

Authorization for Incidental Take and Implementing Agreement

Pursuant to the Illinois Endangered Species Protection Act (520 ILCS 10/5.5), on behalf of the Illinois Rural Electric Cooperative (IREC), authorization for the incidental take of the State (and Federally) listed Indiana bat (*Myotis sodalis*) and gray bat (*Myotis grisescens*) in Pike County, Illinois is hereby granted, subject to the terms and conditions described in the following Authorization/Implementing Agreement. The Illinois Department of Natural Resources has determined that this authorized take is incidental to the continued operation of the IREC/PCWPP (Pike County Wind Power Project) wind turbine project in Pike County, Illinois.

As background information, in 2003, the Illinois Rural Electric Cooperative (IREC) began permitting for the construction of a 1.65 mega-watt wind turbine known as the Pike County Wind Power Project (PCWPP). The single turbine was constructed during a period between February 2004 and February 2005 and is located at 24920 365th Street, Pittsfield, Illinois 62363, Pike County. The Mississippi River is approximately 35 miles to the west, while the Illinois River is approximately 15 miles to the east.

The IREC Conservation Plan was specifically created as part of an application for an Incidental Take Authorization (ITA) as described by Illinois regulations administered by the Illinois Department of Natural Resources (IDNR). According to IDNR records, the PCWPP does not lie in close proximity to any known Indiana bat hibernaculum. The PCWPP is located near the Mississippi River Valley which is a major migratory flyway for various avian species and approximately 29 miles from Burton Cave and 25 miles from Twin Culvert Cave, which are known bat hibernacula.

The IREC, as a cooperative organization, is tasked with providing reliable energy service to its members. The co-op has over 10,485 members serving communities in 10 Illinois Counties (Adams, Brown, Calhoun, Cass, Greene, Jersey, Macoupin, Morgan, Pike, and Scott). Sustainability is part of maintaining reliability and the co-op continually explores ways to utilize and develop *green* energy from sources such as solar and wind. The construction of the Pittsfield area turbine serves to enhance the co-op's ability to tap into a sustainable energy source while reducing the carbon footprint needed to produce that energy. While a wind turbine provides a source of emission free, renewable energy, it may have an environmental downside: avian and bat species are known to be killed or injured by striking the tower structure such as the spinning rotor blades or as a result of barotraumas.

Procedural History

The Association of Illinois Electric Cooperatives (AIEC) on behalf of the Illinois Rural Electric Cooperative (IREC), prepared a conservation plan (CP) for the PCWPP wind turbine/power project as described by the Illinois Endangered Species Protection Act (520 ILCS 10/5.5). That plan and IREC's request for authorization for incidental take of the Indiana bat (*Myotis sodalis*) and gray bat (*Myotis grisescens*) in Pike County, Illinois were received by the Illinois Department of Natural Resources (Department) on May 10, 2013. Public notice of IREC's request for authorization of incidental take of these State/Federally listed species was published in the Breeze Courier (Official State newspaper) on May 22, May 29, and June 5, 2013; and the Jacksonville Journal Courier (Morgan County) on June 30, as well as on July 7, and July 14, 2013. Public comments on IREC's conservation plan were accepted by the Department until August 7, 2013. No comments were received by the public during the period of May 22, 2013 through August 7, 2013.

The USDA did not request preparation of either an Environmental Assessment (EA) or Environmental Impact Statement (EIS) for the Pittsfield turbine. Although wind turbines are in general known to be hazardous to avian and bat species, the specific impacts of wind turbines on migratory species and/or threatened and endangered species have not been clearly documented and are still under scientific study.

The USFWS issued an interim guidance memorandum for avoiding and minimizing wildlife impacts from wind turbines in 2003, which is used by all review personnel. The USFWS recently developed a revised set of draft guidance that will further define wind turbine impacts to bats. Because the USFWS continues to accept comments on their draft document and it continues to be in a state of flux, IREC has not incorporated the document into the development of the draft CP. The USFWS did not object to this IREC project nor has USDA or RUS (Rural Utility Service) requested formal consultation under the Section 7 process for the Pittsfield turbine; however, this does not release IREC from the potential for responsive action from the USFWS at any point in the future should a federally threatened or endangered species be found to be killed by the PCWPP.

Initial coordination with the IDNR in December of 2003, produced a "no record of occurrence" of endangered or threatened species and a no adverse impact determination from the PCWPP wind turbine [IDNR, 2003]. IREC staff also coordinated with the Illinois Environmental Protection Agency, Illinois Department of Agriculture, and Illinois Historic Preservation Agency in an effort to understand any perceived or real impacts the PCWPP may have on environmental or cultural resources. All agencies consulted with during planning activities in 2003 issued letters clearing the way for the construction of the PCWPP.

As a result of a study performed by Eco-Tech Consultants, Inc. for the proposed Panther Creek Wind Farm (2011-2012/Pike County), and ongoing studies at Adams Electric Cooperative, the IDNR contacted IREC to assess potential impacts to State and Federal listed (threatened and endangered) species in the general proximity of the PCWPP. A follow up query of the IDNR online resource Ecological Compliance Assessment Tool (Eco-CAT), identified records of state listed threatened and endangered species (bats) in the general proximity of the PCWPP turbine location.

Subsequent coordination with the IDNR determined that although official consultation had been considered terminated in 2003, a voluntary implementing agreement with the IDNR for the *taking* of selected species of concern was strongly recommended by IDNR staff. The highest level of concern is primarily in regard to the Federal and Illinois endangered Indiana bat (*Myotis sodalis*). The growing body of scientific literature on the interaction between wind turbines and wildlife is further defining/refining the risks posed to wildlife, but there is not a comprehensive understanding of the risks posed. The IDNR therefore expressed the desire to enter into an implementing agreement/ITA with IREC due to the known populations of Indiana bats and other bat species declining at a precipitous rate from other causes as well as wind turbines.

IREC has chosen to be proactive in its approach to the concerns raised regarding the identified species. The ITA agreement is between the IDNR and IREC; however, the USFWS has been encouraged to participate in the process by providing comments for incorporation into this, and previous, documents. It has been discussed that the ITA be held active for the remaining life expectancy of the turbine (approximately 20 years/2033 – data per IREC). After the terms of the ITA expire, any 'take' as a result of the turbine will require reexamination of the PCWPP, unless previously deferred based on any future agreements between IREC and the IDNR.

During the Fall of 2012, coordination with the IDNR's Office of Realty and Environmental Planning (OREP) determined that although official consultation had been considered terminated in 2003, a voluntary implementing agreement/ITA with the IDNR was recommended by OREP and IDNR's Office of Resource Conservation (ORC) for the *taking* of selected species of concern - strongly recommended by IDNR staff. At that time (Fall of 2012), IREC chose to enter into the formal ITA process. Therefore, the Association of Illinois Electric Cooperatives (AIEC) on behalf of the Illinois Rural Electric Cooperative (IREC), prepared a conservation plan (CP) for the PCWPP wind turbine/power project as described by the Illinois Endangered Species Protection Act (520 ILCS 10/5.5). That plan and IREC's request for authorization for incidental take of the Indiana bat (*Myotis sodalis*) and gray bat (*Myotis grisescens*) in Pike County, Illinois were received by the Illinois Department of Natural Resources (Department) on May 10, 2013. Public notice of IREC's request for authorization of incidental take of these State/Federally listed species was published in the Breeze Courier (Official State newspaper) on May 22, May 29, and June 5, 2013; and the Jacksonville Journal Courier (Morgan County) on June 30, as well as on July 7, and July 14, 2013. Public comments on IRC's conservation plan were accepted by the Department until August 7, 2013. No comments were received by the public during the period of May 22, 2013 through August 7, 2013.

Target Species

Indiana bat (*Myotis sodalis*) – Federally Endangered; (Illinois) State Endangered

Gray bat (*Myotis grisescens*) – Federally Threatened; “ State Endangered

The IDNR provided records of hibernating Indiana bats (*Myotis sodalis*) and Gray bats (*Myotis grisescens*) at Burton Cave 10 miles east of Quincy, Illinois (or approximately 29 miles from the PCWPP site) and Twin Culvert Cave approximately 15.5 miles southeast of Pittsfield, Illinois. The Panther Creek Wind Farm study (Eco-Tech: 2011-2012) identified potential roosts in trees surrounding the IREC Pittsfield site. Although the Panther Creek study was used as reference for the development of the PCWPP CP, the specific project (Panther Creek Wind Farm) was not developed and no further data have been created to substantiate the findings of initial investigations by Eco-Tech Consultants. IREC has assumed data included in the Panther Creek Wind Farm study to be tangentially relevant to the PCWPP and has thus factored in the potential existence of *Myotis* species near the PCWPP

A. Indiana bat (*Myotis sodalis*) – Federally Endangered; (Illinois) State Endangered

Habitat Requirements:

The Indiana bat has two distinct annual habitats: winter hibernacula in caves and summer roosting sites located in forested areas along or near waterways. Preferred hibernation sites have the following characteristics: medium to large limestone caves with pools present, shallow passageways, mean mid-winter temperatures between 3-6 degrees C (early studies identified a preferred mid-winter temperature range of 4-8 degrees C / 39-46 degrees F, but more recent examination of long-term data suggests that the slightly lower and narrower range of 3-6 degrees C / 37-43 degrees F may be ideal for the species; IBRT, 1999), and relative humidity greater than 66 percent. Hibernating individuals characteristically form large, compact clusters of as many as 5,000 individuals - averaging 500 to 1,000 bats per cluster, which may move to cooler or warmer areas of cave during winter. After arousal from hibernation, migration to the summer habitat ensues. Although there have been a number of studies of summer habitat of the Indiana bat, such a small percentage of the total population has been observed that the information known to date presents more generalities than specifics.

Summer roosts typically are not found in forests with less than 10-30 percent canopy cover or in old fields with less than 10 percent canopy cover. In Missouri, primary maternity roosts occur in standing dead trees exposed to direct sunlight (Callahan et al., 1997). Maternity colonies select multiple roosting sites within their home range, divided into primary and alternative sites. Each colony may have 1-3 primary roosts and numerous more alternate roosts. The roost trees used by each colony are typically not widely dispersed (observed less than 1.5 km radii). Primary and alternate roost trees are similar with the exception of location (open vs. interior) and status (living vs. dead). Trees used as primary roosts can be characterized as dead, located in the open, have relatively large diameter trunks, and on average have 75 percent of their bark attached (Callahan et al., 1997). Alternate roosting sites may be living or dead, tend to have slightly smaller diameter trunks than primary, are located in the interior of the forest, and appear to be used during periods of inclement weather. Colonies move to the interior / alternate roosting trees during prolonged days of precipitation, cold, or heat. Live trees seem to be the preferred alternate roosting sites during prolonged precipitation or cold while dead trees the preferred alternate roosting sites during periods of high temperatures. Selection of multiple roosting sites of differing characteristics infers separate, specific thermodynamic advantages for each chosen roost. It is suggested that as many as 30 percent of roost trees may deteriorate in any given year with most primary roost trees lasting only 6-8 years (Humphrey and Cope, 1977).

Species Status in the Action Area:

The Indiana bat has been found in 27 states throughout much of the eastern United States. Based on the 2005 winter census taken at hibernacula, the total known Indiana bat population was estimated to number about 457,000 bats (USFWS, 2007). This represents an overall decline since population surveys began in the 1960s but an increase from the population lows in the 1990s when the population was estimated to have experienced a decline of 60 percent. The most severe declines have occurred in two states: Kentucky, where 180,000 bats were estimated lost between 1960 and 1997; and Missouri, where an estimated 250,000 Indiana bats may have been lost between 1980 and 1997. Significant hibernacula are classified into "Priority Sites" (P1, P2, P3, or P4). The Priority Sites have recently been reclassified by the USFWS within the 2007 draft Indiana Bat Recovery Plan. P1 sites are "essential to recovery" and have current or historical observed numbers of 10,000 or more. In 2005 there were P1 hibernacula in 7 states (IL, IN, KY, MO, NY, TN, and WV). Currently, Illinois has only one P1 site. In 2005 more than 90 percent of Indiana bats hibernated in 5 states (IL, IN, MO, NY, and KY) and nearly half in Indiana alone. The top ten P1 sites in 2005 accounted for 71.6 percent of the total population. P2 sites are those which currently have or had documented 1,000-10,000 Indiana bats. P3 sites are those which have or had documented 50-1,000 Indiana bats. P4 sites are considered the "least important to recovery and long-term conservation" and have or had documented less than 50 Indiana bats. Burton Cave (Adams County) is classified as a P4 site.

B. Gray bat (*Myotis grisescens*) – Federally Threatened; " State Endangered

Habitat Requirements:

The gray bat inhabits caves at all times of the year, although requirements for winter and summer caves differ. Winter / hibernating caves are generally deep vertical pits which contain a large volume below the lowest entrance thus acting as a cold sink to trap air (MDOC, 2004). Temperatures in winter caves remain stable between 42-52 degrees (F). Summer / maternity caves are more variable in size and structure, but generally have entrances lower than roosting areas and have domed ceilings which can trap warm air. High humidity appears to be a requirement and streams are typically present in preferred maternity caves. Temperatures range from mid-50 to 80 degrees (F) with relative humidity greater than 80 percent. Although temperature and humidity ranges are variable from site to site, these two parameters are highly stable within each site. There is generally no discernable air movement at the selected roosting

site. Non-reproductive females, juveniles, and males are not as selective in their summer roosting sites and form smaller bachelor colonies separate from maternity colonies (bachelor colonies may be present in same cave but in a 'non-preferred' area). A small percentage of this non-reproducing part of the population, however, will exist within a maternity colony. Bachelor colonies, as a result of selecting 'less-desirable' sites, tend to be cooler or have more variable temperature and humidity levels and individuals in most bachelor colonies tend to become torpid during the day. Undisturbed maternity colonies generally remain active and do not enter torpor. A single record exists for a maternity colony of gray bats using a barn (Gunier and Elder, 1971). Bachelor colonies can select sites up to 2 miles away from foraging areas but maternity colonies are generally not more than a mile from foraging areas. The gray bat has been observed to forage within forests but over-water areas along forested sections of streams and reservoirs are preferred. Forest corridors and buffers appear to play a crucial role in selection of colony sites and foraging areas for the protection they provide against predators such as the screech owl. Gray bats have been observed to fly a much longer distance in order to stay along fencerows or any clump of trees between roosting and foraging areas. In addition to providing cover against predation, forested areas provide 'rest-stops' for newly-volant young as they learn to fly and hunt. Former preferred foraging habitats have been reported abandoned when areas become deforested (NatureServe, 2004).

Species Status in the Action Area:

The range of the gray bat is primarily limited to Alabama, Kentucky, Tennessee, Missouri, and northern Arkansas. Nine winter caves are known to harbor approximately 95 percent of the total population during hibernation; one cave alone harbors 50 percent (NatureServe, 2004). Because of the specific roost and habitat requirements, fewer than five percent of available caves are suitable for occupation by this species. This results in patchy distribution of the species within its range.

Compliance with the Illinois Endangered Species Protection Act

The Illinois Endangered Species Protection Act includes six (6) criteria which must be met for the authorization of incidental take of an endangered or threatened species. These criteria and the Department's determination for each criterion are listed below.

1. The taking will not be the purpose of, but will only be incidental to, the carrying out of an otherwise lawful activity:

In 2003, the Illinois Rural Electric Cooperative (IREC) began permitting for the construction of a 1.65 mega-watt wind turbine known as the Pike County Wind Power Project (PCWPP). The single turbine was constructed during a period between February 2004 and February 2005 and is located at 24920 365th Street, Pittsfield, Illinois 62363, Pike County. The Mississippi River is approximately 35 miles to the west, while the Illinois River is approximately 15 miles to the east.

The IREC, as a cooperative organization, is tasked with providing reliable energy service to its members. The co-op has over 10,485 members serving communities in 10 Illinois Counties (Adams, Brown, Calhoun, Cass, Greene, Jersey, Macoupin, Morgan, Pike, and Scott). Sustainability is part of maintaining reliability and the co-op continually explores ways to utilize and develop *green* energy from sources such as solar and wind. The construction of the Pittsfield area turbine serves to enhance the co-op's ability to tap into a sustainable energy source while reducing the carbon footprint needed to produce that energy. While a wind turbine provides a source of emission free, renewable energy, it may have an environmental downside: avian and bat species are known to be killed or injured by striking the tower structure such as the spinning rotor blades or as a result of barotraumas.

The PCWPP is located in Pike County, west central Illinois, and is situated across narrow rolling ridge features within agricultural fields north and west of Pittsfield, Illinois and south of Interstate 72. The project is located in the USEPA Level IV Ecoregion described as the Western Dissected Illinoian Till Plain of the Interior River Valley and Hills (72i). Ecoregion 72i is a well dissected, broad till plain with many forested slopes, ravines, and floodplains. Elevation ranges from 490 to 820 feet above mean sea level. Mean temperature ranges from 11-36°F in January and 63-88°F in July. Mean annual precipitation is 36-39 inches with 170-187 frost-free days a year.

Land-use is dominated by agriculture with forests remaining on slopes and ravines. Nearly level plains that were once covered by prairie are now used as cropland (corn and soybeans) or livestock farms. Potential natural vegetation is mostly oak hickory forest on the hillsides and bottomlands.

Overall, Pike County, as is most of central Illinois, is dominated by agricultural lands. Of the approximately 848.88 square miles in the county, 50% are in some form of agricultural production with the predominant crops being corn and soybeans. The PCWPP facility is located in the central portion of Pike County in an agricultural field (row crop). The turbine is situated in agricultural field at the intersection of 365th Street and Township 1500 north, generally surrounded by other agricultural parcels. Forested cover is limited to buffers along unnamed tributaries or upland swales passing through or along the edges of the fields. There are no large contiguous stands of forest within several miles of the turbine location. The wooded areas present along the drainage ways are composed of early successional tree species that are typically all of the same age (young) and relative size (diameter). The composition is indicative of areas that were either unforested or clear-cut in the past. Eco-Tech Consultants (2011-2012) have identified the possible location of roost trees that are suitable of Indiana bats within nearby drainage ways. The existence of these roost trees have not been confirmed by either IDNR or IREC, however appropriate consideration has been given to their possible existence when developing both the CP and this Incidental Take Authorization Agreement.

2. The parties to the conservation plan will, to the maximum extent practicable, minimize and mitigate the impact caused by the taking:

The wind turbine selected for use at the PCWPP includes one Vestas V82 1.65 megawatt turbine that begins spinning at a wind speed of approximately five to six miles per hour (mph) and shuts down at about 55 mph. The hub of the wind turbine is 235 feet tall, and when the blades of the turbine point straight up, the turbine is 365 feet in length (130 foot blades). The rotor spins at a nominal value of 14.2 revolutions per minute. The PCWPP turbine is located in the Northeast Quarter of Section 22, Township 5 South, Range 4 West of the Fourth Principal Meridian of Pike County, Illinois. The PCWPP lies between the Mississippi and Illinois River Valleys.

An *Adaptive Management Plan* shall remain intact between IREC and the IDNR throughout the duration of this Authorization (approximately 20 years/2033) to address any unforeseen events. An adaptive management plan shall allow alterations in mitigation and minimization methods. The IDNR, in conjunction with any and all appropriate Federal Agencies (i.e. USFWS), shall maintain sole discretion over this plan and the implementation of new mitigation/minimization policies should they be deemed warranted by changing state and/or national policies and/or impacts found to be above those anticipated.

FOR EXAMPLE PURPOSES only, several Adaptive Management Options are listed below. These options are provided as a draft framework only and subject to any and all future changes deemed necessary by the Department. The Department retains sole authority over any and all conditions associated with any and all Adaptive Management options associated with the IREC PCWPP project

DRAFT/EXAMPLE - ADAPTIVE MANAGEMENT OPTIONS:

Adaptive Management A: Indiana bats are present in the vicinity all season but are active at the elevation of the rotor arc only in the fall migration period. Indiana bats are at risk of take. Minimization measures (curtailment) are implemented in appropriate periods (when bats are active at that height), including effectiveness monitoring, both acoustic and mortality, for second full season (to confirm behavior profile of first season). If minimization measure successfully alleviates risk (no losses), continue curtailment in subsequent years of operation without further monitoring.

Adaptive Management B: Indiana bats are present in the vicinity all season and are active at the elevation of the rotor arc all season. Indiana bats are at risk of take. Minimization measures (curtailment) are implemented all season, including effectiveness monitoring, both acoustic and mortality for second full season. If minimization measure successfully alleviates risk, continue curtailment in subsequent years of operation.

Adaptive Management C: If mortality of covered species occurs despite minimization measures or continuation of minimization measures is economically infeasible, implement mitigation measures, consisting of habitat protection enhancement in appropriate ratio to address future estimated losses during life of turbine.

See *Minimization Proposed Within Selected Alternative - Section 4C* (below) of this document for additional minimization/mitigation measures associated with this project.

3. The parties to the conservation plan will ensure that adequate funding for the conservation plan will be provided:

In the official Conservation Plan prepared by IREC, it states that IREC is a not for profit corporation which has provided excellent service in ten west-central Illinois Counties since 1936. It maintains the financial solvency and wherewithal to provide appropriate funding guarantees of the PCWPP Conservation Plan. Standard practices will be followed as identified in this Final Implementing Agreement/Incidental Take Authorization. Therefore, official acceptance of and signature by IREC official(s) on this Authorization document means that IREC will take all means necessary (financial and otherwise) for the life of this ITA to provide all necessary funds to carry out the terms identified in this final authorization package. The IDNR will not, nor shall be bound in any way, to submitting annual budget requests of any kind related to fulfilling the obligations of the CP, the final ITA, and/or any related statutory requirements to protect the species of concern named in this final authorization document.

4. Based on the best available scientific data, the Department has determined that the taking will not reduce the likelihood of the survival or recovery of the endangered species or threatened species in the wild in Illinois, the biotic community of which the species is a part, or the habitat essential to the species' existence in Illinois:

Based upon data collected directly at the PCWPP wind turbine during the summer of 2012, it is possible that a range of 0-5 Indiana bats/year and a range of 0-5 Gray bats/year may be taken during the remainder of the PCWPP (approximately 20 years – until 2033) located in Pittsfield, Illinois. All 2012 data was collected by IDNR District Natural Heritage Biologist Dean Corgiat beginning on June 15 and ending on November 15, 2012. Note that the figures above are based solely on the number of little brown bats (*Myotis lucifugus*) collected during carcass search surveys. No Indiana bats or Gray bats were recovered during these surveys. Little brown bats, Indiana bats, and Gray bats all reside within the genus *Myotis* and have similar life history characteristics.

A. General Overview – Impacts to Birds and Bats from Wind Facilities/Farms

The project will result in the continued operation of one (1) wind turbine. The continued operation of this wind turbine will more than likely not destroy or degrade any habitat used by any of the species of concern described within this plan. The potential for impact is more than likely limited to the physical – mortality risk posed by the individual turbine/tower.

Background information: It is estimated that 200-500 million birds die annually from collisions with manmade structures (Erickson, 2002). Of the total fatalities, it is calculated that only 0.01-0.02% (or one to two out of every 10,000) are a result of a collision with a wind turbine. Passerines (i.e. songbirds) are apparently the most vulnerable, as they comprise 80% of the fatalities found at wind turbines. Excluding California, raptors accounted for only two percent of avian fatalities nationally at wind farms. American kestrels/sparrow-hawks (*Falco sparverius*) are the most common raptors observed and impacted. Based on a synthesis of data collected, the national annual average per-turbine mortality rate is 2.19 birds (1.83 excluding California). The combination of slower blade rotations and raised hub height on the new generation turbines has dramatically reduced the number of fatalities. In the process of conducting avian studies at wind farms with the build out of wind resource areas in the 1990's; however, researchers began noting numerous bat fatalities (Kaskaskia, 2009).

Documentation of bat fatalities: A synthesis of the information collected nationally provides relatively consistent results: migratory tree roosting species are the most likely to be killed (hoary, eastern red, and silver-haired bat), fatalities occur almost exclusively during the fall migratory period (mid-July to mid-September), fatalities do not tend to be concentrated at specific turbines (i.e. same relative probability of observed fatalities at any turbine within a wind farm), and the highest number of fatalities tend to occur on nights with wind speeds below six meters per second (mps).

The presence of a fatality spike of migratory species in the fall, as represented by numerous studies, has created some confusion for researchers as there is not a corresponding spike in the spring. Studies have not been able to conclusively determine, but it is believed that bat species migrating over long distances may do so relying on sight rather than echolocation. Bats exhibit differences between seasonal migratory behaviors as spring migration tends to occur slowly and sporadically with individuals meandering their way to the northern feeding ranges, while fall migration tends to occur in large waves of individuals over a short period of time. It is theorized that some species may not be using echolocation during fall migration which results in them being more susceptible to impacts with spinning turbine blades or other tall objects within their flight path.

Field studies have also observed that bat activity around the turbines increases during the fall migratory period. A current working theory supposes that the migratory tree roosting bats are exhibiting a roosting behavior which triggers them to search for the tallest available tree snag during fall migration. The species most impacted are generally solitary and the behavior may be an adaptation for selecting a location with the highest probability of meeting sexual partners.

As described above, seasonally the highest number of fatalities occurs during the fall migratory period but within that period peak fatalities occur on calm nights with wind speeds of less than 6 mps. Current turbines are generally designed to *freewheel* or spin under very low wind speeds without generating electricity. While the blades may be spinning at slow rpm's during this period, the blade tips may still be moving at speeds exceeding 100 mph. Bat activity tends to increase as winds speeds decrease. This is a direct reflection of the behavior of their prey as insect activity decreases as wind speed increases. It is theorized that the correlation between low wind speed and increased fatalities could be a reflection of concentrated bat activity and possibly a change in foraging behavior (potentially taking higher risks to increase fat reserves) at the turbines during the fall migratory period.

The national annual average of bat fatalities is 3.4 per turbine (AWEAABC, 2004). The national averages indicate that bats are more likely to be killed than birds by the turbines. Bat fatalities have been found not to be limited to striking the turbines or being struck by the spinning blades. Necropsies performed on bat carcasses collected during studies have found *pulmonary barotrauma* to be a cause of death (Baerwald, 2008).

B. Measures Proposed to Minimize Harm to Species of Concern

Three (3) alternatives were evaluated/proposed by IREC for the analysis of proposed impacts: The no-action alternative, construction alternative, and continued operation, maintenance, and monitoring alternative.

- The no-action alternative would normally result in not constructing the turbine at the PCWPP, however this alternative is not considered a viable option as the turbine has already been constructed following full approval and authority from all required state and federal entities. This option was considered not to be a viable alternative for evaluation. This alternative would result in the removal of any potential harm to any of the species of concern by not constructing the turbine; however, this alternative would not promote the use of alternative renewable wind energy.
- The construction alternative would result in the installation of a wind turbine for electrical generation. This alternative would also be considered moot and not viable due to the previous construction and ongoing implementation of the turbine.
- The **continued operation, maintenance, and monitoring alternative** would result in the operation of the existing wind turbine at the PCWPP. Enhanced monitoring and operational modifications would be applied as appropriate to avoid and minimize impacts to species identified in the CP.

The selected alternative for the CP is the continued operation, maintenance, and monitoring alternative. The wind turbine selected for use at the PCWPP includes one Vestas 1.65 megawatt turbine that begins spinning at a wind speed of approximately 5-6 mph and shuts down at about 55 mph. The hub of the wind turbine is 235 feet tall, and when the blades of the turbine point straight up, the turbine is 365 feet in length. The PCWPP turbine is located in the Northeast Quarter of Section 22, Township 5 South, Range 4 West of the Fourth Principal Meridian of Pike County, Illinois. The PCWPP lies between the Mississippi and Illinois River Valleys.

C. Minimization Proposed by IREC Within Selected Alternative

The potential negative impacts to the listed species to be covered in the CP are limited to physical harm posed by striking the tower or being struck by the spinning blades while in flight. The PCWPP turbine is located within agricultural fields and its construction did not require tree clearing or any other form of disturbance to any high quality natural habitat. The construction of the access roads did not remove trees as it was constructed in existing agricultural land. Minimization of impacts are centered on the selected location and construction material of the turbine:

- The immediate base of the tower is fenced and maintained in gravel to discourage vegetative growth that could encourage small mammal populations from migrating into the area. Additional vegetative management techniques will be applied to minimize vegetative growth in an approximate one acre area surround the turbine, which would in turn discourage use of area by avian predators.
- Vegetation management will facilitate better identification of potentially impacted species covered by this plan as a result of turbine operations.
- Mercury vapor security lighting will be eliminated from the site so as not attract forage species for species covered by this plan.
- Appropriate vegetative management techniques will be applied to the base of the turbine to eliminate habitat for the generation of forage species and to facilitate better identification of potentially impacted species covered by this plan by the turbine.
- Modification of cut in speeds will be evaluated and applied as appropriate during periods of identified impact (see below in *Operational Changes - Section 4F* of this document).

D. Operation Modifications and Mitigation Proposed by IREC Within Selected Alternative

The potential for a *take* to occur is primarily, at this time, limited to the risk of being maimed or fatally injured by the operation of the turbine. The construction of the tower has not destroyed or degraded any habitat used by the listed species to be covered by the CP as ground disturbed by the construction of the tower was previously committed to agricultural use. None of the listed species to be covered by the CP have been documented as a fatality at an Illinois wind turbine or at the PCWPP site. Of the two listed species to be covered by the CP (Indiana bat, Gray bat), the Indiana bat has the highest risk of being *taken* based on their life history profile and actual capture data from western Illinois. Bat fatalities to date are almost exclusively limited to migratory tree roosting species and the Indiana bat is categorized as such. The operation modifications and potential mitigation being proposed are a mixture of monitoring, operational protocols, and monetary donations.

E. Monitoring

The Pittsfield turbine was constructed between 2004 and 2005. An intensive one (1) year monitoring program will be initiated in 2014 to evaluate potential fatalities caused by the turbine. The study will be completed to assess the overall impacts/fatalities caused by the turbine and will not be limited to only identifying fatalities of any of the listed species covered by the CP (i.e. all bat carcasses discovered will be identified and documented). The study will help establish a measured approach toward developing a ratio applied metric that would trigger adaptive management responses. A specific procedure will be developed in strict conjunction with the IDNR. The study will serve to identify whether any listed species covered by the CP are being impacted and assist in developing an overall risk assessment for the turbine. Based upon data collected during 2014 (based upon the study design of the summer 2012 carcass search surveys conducted by the IDNR) the IDNR will work with IREC to develop an appropriate long-term monitoring plan (to be completed by December 31, 2015). A rough outline has been created to begin this process and is described below. This outline is provided as a draft framework only and is subject to any and all future changes deemed necessary by the Department. The Department retains sole authority over any and all conditions associated with such a monitoring plan:

DRAFT/EXAMPLE - MONITORING PLAN FRAMEWORK:

- Post-construction monitoring will consist of fatality searches twice a week from April 1 through November 15 of 2014. IREC will partner with a bat specialist yet to be determined to conduct field surveys.
- Permanent transects will be established surrounding the turbine as necessary and pertinent information such as species, sex, relative age (juvenile/adult), location, and condition will be documented.
- Weather information such as wind speed, humidity, cloud cover, precipitation data for the day of and the previous day will be recorded. The length and number of transects will be determined as the detailed monitoring plan is developed.
- Bat carcasses will be collected, tagged, frozen, and shipped to a bat specialist for verification of species identification.
- Prior to beginning the surveys each April, a mock search will be conducted to determine searcher efficiency as well as scavenging pressure.
- Concurrent acoustic bat call recording at high and low stations on the turbine to assess bat activity during mortality monitoring will be implemented. An analysis of acoustic recording will be conducted to determine whether Indiana bats are present at the turbine, whether they are high or low in elevation, whether there is a correlation to wind speed and direction, and whether there is a correlation to season of occurrence.
- Monitoring is limited to carcass surveys and acoustic monitoring and no mist netting will be conducted as part of the surveys.
- The data collected will be summarized in a report which will be submitted to the IDNR in December, 2014.
- IREC will remove and manage weedy growth from around the turbine in order to facilitate adequate monitoring of bat fatalities if they do occur.

If the surveys produce data that are at or below a determined threshold limit and no species covered by the ITA are documented, the need for additional surveys shall be discussed between IREC and IDNR. Future annual monitoring or studies will be conducted as deemed necessary through mutual coordination between IREC and IDNR.

F. Operational Changes

National studies have found that weather conditions can affect the risk factors for impacts. The Casselman Wind Project in Pennsylvania has investigated the effect of altering the operation of the turbines during different wind speeds (Arnett, 2009). The results have found reductions in fatalities of 50 to nearly 90 percent by idling or *feathering* the blades when wind speeds are below 5 mps (Kaskaskia, 2009). Modification of cut in speeds has been found to be successful in other Illinois electric cooperative wind projects below 6 mps (DeWitt, 2012).

If the monitoring studies (described above in *Monitoring - Section 4E*) conducted by IREC determine that the threshold limit to be employed at the PCWPP (5 mps) is impacting listed species covered by the ITA, and the fatalities correspond to low wind speed nights, then operation of the PCWPP turbine shall be altered from April 1 to November 15 to raise the cut-in wind speeds to 6 mps. Additional mortality and acoustic studies would then commence in association with modifications of cut in speed and would be performed per mutual agreement between IREC and IDNR.

In addition, the following operational changes shall be instituted immediately after formal implementation (signature) of this ITA for the PCWPP turbine:

- Curtailment shall occur August 15 through September 30 from sundown to sunrise when wind speeds are below 5.5 m/s and temperatures exceed 60 degree (F) Fahrenheit for 10 consecutive minutes.
- No free-wheeling of blades below the manufacturer's recommended cut-in speed shall occur from April 1 through October 31.
- Normal turbine operations may occur when temperatures fall below 60 degrees (F) Fahrenheit for 10 consecutive minutes.

Note: Due to individual turbine construction and built-in engineering specifications of the PCWPP turbine model, the requirements for curtailment and free-wheeling may be modified depending on the mechanical ability of this wind turbine to automatically perform this function.

In addition to the turbine speed changes described above, IREC will seasonally eliminate the use of the vapor security light that has been found to attract various bat species during a study by the Illinois Natural History Survey (Larkin, 2012). The existing American Electric 400 watt metal halide model 211 security light will be removed from service during peak bat activity seasons (spring and fall) in an effort to eliminate the attraction of foraging insects for bat species.

- Lastly, the turbines shall be idled during periods of dense fog during the spring and fall migratory periods as appropriate (March-May and July-October).

G. Compensatory Mitigation

Please see the *Authorization* Section of this document – *Item #3* for details regarding compensatory mitigation details associated with this incidental take authorization (ITA).

5. Any measures required under Section 5.5 of the Illinois Endangered Species Protection Act [520 ILCS 10/5.5 – 17 IL. Adm. Code Part 1080.40(b)], will be performed. Additional measures are listed below under “Authorization.” This authorization is, by definition, subject to those terms and conditions and official IREC signature(s) on this authorization indicates their commitment to performing those measures.

6. The public has received notice of the application and has had the opportunity to comment before the Department made any decision regarding the application:

The Association of Illinois Electric Cooperatives (AIEC) on behalf of the Illinois Rural Electric Cooperative (IREC), prepared a conservation plan for the PCWPP wind turbine/power project as described by the Illinois Endangered Species Protection Act (520 ILCS 10/5.5). That plan and IREC’s request for authorization for incidental take of the Indiana bat (*Myotis sodalis*) and gray bat (*Myotis grisescens*) in Pike County, Illinois were received by the Illinois Department of Natural Resources (Department) on May 10, 2013. Public notice of IREC’s request for authorization of incidental take of these State/Federally listed species was published in the Breeze Courier (Official State newspaper) on May 22, May 29, and June 5, 2013; and the Jacksonville Journal Courier (Morgan County) on June 30, as well as on July 7, and July 14, 2013. Public comments on IRC’s conservation plan were accepted by the Department until August 7, 2013. No comments were received by the public during the period of May 22, 2013 through August 7, 2013.

Authorization

It is the determination of the Department that the measures to be implemented by IREC will more than likely minimize and mitigate for the anticipated taking (disturbance/harassment) of the State (and Federally) listed Indiana bat (*Myotis sodalis*) and gray bat (*Myotis grisescens*) in Pike County, Illinois. The Illinois Department of Natural Resources has determined that this authorized take is incidental to the construction/continued operation of the PCWPP wind turbine in Pike County, Illinois. Further, it is our opinion that the take (disturbance/harassment) authorized herein would more than likely not diminish the likelihood of the survival of either these aforementioned species in the wild within the State of Illinois, the biotic community of which the species is a part, or the habitat essential to the species’ existence in Illinois.

Pursuant to Section 5.5 of the Illinois Endangered Species Protection Act [520 ILCS 10/5.5 – 17 IL. Adm. Code Part 1080.40(b)], this authorization is issued subject to the following additional terms and conditions:

Terms and Conditions:

1. This authorization is effective upon signature of the Department and shall remain in effect for a period of approximately 20 years/2033 [after formal signature by both the IDNR and IREC], unless terminated pursuant to Section 5.5. of the Illinois Endangered Species Protection Act [520 ILCS 10/5.5 – 17 IL. Adm. Code Part 1080.80].
2. The following (monitoring) measures shall be implemented with regards to the IREC/PCWPP Wind Turbine Project:

See Monitoring - Section 4E above. The IDNR maintains the sole authority and discretion to require IREC to alter/modify its monitoring plan outline (see Monitoring - Section 4E above) to better meet the needs and requirements of local ecological resources.

3. Direct financial mitigation responsibilities of IREC for this Project are as follows:

Based upon data collected directly at the PCWPP wind turbine during the summer of 2012, it is possible that a range of 0-5 Indiana bats/year and a range of 0-5 Gray bats/year may be taken during the remainder of the PCWPP (approximately 20 years – until 2033) located in Pittsfield, Illinois. All 2012 data was collected by IDNR District Natural Heritage Biologist Dean Corgiat beginning on June 15 and ending on November 15, 2012. These figures are based solely on the number of little brown bats (*Myotis lucifugus*) collected during carcass surveys. No Indiana bats or Gray bats were recovered during these surveys. Little brown bats, Indiana bats, and Gray bats all reside within the genus *Myotis* and have similar life history characteristics.

Therefore:

-Anticipated life span of this IREC project: 20 years

-Using an upper limit of 10 bat mortalities per year [5 *M. sodalis* and 5 *M. grisescens*] @ 20 years, yields a total of: 200 deceased (Indiana and Gray) bats over the life of the PCWPP turbine.

-Of the total number of bat carcasses retrieved during the 2012 season, 5.0% (0.05) were in the genus *Myotis*. In order to allow for variables such as seasonal changes in temperature and humidity, unusual weather patterns, insect abundance, and behavioral changes, [and more specifically, following the species mitigation factor as derived from the State of Illinois' Interagency Wetlands Policy Act of 1989, - a mitigation ratio of 5.5:1 is employed when endangered/threatened species are at risk] - the following factor is derived: $0.05 \times 5.5 = 0.27$ or 27%.

-Therefore: 0.27×200 deceased bats = 54 deceased bats (over 20 years) x \$50/bat = \$2,700.00

*Please note that the figure of \$50.00/bat is derived from the State of Illinois' Wildlife Code [520 ILCS 5/2.36a] where all non-game mammals are assessed a value of \$50.00 per specimen.

Therefore, the applicant (IREC) shall provide the Department with a check made out to the ILLINOIS WILDLIFE PRESERVATION FUND in the amount of: \$2,700.00. This check shall be received within 36 months after formal implementation of the ITA (after this document is signed by both IREC and the IDNR). These mitigation funds will be used solely for management and/or recovery actions for any and all listed species throughout the State of Illinois, with an emphasis on the listed bats described in this document, if and when applicable as deemed by the Department.

4. The following Party Responsibilities shall be in effect with regards to the IREC/PCWPP wind turbine in Pike County, Illinois:

IREC (and any agents/consultants thereof) will be responsible for overseeing all minimization, monitoring, and mitigation efforts identified within the Conservation Plan and this Authorization document. IREC (and any agents/consultants thereof) will also be responsible for planning, contract execution, and construction supervision for the entire project.

Therefore, official acceptance of and signature by IREC official(s) on this Authorization means that IREC will take all means necessary for the life of this ITA to provide all necessary funds to carry out the terms identified in this final authorization package. The IDNR will not, nor shall be bound in any way, to submitting annual budget requests of any kind related to fulfilling the obligations of the CP, the final ITA, and/or any related statutory requirements to protect the species of concern named in this final authorization document.

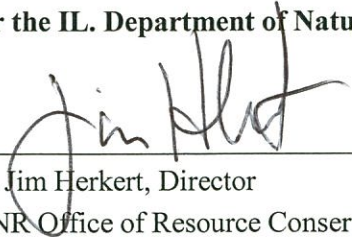
5. The effective period of this authorization may be altered by mutual agreement between IREC and the Department.

6. This authorization may be revoked pursuant to Section 5.5 of the Act if the Department finds that IREC has failed to comply with any of these terms and conditions or has been responsible for the take of any Illinois State or Federally Listed Species beyond that which is incidental to the construction and operation of the IREC wind turbine project in Pike County, Illinois.

7. Please note that: The USFWS issued an interim guidance memorandum for avoiding and minimizing wildlife impacts from wind turbines (dated 2003), which is used by all review personnel. The USFWS has not objected to this IREC project nor has it requested formal consultation under the Section 7 process for the PCWPP wind turbine; however, this does not release IREC from the potential for responsive action from the USFWS (and/or IDNR) at any point in the future should a Federally or Illinois State threatened or endangered species be found to be killed by the wind turbine(s).

8. The IREC official(s) identified below is/are authorized to execute this agreement. Execution by an official from any one of these organizations indicates acceptance of all terms and conditions described in this document.

For the IL. Department of Natural Resources

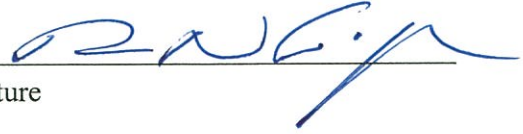


Dr. Jim Herkert, Director
IDNR Office of Resource Conservation

2/28/14

Date Signed

For the Illinois Rural Electric Cooperative (IREC)



Signature

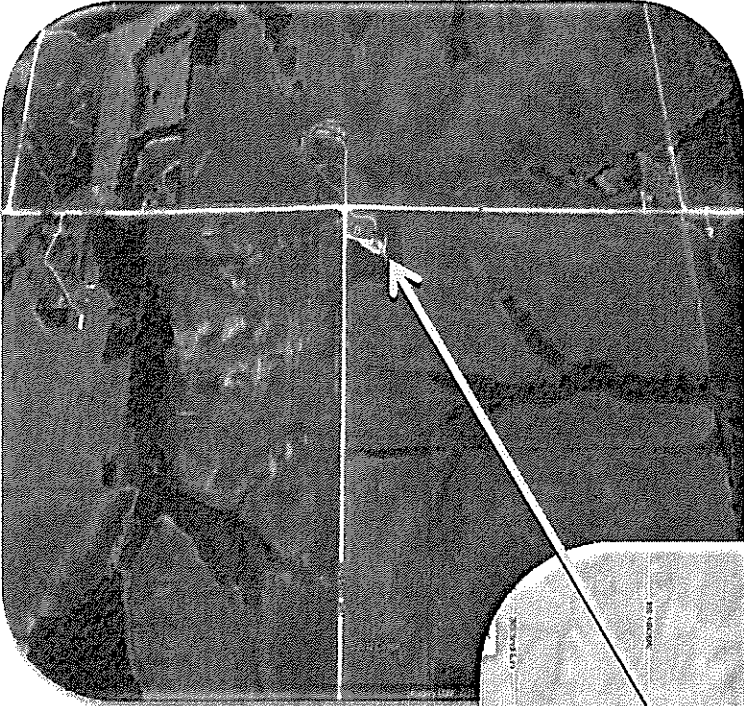
Bruce N. Giffin

Please print name and official title

1-30-14

Date Signed

Pike County Wind Power Project Location Map



The Pike County WindPower turbine is located in Pike County approximately 2 miles north and west of Pittsfield, Illinois at Latitude 39.61883 North and Longitude 90.84608 West

