasslands, wetlands, or other suitable habitat within the project area. Wildlife species typically observed during the surveys included common bird and mammal species typically found in agricultural settings.

ENDANGERED SPECIES COMMENTS: No federally-listed species were documented within the project area, and no suitable habitat for federally-listed species occurs in the project area.

The project lies within the range of the Indiana bat (*Myotis sodalis*), a federally listed endangered species.

Indiana bats were recently documented within eastern Hardin County. During winter, Indiana bats hibernate in caves and abandoned mines. Summer habitat requirements for the species are not well defined but the following are considered important:

- (1) dead or live trees and snags with peeling or exfoliating bark, split tree trunk and/or branches, or cavities, which may be used as maternity roost areas;
- (2) live trees (such as shagbark hickory and oaks) which have exfoliating bark;
- (3) stream corridors, riparian areas, and upland woodlots which provide forage sites.

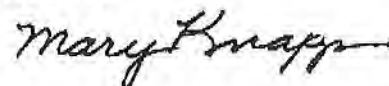
The project area does not provide any suitable Indiana bat habitat. No forested areas or streams with forested riparian corridors, nor caves or mines are present within the project area. The Service firmly believes that as the project is currently proposed, Indiana bats are unlikely to occur within the project area, and that take of Indiana bats will not occur. At this time, we do not believe that additional consultation relative to the Indiana bat is warranted for this project.

Although we do not anticipate take of Indiana bats at this project, we believe it is likely that mortality of non-listed bat species will occur, and recommend post-construction monitoring be implemented, as specified in ODNr's "On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio," to assess impacts to non-listed bat species. JW Great Lakes Wind LLC is a signatory to ODNr's Voluntary Cooperative Agreement, and has agreed to curtail all operations during night time hours (sunset-sunrise) from July 1 through October 31 when wind speeds are less than or equal to four (≤ 4) meters per second for the life of the facility to avoid and minimize potential impacts to bats. We request this both post-construction mortality monitoring and operational curtailment as described above be made conditions of any issued certificate.

MIGRATORY BIRD COMMENTS: The Migratory Bird Treaty Act (16 U.S.C. 703-712; MBTA) implements four treaties that provide for international protection of migratory birds. The MBTA prohibits taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior. Bald and golden eagles are afforded additional legal protection under the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d). Unlike the Endangered Species Act, neither the MBTA nor its implementing regulations at 50 CFR Part 21, provide for permitting of "incidental take" of migratory birds. While bald eagles are known to occur in Hardin County, none are within 5 miles of the project area. Therefore, we do not anticipate any impact on this species. Based on the proposed location of this project, the general lack of suitable habitat for migratory birds, the disturbed nature of the project area, and the results of the bird surveys conducted by the applicant, we do not believe this site poses a substantial threat to migratory birds or their habitat, though a limited amount of mortality to migratory birds should be expected to occur.

We appreciate your conscientious efforts to protect the Indiana bat and other natural resources within the Hardin County North Wind Farm project area. If you have questions, or if we may be of further assistance in this matter, please contact Megan Seymour at extension 16 in this office.

Sincerely,



Mary Knapp, Ph.D.
Field Supervisor

cc: Keith Lott, ODNr, 2514 Cleveland Road East, Huron, OH 44839

This foregoing document was electronically filed with the Public Utilities

Commission of Ohio Docketing Information System on

9/4/2011 1:28:07 PM

in

Case No(s). 04-6000-XX-XXX

Summary: Agreement test electronically filed by Ms. Donielle M Hunter on behalf of PUCO