#103 FINAL 2013

Conservation Plan

Illinois Rural Electric Cooperative

Your Touchstone Energy® Partner

For:

Indiana bat *(Myotis sodalis)*
Gray bat *(Myotis grisescens)*

Prepared by:

Association of Illinois Electric Cooperatives

Your Touchstone Energy® Partner

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Acronyms

CP – Conservation Plan

ESA – Endangered Species Act

DOI – Department of Interior

IDNR – Illinois Department of Natural Resources

IEPA – Illinois Environmental Protection Agency

IESPA – Illinois Endangered Species Protection Act

IESPB – Illinois Endangered Species Protection Board

IREC – Illinois Rural Electric Cooperative

ITA – Incidental Take Agreement

MBTA – Migratory Bird Treaty Act

NEPA – National Environmental Policy Act

PCWPP – Pike County Wind Power Project

RPM – Revolutions per Minute

USDA – United States Department of Agriculture

USEPA – United States Environmental Protection Agency

USFWS – United States Fish and Wildlife Service

1.0 Purpose of the Conservation Plan

1.1 Introduction

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 purpose of this document is to create a Conservation Plan (hereafter referred to as the CP or Plan) in anticipation of application for an Incidental Take Agreement (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 35 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.

1.2 Regulating Authority

Regulating wind power facilities is largely the responsibility of state and local governments through processes such as zoning ordinances to permit construction and operation. Federal regulation is generally limited to facilities that are on federal lands or have some form of federal involvement, such as receiving federal funds. In these cases, the wind power project must comply with federal laws, such as the National Environmental Policy Act [42 U.S.C. 4371 et seq.] in addition to any relevant state and local laws. There is a federal nexus to the project via funding through a United States Department of Agriculture (USDA) Section 9006 grant. The federal laws involving this project which hold jurisdiction regardless of a federal nexus include the Migratory Bird Treaty Act [16 U.S.C. 703-712] and the Endangered Species Act [16 U.S.C. 1531-1544]. The Migratory Bird Treaty Act (MBTA) implements four treaties which provide international protection for all migratory birds and birds of prey. The MBTA maintains strict liability: regardless of intent, the *taking* of a protected species can be a

violation. The Endangered Species Act (ESA) provides protection to those species listed as threatened, endangered, or included as a *candidate* (species which are being considered and will most likely be placed on the federal list) by the federal government. While the ESA makes it unlawful to harass, harm, pursue, hunt, shoot, wound, kill, capture, or collect or attempt to engage in any such conduct, the U.S. Fish and Wildlife Service (USFWS) under the Department of Interior (DOI) is authorized by the ESA to permit *incidental takes* which occur as a result of an otherwise legal activity [Kaskaskia, 2009].

The State of Illinois maintains its own regulations for species considered threatened or endangered under the Illinois Endangered Species Protection Act [520 ILCS 10/4 and 11(c)]. The Illinois Endangered Species Protection Board (IESPB) is tasked with responsibility of maintaining the list of threatened or endangered species. The Illinois Department of Natural Resources (IDNR) is responsible for administration of the current law. Under the Illinois Code, *Endangered Species* means any species of plant or animal classified as endangered under the Federal Endangered Species Act of 1973 and amendments thereto, plus such other species which the Board may list as in danger of extinction in the wild in Illinois due to one or more causes including but not limited to, the destruction, diminution or disturbance of habitat, over-exploitation, predation, pollution, disease, or other natural or manmade factors affecting its prospects of survival, but not including nursery plant stock obtained from a non-wild source, nor pre-act or legally obtained birds of prey held by licensed falconers; *Threatened Species* means any species of plant or animal classified as threatened under the Federal Endangered Species Act of 1973 and amendments thereto, plus such other species which the Board may list as likely to become endangered in Illinois within the foreseeable future. Modeled after the USFWS *incidental take* permitting process, the IDNR is responsible for authorizing and implementing an ITA for state listed threatened or endangered species [Kaskaskia, 2009].

1.3 Initial Agency Coordination

The USDA did not request preparation of either an Environmental Assessment or Environmental Impact Statement 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 the project nor has USDA or RUS 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 wind turbine.

Habitat

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°C/39-46°F, but more recent examination of long-term data suggests that the slightly lower and narrower range of 3-6°C/37-43°F may be ideal for the species) [IBRT, 1999], and relative humidity greater than 66%. 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 [Kaskaskia, 2009].

Summer roosts typically are not found in forests with less than 10-30% canopy cover or in old fields with less than 10% 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 one to three 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% 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% of roost trees may deteriorate in any given year with most primary roost trees lasting only six to eight years [Humphrey and Cope, 1977].

Observations by IREC indicate that there may be no suitable summer habitat for the Indiana bat in the vicinity of the PCWPP site. However IREC is mindful of data referenced in the Panther Creed study and intend to factor these data into future data gathering efforts associated with the CP. As discussed in Section 1.4, known winter hibernacula have been well identified and documented in western Illinois.

Diet

Several studies have been conducted on the foraging habits of this species in several areas of

its range. These studies have shown variations in the bat's primary diet, foraging behavior, and foraging habitat. Studies in Missouri have found the largest proportion of diet throughout the summer was from lepidopterans (moths), often in excess of proportional availability [Brack and LaVal, 1985]. Several orders of aquatic insects were eaten to a lesser extent and were found to correlate to the amount of lunar illumination. Both riparian and non-riparian foraging areas were present near the cave but riparian area was smaller than non-riparian area and the bats tended to forage upstream where stream sections narrowed and wooded areas became denser. In eastern Missouri, foraging occurred almost exclusively under the forest canopy on ridges and hillsides. Studies in Indiana found the bulk of the diet to come from the insect orders Lepidoptera, Diptera, and Coleoptera but with a higher percentage of diet coming from aquatic insects than the Missouri populations. This discrepancy is attributed to the likely difference in foraging habitat resulting from inter-specific competition with Gray bats, which feed almost exclusively over water along riparian corridors [LaVal etal., 1977]. In southern Michigan, it was found that Lepidopterans generally did not account for more than 14% of diet. The primary diet was composed of aquatic insects in the orders Trichoptera and Diptera [Kurta and Whitaker, 1998]. The diet of the Indiana Bat may be more related to habitat and availability with the implication that diets may be regional and based on the particular habitat selected by the colony (wetland, floodplain, or upland).

Distribution

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 1960's but an increase from the population lows in the 1990's when the population was estimated to have experienced a decline of 60%. 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 seven states (Illinois, Indiana, Kentucky, Missouri, New York, Tennessee and West Virginia). Currently, Illinois has only one P1 site. In 2005 more than 90% of Indiana bats hibernated in five states (Illinois, Indiana, Kentucky, Missouri, and New York) and nearly half in Indiana alone. The top 10 P1 sites in 2005 accounted for 71.6% 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 is classified as a P4 site [Kaskaskia, 2009].

Ecology

The Indiana bat is one of the most gregarious of the myotines, often forming extremely dense

hibernating clusters. This species of bat will periodically arouse from hibernation during the winter. This is likely an adaptation to a specific hibernating strategy given the energy cost of arousal. Observations of numerous hibernacula have produced three distinct hibernating strategies within morphologically different caves: there are hibernacula with relatively high temperatures which require no intra-cave movements; those with intermediate temperatures, which require at least one intra-cave movement to colder parts of the cave; and those with relatively cold temperatures, which require at least two intra-cave movements [Clawson et al., 1980]. The third form (coldest temperatures but requiring two movements) is the riskiest but appears to be the most physiologically rewarding in the form of fat reserves used. Movement to colder areas of the cave allows for more efficient hibernation, but typically locates the bat where, in the presence of a severe cold front, subfreezing temperatures will exist. Locating in warmer, stable temperatures eliminates the threat of freezing but requires more fat reserves, thus a late arriving spring may result in much higher post-hibernation mortality. Under these warmer conditions, observed cluster size is decreased. Conversely, mean cluster size was observed to increase under the first and second strategies (it is assumed that large cluster size results in buffering and more energy efficient arousal). Data from a known Indiana bat hibernaculum indicate that most place lower metabolic activity as highest priority and locate to hibernacula requiring two intra- cave movements [Clawson et al., 1980].

Although certain migration patterns may be inferred from limited band returns, their interpretation should be done with caution. The sparse band recovery records, all of which are from the Midwest, indicate that females and some males migrate north in the spring upon emergence from hibernation, although there also is evidence that movements may occur in other directions [IBRT, 1999]. However, summer habitats in the eastern and southern United States have not been well investigated; it is possible that both sexes of Indiana bats occur throughout these regions. Very little is known about Indiana bat summer habitat use in the southern and eastern United States, or how many Indiana bats may migrate to form maternity colonies there. Additional work is especially needed to better understand Indiana bat summer distribution.

Most summer captures of reproductively active Indiana bats (pregnant or lactating females or juveniles) have been made between April 15 and August 15 in areas generally north of the major cave areas [IBRT, 1999]. Un-glaciated portions of the Midwest (southern Missouri, southern Illinois, and southern Indiana), Kentucky, and most of the eastern and southern portions of the species' range appear to have fewer maternity colonies per unit area of forest. However, such conclusions may be premature, given the lack of search effort in these areas. Anecdotal evidence suggests that the Indiana bat may, in fact, respond positively to habitat disturbance. Maternity roosts have been found where hog lots have killed over-story trees and removed understory trees in Illinois, Indiana, and Missouri [IBRT, 1999]. Maternity colonies, including the first maternity roost discovered in Indiana, have been discovered when a tree was cut down and the bats moved to another tree. These observations suggest that the Indiana bat may be a more adaptable species than previously thought. Conceptually, at least in the western part of the species' range, the Indiana bat may have been a savanna species. The following facts support this contention: Indiana bats prefer large trees in the open or at edges, they seem to prefer open canopies and fragmented forest landscapes, and they seem to

prefer forest with an open understory [Kaskaskia, 2009].

Indiana bats have strong site fidelity to summer colony areas, roosts, and foraging habitat. Females have been documented returning to the same roosts from one year to the next. Male Indiana bats also have been recaptured when foraging in habitat occupied during prior summers. The Indiana bat may be more adaptable with regard to roosts than previously believed. It has been suggested that the reproductive success of local populations may be dependent on previously used summer roosts, but recent studies have shown that Indiana bats know of and occupy a number of roost sites within a maternity colony area [USFWS, 2007) Colonies are known to move from one roost to another within a season to respond to changes in environmental conditions (temperature and precipitation), and when a particular roost becomes unavailable [Kaskaskia, 2009].

Foraging occurs in and around the tree canopy of flood plain, riparian, and upland forest. In riparian areas, Indiana bats primarily forage around and near riparian and flood plain trees. Within flood plain forests where Indiana bats forage, canopy closures range from 30-100%. Excellent foraging habitat has been characterized as woody vegetation with a width of at least 30 meters on both sides of a stream [IBRP, 1999]. Streams, associated flood plain forests, and impounded bodies of water are preferred foraging habitats for pregnant and lactating Indiana bats, some of which may fly up to 2.5 km (1.5 miles) from upland roosts. Foraging also occurs over clearings with early successional vegetation (e.g., old fields), along the borders of croplands, along wooded fencerows, and over farm ponds in pastures. The extent of foraging area used by an Indiana bat maternity colony has been reported to range from a linear strip of creek vegetation 0.8 km (0.5 miles) in length, to a foraging area 1.2 km (0.75 miles) in length. Foraging air space ranges from 2-30 m (6-100 feet) above ground level. Most Indiana bats caught in mist nets are captured over streams and other flyways at heights greater than 2 m (6 feet) [IBRP, 1999].

Humphrey and Cope (1977) produced the most definitive research into survivorship rates of the Indiana bat to date, but due to the difficulty in sampling their resulting percentages likely underestimate true survival rates, thus values should be considered minimum survival rates rather than average survival rates. Analysis of four banded un-aged cohorts found that the first year, year zero, after banding had the highest mortality rate (this is assumed an expected high mortality of the young of the year and old). From year one to six, there was a fairly stable survival rate (Approximately 76% for females and approximately 70% for males) and then from year seven on, a new constant lower survival rate was reached (66% for females, up to 10 years, and 36% for males). The oldest of the cohorts survived to nearly 15 years of age [Kaskaskia, 2009].

Threats

The Indiana bat, an endangered species, was listed in 1967 due to episodes of people disturbing hibernating bats in caves during winter and killing large numbers of bats. Indiana bats are vulnerable to disturbance because they hibernate in large numbers in only a few caves (the largest hibernation caves support from 20,000 to 50,000 bats). Other threats that have

contributed to the Indiana bat's decline include commercialization of caves, loss of summer habitat, pesticides and other contaminants, and most recently, the disease white-nose syndrome.

White nose syndrome (WNS) is an illness that has killed over a million bats since 2006 when dead and dying bats, with the distinctive "white nose," were first observed. "White nose" refers to a ring of white fungus often seen on the faces and wings of affected bats. First observed in a cave in New York in February 2006, white-nose syndrome has since spread from New York caves to caves in Vermont, Massachusetts, Connecticut, New Hampshire, New Jersey, Pennsylvania, and West Virginia. Most recently in February 2013, WNS was found to exist in several counties within Illinois

Bats afflicted with white-nose syndrome have been found in over 25 caves and mines in the northeastern U.S. The U. S. Fish and Wildlife Service has called for a moratorium on caving activities in the affected areas, and strongly recommends that any clothing or equipment used in such areas be decontaminated after each use (USFWS, 2013).

3.2 Gray bat (Myotis grisescens)

Taxonomy and Morphology

The Gray bat is a member of the family Vespertilionidae and is in the genus Myotis. This genus is composed of more than 20 species distributed worldwide. The gray bat is considered the most cave-dependent mammal in the United States. The gray bat is the largest species in the genus Myotis in the eastern United States. This species is most commonly confused with M. lucifugus, M. sodalis, M. austroriparius, and M. keenii. Distinguishing characteristics include uniformly colored fur (all other species of Myotis have bi- or tri-colored hair). Additionally, the wing membrane is attached at the base of the foot at the ankle, not at the base of the first toe. Adults grow to three inches in length with a wingspan of 10-12 inches and typically weigh 8-11 grams. Following late summer molt (July-August), dorsal fur is uniformly dark gray but tends to bleach to chestnut brown or russet. Males and females are similar in size and color; however, reproductive females tend to have more pronounced russet color prior to summer molt [USFWS, 2004].

Reproduction

Females become sexually mature in their second year [Tuttle, 1975]. Mating occurs when males arrive at the winter hibernacula (females generally arrive a few weeks earlier than males). Females immediately enter hibernation after copulation while males continue to feed for several more weeks before entering hibernation. The sperm is stored by the female throughout the winter months and they become pregnant after emerging from hibernation. Females emerge from their winter hibernaculum in late March or early April and migrate to warmer caves to form maternity colonies. Birth is given to a single young in late May or early June. Growth rates of young are positively correlated with colony size (other environmental factors such as size and structure of maternity cave and porosity of limestone can affect

growth). In a large colony, young will typically become volant (fly) in 20-25 days, whereas young in smaller colonies may take 30-35 days. Young in severely reduced colonies may die before learning to fly. The growth rate connection to colony size relates to the reduced energy demand required for thermoregulation. Lactating females have increased metabolisms and need to maintain higher body temperatures, larger colony sizes reduce the amount of energy required. Growth and survival rates in volant young are inversely proportional to the distance from roosting sites to nearest over-water foraging area. Although mothers continue to nurse young after they become volant, young are apparently left to learn to hunt on their own. Survival rates the first year are between 55-85% in undisturbed colonies and 57-66% in disturbed colonies. Mean annual survival rates in adults appear constant at 70% for males and 73% for females [Elder and Gunier, 1981]. Mortality is highest for both juveniles and adults during the spring migration, when fat reserves are lowest [Kaskaskia, 2009].

Habitat

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°(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°F with relative humidity greater than 80%. 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 two 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].

Diet

Species is insectivorous but preferred diet is unknown. Gray bats have been observed in areas that have large populations of mayflies, which are assumed to be a major source of food.

Distribution

The range of the Gray bat is primarily limited to Alabama, Kentucky, Tennessee, Missouri, and northern Arkansas. A few can be found in northwestern Florida, western Georgia, southeastern Kansas, southern Indiana, southern and southwestern Illinois, northeastern Oklahoma, northeastern Mississippi, western Virginia, and possibly western North Carolina (USFWS, 2013). Nine winter caves are known to harbor approximately 95% of the total population during hibernation; one cave alone harbors 50% [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.

Ecology

This species was originally estimated to have a life expectancy of 10 years but more recent studies predict they can live for nearly 40 years [NatureServe, 2004]. The oldest known specimen was 16 years old. Individuals are extremely loyal to migration routes, home ranges, and colonies [USFWS, 1982]. Upon emerging from winter hibernation, individuals migrate to summer sites, selecting numerous temporary colony sites along the way (these sites may be used for several days or more). Within the home range of a colony, there may be several potential roosting sites. If a colony is disturbed, individuals may move to a different, generally less preferred, site. Some areas may only contain one suitable site, which if made unsuitable (man-made or otherwise) could result in the loss of an entire colony. Disturbance is the single biggest threat to this species. A single disturbance of a maternity colony at the wrong time could result in the death of thousands of young. Each disturbance during hibernation burns a 20-30 day supply of fat [USFWS, 1982]. The total population of this species is estimated to be at 50% of historical (prior to 1960's) numbers. Numerous local populations have been extirpated or reduced by greater than 80%. Greatly reduced colony sizes can ultimately result in the loss of the entire colony due to increased mortality rates of young in smaller colonies. Most of the important known colony sites are currently protected and populations appear stable or increasing. No new roosting sites have been recorded in caves that have not been historically occupied; however, there are several instances of maternity colonies becoming established in large storm sewers in major municipalities [NatureServe, 2004].

Threats

Abundance declined by at least 50% from the 1960s to the early 1980s (Brady *et al.* 1982). The number of occupied caves has substantially decreased. In Missouri, 26 of 66 caves used

historically by this species and surveyed in 1994 showed no evidence of recent use. See Layne 1978 for information on decline in Florida. Cave disturbance has been the major factor in the decline. Cave protection efforts have greatly reduced this threat.

Although there are apparently few current threats, the use of forestry insecticides and crop pesticides in areas adjacent to riparian corridors where gray bats forage may reduce the prey base or kill bats that ingest contaminated insects. Some maternity and hibernating colonies are susceptible to human disturbance (Northern Prairie Wildlife Research Center, 2013).

Decline began with cave disturbance associated with saltpeter production during the Civil War. Some of the largest colonies were lost as a result of cave commercialization. Some caves were improperly gated. The species is especially vulnerable due to its high fidelity to particular favored caves, and it is very sensitive to disturbance, including the mere presence of humans with lights; disturbance may result in bats moving to less favorable roosting places. Other threats include pesticides, deforestation, and impoundment of waterways (and subsequent cave inundation) (Arroyo-Cabrules, 2013)

White nose syndrome (WNS) is an illness that has killed over a million bats since 2006 when dead and dying bats, with the distinctive "white nose," were first observed. "White nose" refers to a ring of white fungus often seen on the faces and wings of affected bats. First observed in a cave in New York in February 2006, white-nose syndrome has since spread from New York caves to caves in Vermont, Massachusetts, Connecticut, New Hampshire, New Jersey, Pennsylvania, and West Virginia. Most recently in February 2013, WNS was found to exist in several counties within Illinois

Bats afflicted with white-nose syndrome have been found in over 25 caves and mines in the northeastern U.S. The U. S. Fish and Wildlife Service has called for a moratorium on caving activities in the affected areas, and strongly recommends that any clothing or equipment used in such areas be decontaminated after each use (USFWS, 2013).

4.0 Identification of the Source of Negative Affect

The PCWPP involved the construction of one wind turbine. The construction of the wind turbine has not destroyed or degraded any habitat used by either listed species to be covered within this Plan. The potential for impact is limited to the physical risk posed by the individual turbine/tower.

Altamont Pass, California was one of the first commercial generating wind plants/wind farms in North America. Wind turbines began being built in Altamont Pass after the energy crisis occurred in the 1970's. As the wind farm was being developed, a significant number of raptor deaths were found to be occurring from collisions with the spinning turbine blades [Weller, 2007]. Environmental studies began to be conducted based on the concerns about the observed avian fatalities, especially populations of golden eagles (Aquila chrysaetos), at Altamont Pass; however, research beyond California was relatively limited until the mid-1990's when wind resource areas began to be developed nationally [Kaskaskia, 2009].

Turbine technology has evolved since the 70's and the newer generations of wind turbines are more efficient, significantly larger, but have slower spinning rotors. The most common generators at Altamont Pass are 18 meter tall downwind turbines which spin at 60 revolutions per minute (rpm) and many have blade tips within nine meters of the ground. In contrast, current generators are more than twice as tall, have three to eight times the same rotor swept area, and spin at significantly slower speeds (less than 20 rpm). Studies have shown the new generation turbines produce far less fatalities than the older units [Erickson, 2002]; however, fatalities still occur.

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].

Researchers generally presupposed bats would have a low vulnerability to colliding with wind turbines based on their ability to navigate around tightly spaced objects (even moving objects). As avian studies continued to document bat fatalities, the focus of studies began to shift to impacts to bat populations. 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). Although the data collected are consistent, the reason is not entirely understood [Kaskaskia, 2009].

The Anabat® audio monitoring system has been used with many of the studies to determine bat activity at turbine sites. Use of the Anabat® system has found no avoidance behavior demonstrated at turbine areas or any significant difference between use of airspace in turbine and non-turbine sites [Jain, 2005]. Additionally, studies have identified resident bat populations immediately surrounding wind farms and actively foraging around turbine areas. The presence of bats around turbines through much of the year with no fatalities has produced numerous hypotheses; however, there are more questions than answers remaining and the resulting fatalities may be a combination of several factors [DeWitt, 2012 and Kaskaskia, 2009].

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. A study at a tall building in Chicago found 50 dead eastern red bats over one year with only two occurring outside of the fall migration period [Erickson, 2002].

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. This triggered behavioral response results in mistaking turbines for dead tree snags. Studies using infrared cameras have documented bats investigating and landing on all parts of the towers. While not a confirmed behavior for the bat species, males of other species which display a similar *roosting* behavior often tend to exhibit territorial behavior. This territorial behavior would trigger increased activity of the males at the roost site which increases the risk of being struck by the spinning blades. The roosting behavior theory is partially supported from the evidence that adult males are disproportionately impacted over juveniles or females [Kaskaskia, 2009].

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.

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 potential cause of death [Baerwald, 2008]. Barotrauma results from decompression of living tissue during a rapid change in air-pressure, which in turn can cause internal hemorrhaging. Vortices of extremely low air pressure occur around the edges of the rotating blades. Pulmonary barotrauma can occur as a bat enters one of these vortices, effectively causing the air sacs within the lungs to explode. The anatomy of bird lungs is significantly different and does not leave them very susceptible to pulmonary barotraumas. Searches typically find bird carcasses twice as far from the turbines as bat carcasses; whether it is related to this phenomenon or not is unknown.

5.0 Measures Proposed to Minimize Harm to Listed Species to be Covered

5.1 Proposed Alternatives

Three alternatives were evaluated 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.

5.2 Minimization Proposed 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:

- Turbine is located within agricultural fields away from forest edges, perennial

waterways, and bluff lines that could be considered *high risk* locations.

- 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.
- The tower is not guyed to reduce potential for fatal strikes.
- The support structure is a solid tower and not a lattice network to discourage nesting or perching.
- The turbine blades are situated upwind rather than downwind from the generator to limit risk of fatality if perching on the generator does occur.
- 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.

5.3 Operation Modifications and Mitigation Proposed Within Selected Alternative

The potential for a *take* to occur is, 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. Therefore, no direct replacement or enhancement of habitat will be included as part of the mitigation plan. 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. Bat fatalities 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 is a mixture of monitoring, operational protocols, and monetary donations.

Monitoring

The Pittsfield turbine was constructed between 2004 and 2005. An intensive one year monitoring program will be initiated in 2013 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. 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 conjunction with IDNR where appropriate. 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. A detailed monitoring plan will be developed as part of this Plan and will made part of a final implementing agreement between IREC and IDNR. A rough outline has been created to begin the process and is as follows:

- Post-construction monitoring will consist of fatality searches twice a week from April 1 through November 15 of 2013. 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, 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.
- 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 CP are documented, the need for additional surveys would be discussed between IREC and IDNR. Future annual monitoring or studies will be conducted as deemed necessary through mutual coordination between IREC and IDNR.

Operational Changes

National studies have found that weather conditions can affect the risk factors for impacts. Large, single event occurrences of bird fatalities have been documented in the migratory seasons during periods of exceptionally heavy fog. Fog has not been correlated with bat fatalities, but the majority of fatalities have occurred on nights with wind speeds below 6 mps. 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 have been found to be successful in other Illinois electric cooperative wind projects at 6 mps [DeWitt, 2012].

If the monitoring studies conducted by IREC determine that above threshold limit is impacting listed species to be covered by the CP and the fatalities correspond to low wind speed nights, then operation of the turbine would be altered from April 1 to November 15 to raise the cut-in wind speeds to 6 mps. Additional mortality and acoustic studies would commence in association with modifications of cut in speed and would be performed per mutual agreement between IREC and IDNR.

In addition to turbine speed changes, 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 forage for bat species. The turbines will be idled during periods of dense fog during the spring and fall migratory periods as appropriate (March-May and July-October).

Donations

IREC has proceeded forward with this Plan in the hopes of developing a plan to reduce or avoid any fatalities of the covered by the CP; however, the possibility remains. Should an unfortunate 'take' occur, IREC is prepared to provide a donation of $1,000 to any not-for-profit organization that the IDNR chooses which is directly related to the study, education, or preservation of any avian or bat species. Examples are not limited to but would include organizations such as the Illinois Audubon Society, Organization for Bat Conservation, Southeastern Bat Diversity Network, Conservation Leadership Network or The Conservation Fund. Additionally, donations could go to any entity for land purchases which would serve to provide or expand habitat for endangered species. A donation would be provided for each 'take' that occurs.

5.4 Adaptive Management Plan

Studies are ongoing across the nation regarding the impacts of wind turbines on avian and bat species. As technological advances continue to improve the efficiency of wind electrical generation and the scientific community continues to gather information improving the understanding between the interaction of wind turbines and those negatively affected species new knowledge will be discovered on how to best minimize and mitigate negative impacts. Additionally, the wind turbine as it presently exists is not anticipated to produce significant numbers of fatalities from the listed species to be covered in the CP. An Adaptive Management Plan shall remain in effect between IREC and the IDNR through the duration of the implementing agreement of the Plan to address any unforeseen events.

In an attempt to fully implement an adaptive management strategy, IREC will implement an evaluation process outlined below that will enable the initiation of a specific adaptive

management option depending on the specific scenario presented:

- Expected Scenario: Although baseline total bat mortality may be elevated, Indiana bats are active near the turbine only at lower elevations below the rotor arc and mainly during low wind speed periods and no mortality results. A *take* of the Indiana bat is unlikely and no minimization or mitigation measures are needed.
- Alternate Scenario: Indiana bats suffer mortality or demonstrate behavioral vulnerability to collision at some point during any given season.

    1. 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.
    2. 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.
    3. 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.

5.5 Assurance of Funding

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 Plan. Standard practices will be followed as identified in the Final Implementing Agreement. The Draft Implementing Agreement is provided in Appendix A.

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Appendix A:

Implementing Agreement

The draft implementing agreement provided has been taken from an example obtained from the U.S. Fish and Wildlife Service.

IMPLEMENTING AGREEMENT

by and between

ILLINOIS RURAL ELECTRIC COOPERATIVE

and the

ILLINOIS DEPARTMENT OF NATURAL RESOURCES

TO ESTABLISH A PROGRAM FOR THE CONSERVATION OF ENDANGERED SPECIES AT THE ILLINOIS RURAL ELECTRIC COOPERATIVE WIND TURBINE SITE KNOWN AS THE PIKE COUNTY WIND POWER PROJECT.

The implementing Agreement ("Agreement") made and entered into as of the day of , 2013 by and among ILLINOIS RURAL ELECTRIC COOPERATIVE, and the ILLINOIS DEPARTMENT OF NATURAL RESOURCES (IDNR), hereinafter collectively called the "Parties", defines the Parties' roles and responsibilities and provides a common understanding of actions that will be undertaken for the conservation of the subject listed species and their habitats during operation of a wind turbine located in Pike County Illinois.

The parties enter into this Agreement in accordance with Section 5.5 of the Illinois Endangered Species Protection Act [520 ILCS 10/5.5].

1.0 Recitals

WHEREAS, the wind turbine located in Pike County has been determined to pose a potential risk to the health of seven species listed as threatened or endangered by the State of Illinois: Indiana bat (Myotis sodalis), Gray bat (Myotis grisescens); and,

WHEREAS, the Illinois Rural Electric Cooperative, through consultation with the IDNR, and with the agreement of that agency, has developed a series of measures, described in the Conservation Plan, to conserve the subject species during project activities; and,

WHEREAS, procedures to obtain permits allowing incidental take of the species listed in the CP pursuant to Title 17, Chapter 1, subchapter c, part 1080 also require a binding agreement committing the parties to implement specified conservation measures for those species; and,

WHEREAS, Illinois Rural Electric Cooperative and the IDNR intend to and agree that they shall work together to allow the INDR to issue an incidental take permit to Illinois Rural Electric Cooperative pursuant to Illinois Law and Illinois Administrative Code to allow the turbine to continue to operate as more fully detailed below:

THEREFORE, for and in consideration of the mutual covenants and conditions herein, the Parties hereto do hereby understand and agree as follows:

2.0 Definitions

The following terms as used in this Agreement shall have the meaning set forth below:

2.1 The term "Permit" shall mean an incidental take permit issued by IDNR to the Illinois Rural Electric Cooperative pursuant to Title 17(1) (c) part 1080?

2.2 The term "Permit Area" shall mean the location of the turbine site: the Pike County Wind Power Project turbine located in the northeast 1/4 of Section 22, Township 5 south, Range 4 west of Pike County, Illinois

2.3 The term "Permittee" shall mean the Illinois Rural Electric Cooperative.

2.4 The term "Conservation Plan" (CP) shall mean the Conservation Plan prepared for the Pike County Wind Power Project wind turbine.

2.5 The term "Plan Species" shall mean the two species identified in Section 1.0 of this Agreement.

2.6 The term "Unforeseen Circumstances" shall mean any significant adverse change in the population of a species or in the anticipated impacts of the project or other factors upon which the CP is based, or any significant new information relevant to the CP that was unforeseen by the Parties on the date hereof.

2.7 The term "Qualified Individual" shall mean any person or persons identified by Illinois Rural Electric Cooperative and approved by IDNR to conduct activities specified by the CP or the Implementing Agreement.

3.0 Conservation Plan

Pursuant to the provision of Title 17(1) (c) part 1080 and the Illinois Endangered Species Act [520 ILCS 10/5.5], the Illinois Rural Electric Cooperative has prepared a CP and submitted it to the IDNR with a request that IDNR issue a Permit to allow subject listed species to be incidentally taken, as the term is defined in Title 17(1) (c) part 1080, within Permit Area as

depicted and described in Section 2 of the CP. The CP proposed a program of conservation for the subject listed species.

4.0 Incorporation of CP

The CP and each of its provisions are intended to be, and by this reference are, incorporated herein. In the event of any direct contradiction between the terms of this Agreement and the CP, the terms of this Agreement shall control. In all other cases, the terms of this Agreement and the terms of the CP shall be interpreted to be supplementary to each other.

5.0 Legal Requirements

In order to fulfill the requirements that will allow the IDNR to issue the Permit, the CP provides measures that are intended to ensure that any take occurring within the Permit Area will be incidental; that the impacts of the take will, to the maximum extent practicable, be minimized and mitigated; that adequate funding for the CP will be provided; and that the take will not appreciably reduce the likelihood of the survival and recovery of the Plan Species in the wild.

6.0 Cooperative Effort

In order that each of the legal requirements as set forth in Paragraph 5.0 hereof are fulfilled, each of the Parties to this Agreement must perform certain specific tasks. The CP thus describes a cooperative program by the IDNR and Illinois Rural Electric Cooperative to conserve the Plan Species.

7.0 Terms Used

Terms defined and utilized in the CP and implementing agreement shall have the same meaning when utilized in this Agreement, except as specifically noted.

8.0 Purposes

The purposes of the Agreement are:

8.1 To ensure the implementations of each of the terms of the CP;

8.2 To contractually bind each Party to fulfill and faithfully perform the obligations, responsibilities, and tasks assigned to it pursuant to the terms of the CP; and,

8.3 To provide remedies and recourse should any Party fail to perform its obligations, responsibilities, and tasks as set forth in this Agreement.

9.0 Term

This Agreement shall become effective on the date that the IDNR issues the Permit requested in the CP and shall remain in full force and effect for a period of 20 years unless an alternate term is mutually agreed to by Illinois Rural Electric Cooperative and IDNR.

10.0 Funding

10.1 Illinois Rural Electric Cooperative will provide the funds to carry out the terms identified in the CP for takes within the Permit Area.

10.2 IDNR shall include in annual budget requests sufficient funds to fulfill its obligations under the CP and its statutory requirements to protect the Plan Species.

11.0 Responsibilities of the Parties in Conservation Program Implementation

11.1 The Illinois Rural Electric Cooperative shall undertake those actions for conservation of the Plan Species as detailed in Section 5 of the CP and summarized here during operation of the wind turbine:

a. Implement a monitoring program within the Permit Area. The persons overseeing the intensive surveys must be qualified individuals and an independent bat specialist must be used to confirm the species identification of bat carcasses found in the Permit Area. The IDNR must be provided and approve of those persons conducting the surveys.

b. Implement operation changes as needed, through coordination with IDNR, to the turbines for idling the blades during peak migration periods and weather periods described in the CP.

c. Implement those measures provided in the CP for donations to not-for- profit organizations to offset any take within the Permit Area.

11.2 The IDNR agrees to undertake the following actions to implement the CP:

a. Assist Illinois Rural Electric Cooperative in processing all necessary matters which result in IDNR issuing an appropriate Permit.

b. Upon issuance of the Permit, the IDNR shall monitor the implementation of the Permit, the CP and the activities thereunder.

c. Provide assistance during CP implementation as described below:

(1) Review credentials of any qualified individuals(s) under consideration by the Illinois Rural Electric Cooperative to determine if qualified to undertake protection and monitoring actions for the Plan Species;

(2) Assist the Illinois Rural Electric Cooperative in the establishment of appropriate methodologies and monitoring procedures as described in Section 5 of the CP;

(3) Assist the Illinois Rural Electric Cooperative with processing of any permits necessary to authorize designated project qualified individual(s) to undertake, collection, handling, monitoring, or other actions as identified in Section 5.3 of the CP and as determined to be appropriate by the IDNR;

(4) Maintain open communication with the Illinois Rural Electric Cooperative and project representatives to assist with compliance procedures for the Plan Species;

(5) Assist the Illinois Rural Electric Cooperative in identifying organizations for providing donations to in the event a take occurs.

(6) Accept any injured listed species found during project activities, subject animals to be retained by IDNR for care, analysis, and disposition;

12.0 Issuance of the Permit

12.1 Upon finding after opportunity for public comment with respect to the Permit application and the CP that:

a. (Incidental Take) Any permitted taking of the subject listed species will be incidental to the carrying out of otherwise lawful activities; and,

b. (Minimize and Mitigate) The CP and this Implementation Agreement will, to the maximum extent practicable, minimize and mitigate the impacts of such incidental taking; and,

c. (Adequate Funding) Illinois Rural Electric Cooperative will ensure that adequate funding for the CP will be provided; and,

d. (No Likely Jeopardy) Any permitted taking of the subject listed species will not appreciably reduce the likelihood of the survival and recovery of the Plan Species in the wild; and,

e. (Other Measures) Any other measures set forth in the CP and required by IDNR as being necessary or appropriate for the purposes of the CP, including any measures determined by the Parties to be necessary to deal with Unforeseen Circumstances, will be fulfilled; IDNR shall issue a Permit allowing incidental take of listed Plan Species to the Illinois Rural Electric Cooperative. Such Permit shall be issued concurrently with the execution of the Agreement by the Parties, and it is specifically agreed that this Agreement shall not become effective nor binding upon the Parties hereto until and unless the Permit has been issued.

12.2 After issuance of the Permit, IDNR shall monitor the implementation thereof, including each of the terms of this Agreement and the CP in order to ensure compliance with the Permit, the CP and this Agreement. In addition, IDNR shall, to the maximum

extent possible, ensure the availability of its staff to cooperate with and provide technical and research assistance to the Parties.

13.0 Remedies and Enforcement

13.1 Except as set forth hereinafter, each Party hereto shall have all of the remedies available in equity (including specific performance and injunctive relief) and at law to enforce the terms of this Agreement and the Permit and to seek remedies and compensation for any breach hereof, consistent with and subject to the following:

a. (No Monetary Damages) None of the Parties shall be liable in damages to the other Parties or to the person for any breach of this Agreement, any performance or failure to perform a mandatory or discretionary obligation imposed by this Agreement or any cause of action arising from this Agreement. Notwithstanding the foregoing:

(1) Retain Liability – Each Party shall retain whatever liability it would possess for its present and future acts or failure to act without existence of this Agreement.

(2) Land Owner Liability – The Illinois Rural Electric Cooperative shall retain whatever liability it possesses as an owner of interest in land.

b. (Injunctive and Temporary Relief) The Parties acknowledge that the Plan Species are unique and that their loss as species would result in irreparable damage to the environment and that therefore injunctive and temporary relief may be appropriate in certain instances involving a breach of this Agreement.

13.2 The terms for suspension, revocation, or termination of the permit are as follows:

a. Suspension – In the event of any significant violation or breach of the Permit or this Agreement, IDNR may suspend the Permit; however, except where IDNR determines that emergency action is necessary to protect the Plan Species, it will not suspend the Permit without first:

(1) Requesting the Illinois Rural Electric Cooperative to take appropriate remedial, enforcement or management actions; and

(2) Providing the Illinois Rural Electric Cooperative notice in writing of the facts or conduct which may warrant the suspension and an opportunity for the Illinois Rural Electric Cooperative to demonstrate or achieve compliance with the Permit and this Agreement.

b. Reinstatement – In the event the Permit is suspended, as soon as possible, but not later than ten (10) working days after any suspension, IDNR shall consult with the Illinois Rural Electric Cooperative concerning actions to be taken effectively to redress the violation, and after consultation IDNR shall make a determination of the actions necessary to effectively redress the violation or breach. In making this determination

IDNR shall consider the requirements of the terms of the Permit and of this Agreement and any comments or recommendations received during the consultations. As soon as possible, but not later than thirty (30) days after the conclusion of the consultations, IDNR shall transmit to the Illinois Rural Electric Cooperative written notice of the actions necessary to effectively redress the violation or breach. Upon full performance of the necessary actions specified by IDNR in its written notice, IDNR shall immediately reinstate the Permit. It is the intent of the Parties hereto that in the event of any suspension of the Permit all Parties shall act expeditiously to cooperate to rescind any suspension to carry out the objective of this Agreement.

c. Revocation or Termination – IDNR agrees that it will revoke or terminate the Permit for violation of the Permit or breach of this Agreement only if IDNR determines that:

(1) Such violation cannot be effectively redressed by other remedies or enforcement action; and,

(2) Revocation or termination is required to fulfill a responsibility of IDNR under the terms of the Agreement.

d. Terms of Revocation or Termination - IDNR agrees that it will not revoke or terminate the Permit without first:

(1) Requesting the Illinois Rural Electric Cooperative to take appropriate remedial action; and,

(2) Providing the Illinois Rural Electric Cooperative notice in writing of the facts or conduct which may warrant the revocation or termination and a reasonable opportunity (but not less than sixty (60) days) to demonstrate or achieve compliance with the Permit and this Agreement.

13.3 The limitation and the extent of enforceability are as follows:

a. No Further Mitigation for Permit Site – It is acknowledged that the purpose of this Agreement is to set forth the obligations and rights of the Parties hereto with respect to the CP and to provide for the conservation of the Plan Species and the mitigation and compensatory measures required in connection with incidental taking of the listed Plan Species in the course of otherwise lawful activities within the Permit Area. Accordingly, except as otherwise required by law and/or provided under the terms of the CP, including Unforeseen Circumstances, no further mitigation or compensations will be required by IDNR.

In the event that the status of a Plan Species changes (for example if a species should be delisted and is no longer considered threatened or endangered or a different species becomes listed) after the Permit has been issued and the CP and Implementing Agreement have been approved by IDNR, adequate documentation shall be provided to support an amendment to this agreement.

b. Private Property Rights and Legal Authorities Unaffected – Except as otherwise specifically provided in this Agreement, nothing herein contained shall be deemed to restrict the rights of the Illinois Rural Electric Cooperative to manage the use of and exercise all of the incidents of land ownership over those lands and interests in lands constituting the Permit Area subject to such other limitations as may apply to such rights under the Constitution and laws of the United States and the State of Illinois. Furthermore, nothing herein contained is intended to limit the authority or responsibility of the State of Illinois to invoke the penalties or otherwise fulfill its responsibilities under the IESPA.

14.0 Amendments

14.1 (Amendment to the Implementation Agreement) Except as otherwise set forth herein, this Agreement may be amended only with the written consent of each of the Parties hereto.

14.2 (Amendments to the CP) Material changes to the CP proposed by the Illinois Rural Electric Cooperative after the effective date of the Permit, shall be processed by the IDNR as an amendment to the Permit in accordance with the IESPA and permit regulations at Title 17(1) (c) part 1080 and shall be subject to appropriate environmental review.

15.0 Miscellaneous Provisions

15.1 (No Partnership) Except as otherwise expressly set forth herein, neither this Agreement nor the CP shall make or be deemed to make any Party to this Agreement the agent for or the partner of any other Party.

15.2 (Successors and Assigns) This Agreement and each of its covenants and conditions shall be binding on and shall inure to the benefit of the Parties hereto and their respective successors and assigns.

15.3 (Notice) Any notice permitted or required by this Agreement shall be delivered personally to the person set forth below or shall be deemed delivered personally to the person set forth below or shall be deemed delivered five (5) days after deposit in the United States mail, certified and postage prepaid, return receipt requested and addressed as follows or at such other address as any Party may from time to time specify to the other Party in writing.

Joseph Kath
Illinois Department of Natural Resources
One Natural Resources Way
Springfield, IL 62702

Bruce N. Giffin
Illinois Rural Electric Cooperative
P.O. Box 80
Winchester, IL 62694-0080

15.4 (Entire Agreement) This Agreement supersedes any and all other Agreements, either oral or in writing among the Parties hereto with respect to the subject matter hereof and contains all of the covenants and agreements among them with respect to said matters, and each Party acknowledges that no representation, inducement, promise or agreement, oral or otherwise, has been made by the other Party or anyone acting on behalf of the other Party and is not embodied herein.

15.5 (Attorney's Fees) If any action at law or equity, including any action for declaratory relief, is brought to enforce or interpret the provisions of this Agreement, each Party to the litigation shall bear its own attorney's fees and costs.

15.6 (Elected Officials not to Benefit) No member of or delegate to Congress or the Illinois Legislature shall be entitled to any share or part of this Agreement, or to any benefit that may arise from it.

15.7 (Availability of Funds) Implementation of this Agreement by IDNR shall be subject to the availability of appropriated funds.

15.8 (Duplicate Originals) This Agreement may be executed in any number of duplicate originals. A complete original of this Agreement shall be maintained in the official records of each of the Parties hereto.

15.9 (Third Party Beneficiaries) This Agreement shall not create the public or any member thereof as a third Party beneficiary hereof, nor shall it authorize anyone not a Party to this agreement to maintain a suit for personal injuries or property damages pursuant to the provisions of this Agreement. The duties, obligations and responsibilities of the Parties to this Agreement with respect to third Parties shall remain as imposed by general law.

16.0 Alternation of Documents

Any alteration of the CP or associated document by any representative of Illinois Rural Electric Cooperative or the IDNR, at any time after an agreement has been reached between the two responsible parties with respect to CP measures, conditions, or other contents, without express written notification and agreement by the other party to the CP and the Implementing Agreement, shall subject any incidental take permit issued in accordance with any CP or associated document subsequently found to have been altered with potential suspension or revocation pursuant to Section 13.0 of the Implementing Agreement, and shall entitle the injured party or parties to all remedies allowed by law or as otherwise appropriate.

IN WITNESS WHEREOF, THE PARTIES HERETO have executed this Implementing Agreement to be in effect as of the date last signed below.

Signatures