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Memorandum

To: Section 7 Administrative File

From: Assistant Regional Director, Ecological Services , Region 3 Lynn Lewis

Subject: Biological Opinion for Section 10(a)(1)(A) Activities Conducted for Northern Long-eared Bats

The following document contains the biological opinion of the Service regarding the issuance recovery permits for northern long-eared bats in Region 3 under Section 10(a)(1)(A) of the Endangered Species Act. It assesses the effects of research activities and authorized conservation and recovery actions involving the northern long-eared bats. These activities are intended to promote recovery of the species in the long-term, but may have short-term adverse effects. The biological opinion is based on information from scientific literature, species experts, and information in our files.

BIOLOGICAL OPINION

Effects to the Northern Long-eared Bat from Section 10(a)(1)(A) Permitting in the Midwest Region

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INTRODUCTION

This document transmits the Fish and Wildlife Service's (Service) biological opinion based on our review of the proposal to issue section 10(a)(1)(A) permits or fund authorized conservation and recovery actions throughout the Midwest Region of the Service and its effects on the threatened northern long-eared bat (*Myotis septentrionalis*) in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). The Service, under the authority of section 6 of the Act approves funding for bat conservation projects that may result in take of listed bats.
A complete consultation history can be found in Appendix A.
A complete administrative record of this consultation is on file at the Service's Midwest Regional Office in Bloomington, Minnesota.

Interim 4(d) for the northern long-eared bat

On April 2, 2015, the Service has published a species-specific rule pursuant to section 4(d) of the ESA for NLEB (80 FR 17974). Section 4(d) of the ESA states that:

> *Whenever any species is listed as a threatened species ... the Secretary shall issue such regulations as he deems necessary and advisable to provide for the conservation of such species* (16 U.S.C. 1533(d)).

The Service's interim 4(d) rule for NLEB exempts some take of NLEB from the section 9 prohibitions of the ESA. There are several different exceptions described in the 4(d) rule, but the exception relevant to the proposed action is as follows:

> For a limited period of 1 year from the effective date (May 4th, 2015) of this interim 4(d) rule, purposeful take that is caused by the authorized capture, handling, and related activities (attachment of radio transmitters and tracking) of northern long-eared bats by individuals permitted to conduct these same activities for other bats will be excepted from the prohibitions.

Thus, any take of NLEB occurring in conjunction with these activities that complies with the terms of other bat permits, for the first year, is excepted from section 9 prohibitions by the interim 4(d) rule, and does not require incidental take authorization. However, the scope of this biological opinion extends beyond one year. Additionally, during the first year of the interim 4(d) rule new permits or renewed permits still require incidental take authorization.

The interim 4(d) rules do not afford exemption from the ESA's section 7 requirements. Therefore, consultation remains appropriate when actions (even those within the scope of the interim 4(d) rule) are funded, authorized or carried out by a federal agency. This is because the purpose of section 7 consultation is broader than the mere evaluation of take and issuance of an Incidental Take Statement; such consultations fulfill the requirements of section 7(a)(2) of the

ESA, which directs that all federal actions insure that their actions are not likely to jeopardize the continued existence of any listed species, or result in the destruction or adverse modification of designated critical habitat.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The Midwest Region of the Service regularly receives applications for permits and issues permits pursuant to Section 10(a)(1)(A) of the Endangered Species Act, for recovery-related take of endangered and threatened bats caused by presence/absence surveys, population surveys, banding efforts, and other recovery activities. These applications are from various individuals, including Service employees and contractors, private consultants, personnel from non-profit organizations, university scientists, and other Federal, State, and county agency personnel. Each permit undergoes review in the Midwest Region and by biologists at field offices in states where the activities will occur. Permit applications for endangered species are also made available for public review through publication in the *Federal Register*. Although activities conducted under existing bat permits for the first year of the interim 4(d) rule are excepted from Section 9 prohibitions on take of NLEBs, they are not substantially different from actions under new permits or in future years, and are also considered as part of the proposed action.

The Service also proposes to approve funding for projects that enhance the conservation of listed bats pursuant to section 6 of the Act and the Service's Cooperative Agreement with state conservation agencies. Section 6 authorizes the Service to enter into cooperative agreements with any State that establishes and maintains an adequate and active program for the conservation of endangered and threatened species. Under this authority, the Service may provide financial assistance to any such state for the purposes of developing conservation programs or for monitoring the status of species that are subject to the Cooperative Agreement, typically those species of animals and plants that are federally listed. Projects may involve the purposeful take of federally listed bats by section 6 state cooperating agencies and their designated agents.
The biological opinion also evaluates the impacts to the northern long-eared bat of authorizing take for purposes of enhancing recovery and survival through gathering of scientific information and other conservation related actions.

This represents the Service's Biological Opinion (BO) on the effects of these actions on the threatened northern long-eared bat, in accordance with Section 7 of the Endangered Species Act (ESA) of 1973, as amended, (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.).

The specific activities that would occur relative to the northern long-eared bat covered by this biological opinion include the following:

1. **Installation of remote bat detection equipment, including acoustic monitoring**

systems to record bat vocalizations – During this activity, the detection system (e.g., beam-break movement detection instruments or acoustic call monitoring and recording equipment) is placed in a particular location (e.g., often just inside the entrance of the cave or attached to the cave gate, if present). This could occur during the period when bats are actively flying and foraging, but it could also occur during the hibernation period to detect bat activity during the normal hibernation season. Therefore, this activity can also be considered a white-nose syndrome (WNS) surveillance and monitoring measure. Also, the deployment of this equipment would be accomplished by a permitted biologist. This activity does not require the capture and/or handling of individual bats but could harass listed bats that are roosting and/or hibernating due to disturbances during installation and maintenance of the equipment.

2. Entry of hibernacula – This activity involves entering a hibernaculum during the winter months to conduct population estimates or to collect samples (e.g., wing punches, hair samples, etc.). This will include WNS-related surveillance and monitoring activities. Estimating numbers in the hibernaculum does not require handling of bats but can result in harassment of listed bats. For example, bats may leave their perch and fly through the cave, thereby expending energy otherwise reserved for natural arousals between torpor events. The significance of this disturbance is largely site specific and is dependent upon many factors (e.g., number and amount of time surveyors are present in the site, number of bats present, location of roosts, etc.).

3. Salvage of dead bats – This activity involves the removal of dead bats that are occasionally observed at summer roosts, elsewhere on the landscape during the non-hibernation period, or in hibernacula. These salvaged individuals, which may be WNS-infected, would be retained, stored for a period of time, preserved by freezing or chemical means (if necessary), transported or shipped to the testing or research laboratory, and used by the testing or research laboratory or other appropriate researcher or facility for WNS testing and possible necropsy and determination of cause of death. This activity does not require capture and/or handling of live bats, but it can result in harassment if the salvaged bats are found in association with other listed bats, such as with an existing maternity or roosting colony.

4. Harp trapping and mist netting during non-hibernation seasons – This activity involves the temporary installation and monitoring of harp traps and mist nets at locations where bats can likely be captured. A harp trap consists of an array of monofilament fishing line stretched within an aluminum frame. A cloth or plastic catchment bag is placed at the bottom of the frame, and the trap is placed in the opening of a cave or other potential roost. Bats fly into the monofilament lines and fall into the catchment bag where they remain temporarily until removed and processed. Because captured bats are collected in a single catchment bag, harp traps tend to result in greater physical contact between bats while they are in the traps, which may lead to an increased risk of WNS transmission between bats.

Mist nets consist of thin monofilament or nylon mesh line. The mist net is placed between vertical poles and is set in locations of probable bat activity (e.g., across a stream, road, or other corridor opening; near a known roost; etc.) Several panels of nets are typically stacked so that the net fills the corridor likely used by bats (e.g., the opening from the ground or surface of the stream to the lower edge of the forest canopy). Mist nets are set at dusk and are typically left up for five or six hours; however, shorter timeframes are likely in certain situations (e.g., mist netting near a known roost). Bats often avoid the nets but some fly into the net and become entangled. Some individuals are able to free themselves, but typically they become more entangled as they struggle. They remain in the net temporarily until removed, held individually in small bags (i.e., less chance of WNS transmission) and processed (i.e., maximum 30 minute hold time from capture to release).

Harp traps and mist nets are used to collect bats for various purposes such as presence/absence surveys, collection of hair or guano samples, and to band or place transmitters on individual bats. All of these activities require handling of bats. During handling, bats are removed carefully by hand from harp traps and mist nets to avoid injuring the bats. Nets and traps are left unattended, but are checked at regular intervals (e.g., 15 minutes) to ensure that bats are not trapped for long periods of time. Both of these activities may involve WNS-infected bats.

5. Collection of data from individual bats – This activity is usually conducted during harp trapping, mist netting, or by hand in winter and/or summer roosts. Data collected normally includes a combination of species name, determination of sex, band information, wing damage, weight, forearm length, and reproductive condition. Certain WNS-related samples may also be taken including swabbing the bat or using fungal lift tape to obtain fungal spore samples that can then be analyzed to detect or screen for the fungus that causes WNS. These samples will be stored, preserved (if necessary), transported or shipped to the testing or research laboratory, and used by the testing or research laboratory or other appropriate researcher or facility for WNS detection purposes. Collectively, these actions are minimally invasive to bats; however, temporary handling of individual bats is required for each activity, and this activity may involve WNS-infected bats.

6. Collection of fecal material – This activity involves the collection of fecal material that is found in association with communal roosts or that is excreted when bats are collected using harp traps, mist nets, or by hand in winter and/or summer roosts. This fecal material can be collected, stored, preserved (if necessary), transported or shipped to the testing or research laboratory, and used by the testing or research laboratory or other appropriate researcher or facility for various scientific studies (i.e., food habits) and for genetic sampling. This activity does not necessarily require the capture and/or handling of live bats, but it can result in harassment if the collection is taken near listed bats or during trapping efforts. It may also involve WNS-infected bats.

7. Hair clipping – This activity involves the collection of hair from bats captured during mist netting, harp trapping, or by hand in winter and/or summer roosts. A small amount of hair is clipped from the back of the bat for contaminant or isotope analyses, genetic evaluation, or other scientific purposes. The hair samples will then be stored, preserved (if necessary), and transported or shipped to the testing or research laboratory or other appropriate researcher or facility that will conduct the specific analysis. Handling of individual bats is required and may involve WNS-infected bats.

8. Banding – This activity involves the placement of a small, numbered, metal band around the forearm of a bat that has been captured during mist netting, harp trapping, or by hand in winter and/or summer roosts. This allows researchers to track seasonal movements. Handling of individual bats is required and may involve WNS-infected bats.

9. Attachment of radio transmitters or light tags to bats – In this activity, bats are collected using harp traps, mist nets, or by hand in winter and/or summer roosts. A small patch of hair is shaved from the back of the bat, and a dermal adhesive is applied to the skin. The transmitter or light tag is then attached, and the bat is released. Transmitters remain attached to the bats for several days, during which time researchers can track nocturnal movements and locate diurnal roosts. For light tags, a fluorescent light stick is attached to the bat instead of a radio transmitter to allow for short-term tracking of nocturnal movement and foraging activity. The adhesive used to attach light tags is designed to release the tag after only a few hours. The use of light tags has been helpful during the development of acoustic bat call libraries (e.g., Anabat). This activity requires capture and handling of individual bats and may involve WNS-infected bats.

10. Collection of wing punches and/or blood samples for genetics studies and other analyses – In these activities, bats are collected using harp traps, mist nets, or by hand in winter and/or summer roosts. A medical biopsy tool or sterile needle is used to obtain a small sample (i.e., typically two to five millimeters in diameter) of skin by punching a hole in the wing membrane, avoiding bones and major blood vessels or a small sample of blood. This activity is typically conducted in order to obtain samples for WNS detection, genetics or contaminants analyses. The samples will then be stored, preserved (if necessary), and transported or shipped to the testing or research laboratory or other appropriate researcher or facility that will conduct the genetic, contaminants, or other analyses. This activity requires the handling of individual bats and may involve WNS-infected bats.

Receipt of dead bats, bat genetic material, and other samples lawfully collected by authorized third parties – This activity involves the receipt, storage, handling, study, and analysis of dead bats, bat genetic material, and other listed bat-related samples by authorized biologists, researchers, and testing, research, and other facilities that process, evaluate, and study such materials. These materials will be provided by other listed bat permittees, can involve WNS-infected bats, and do not include live bats. **This activity does not require a section 10(a)(1)(A) permit and, therefore, is not addressed in this biological opinion.**

Prior to issuance of permits for the above-listed activities, a separate evaluation of the effects and the incidental take statement would be completed by the permit review staff in the Midwest Region to ensure that the permitted activity is in compliance with the provisions of this biological opinion.

Protective Measures Included as Part of the Proposed Activities to be Permitted under section 10(a)(1)(A)

The proposed activities can be grouped into three categories by potential affects as listed below. Each category of activities has similar potential affects and therefore has similar protective measures. These categories also correspond to the respective potential adverse effects in the Effects of the Action section. The descriptions of the categories highlight the measures that are incorporated in the activities for minimizing adverse effects and take of the northern long-eared bat. In addition, the standard permit provisions contained in Appendix B will apply to these actions, which will also help minimize adverse effects to the species.

1. **Activities that do not involve handling of live bats** – This category would include four activities described above: (a) entry of roosts for visual counting and inspection, (b) monitoring via electronic equipment in caves, (c) salvage of dead bats, and (d) collection of fecal material (where handling is not necessary). Activities (a) and (b) involve the permittee entering roosts where listed bats are known or may occur but do not involve the handling of listed bats. Activities (c) and (d) involve the collection of dead bats and fecal material for use in research and WNS surveillance.

   Protective measures – The number of people entering the hibernacula and the period of time that listed bats are exposed to noise, light, or other forms of disturbance during hibernation or other roosting activity is minimized during these activities in an effort to reduce unnecessary energy expenditure by listed bats and subsequent loss of fat reserves.

2. **Minimally invasive activities that involve handling of listed bats and a low potential for physical injury to listed bats** – This category includes a broad range of activities including: (a) harp trapping and mist netting during non-hibernation seasons, (b) collection of data from individual bats (e.g., species, sex, band data, wing damage, weight, forearm length, and reproductive condition), (c) collection of fecal material (when it involves handling), (d) hair clipping and shaving, and (e) banding. Each of these activities involves the direct handling of listed bats, which may result in short-term harassment of listed bats and the potential to harm listed bats while they are handled.

   Protective measures – The period during which bats are handled is minimized in an effort to reduce stress and the potential to harm listed bats. Also, the amount of collected material (e.g., hair) is minimized to the amount necessary to conduct the needed analysis. These activities have been undertaken by existing and previous permittees with little apparent effect on listed bat populations.

3. **Invasive activities that will cause or have the potential to cause direct physical injury or mortality to listed bats and/or an extended period of harassment** – These activities include wing punches, the attachment of transmitters, and collection of blood samples of listed bats showing advanced symptoms of WNS. Each of these activities involves the direct handling of listed bats and is expected to result in long-term harassment and/or harm and/or mortality to listed bats.

Protective measures – To minimize the effects of these activities, (a) bats are held for the minimum amount of time necessary to collect samples or attach transmitters; (b) the smallest amount of material necessary is collected via wing punches and/or blood samples; (c) transmitter weights are minimized and matched to the weight of the bat to which it will be attached (i.e., smaller bats carry smaller transmitters); and, (d) these activities utilize standard protocols that have been used for many years and that are known to minimize physical and behavioral effects (e.g., wing punch activities are completed at the end of hibernation to minimize stress to bats during hibernation).

Action Area

The action area is defined as all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action. The northern long-eared bat is known from all states within the Midwest Region. Therefore, the action area considered in this biological opinion includes the following states within the Midwest Region of the Service: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin.

STATUS OF THE SPECIES

Refer to the final rule (80 FR 17974) for the best available information on NLEB life history and biology, threats, distribution and overall status. The following is summary from that rule.

Life History and Biology

The NLEB is a temperate, insectivorous, migratory bat that hibernates in mines and caves in the winter and spends summers in wooded areas. The key stages in its annual cycle are: hibernation, spring staging and migration, pregnancy, lactation, volancy/weaning, fall migration and swarming. NLEB generally hibernate between mid-fall through mid-spring each year. The spring migration period likely runs from mid-March to mid-May each year, as females depart shortly after emerging from hibernation and are pregnant when they reach their summer area. Young are born between mid-June and early July, with nursing continuing until weaning, which is shortly after young become volant in mid- to late-July. Fall migration likely occurs between mid-August and mid-October.

Summer habitat and ecology

Suitable summer habitat[1] for NLEB consists of a wide variety of forested/wooded habitats where they roost, forage, and travel and may also include some adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, old fields and pastures. This includes forests and woodlots containing potential roosts, as well as linear features such as fencerows, riparian forests, and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure.

Many species of bats, including the NLEB, consistently avoid foraging in or crossing large open areas, choosing instead to use tree-lined pathways or small openings (Patriquin and Barclay 2003, Yates and Muzika 2006). Further, wing morphology of the species suggests that they are adapted to moving in cluttered habitats. Thus, isolated patches of forest may not be suitable for foraging or roosting unless the patches are connected by a wooded corridor.

Upon emergence from the hibernacula in the spring, females seek suitable habitat for maternity colonies. NLEB actively form colonies in the summer (Foster and Kurta 1999) and exhibit fission-fusion behavior (Garroway and Broders 2007), where members frequently coalesce to form a group (fusion), but composition of the group is in flux, with individuals frequently departing to be solitary or to form smaller groups (fission) before returning to the main unit (Barclay and Kurta 2007). As part of this behavior, northern long-eared bats switch tree roosts often (Sasse and Pekins 1996), typically every 2 to 3 days (Foster and Kurta 1999; Owen et al. 2002; Carter and Feldhamer 2005; Timpone et al. 2010). NLEB maternity colonies range widely in size, although 30-60 may be most common (Service 2014). NLEB show some degree of interannual fidelity to single roost trees and/or maternity areas. Male NLEB are routinely found with females in maternity colonies. NLEB use networks of roost trees often centered around one or more central-node roost trees (Johnson et al. 2012). NLEB roost networks also include multiple alternate roost trees and male and non-reproductive female NLEB may also roost in cooler places, like caves and mines (Barbour and Davis 1969, Amelon and Burhans 2006).

NLEB roost in cavities, underneath bark, crevices, or hollows of both live and dead trees and/or snags (typically $\geq$3 inches dbh). NLEB are known to use a wide variety of roost types, using tree species based on presence of cavities or crevices or presence of peeling bark. NLEB have also been occasionally found roosting in structures like barns and sheds (particularly when suitable tree roosts are unavailable).

Young NLEB are typically born in late-May or early June, with females giving birth to a single offspring. Lactation then lasts 3 to 5 weeks, with pups becoming volant (able to fly) between early July and early August.

Migration

Males and non-reproductive females may summer near hibernacula, or migrate to summer habitat some distance from their hibernaculum. NLEB is not considered to be a long distance

1 See the Service's current summer survey guidance for our latest definitions of suitable habitat.

migrant (typically 40-50 miles). Migration is an energetically demanding behavior for the NLEB, particularly in the spring when their fat reserves and food supplies are low and females are pregnant.

Winter habitat and ecology

Suitable winter habitat (hibernacula) includes underground caves and cave-like structures (e.g. abandoned or active mines, railroad tunnels). There may be other landscape features being used by NLEB during the winter that have yet to be documented. Generally, NLEB hibernate from October to April depending on local climate (November-December to March in southern areas and as late as mid-May in some northern areas).

Hibernacula for NLEB typically have significant cracks and crevices for roosting; relatively constant, cool temperatures (0-9 degrees Celsius) and with high humidity and minimal air currents. Specific areas where they hibernate have very high humidity, so much so that droplets of water are often seen on their fur. Within hibernacula, surveyors find them in small crevices or cracks, often with only the nose and ears visible.

NLEB tend to roost singly or in small groups (Service 2014), with hibernating population sizes ranging from a just few individuals to around 1,000 (Service unpublished data). NLEB display more winter activity than other cave species, with individuals often moving between hibernacula throughout the winter (Griffin 1940, Whitaker and Rissler 1992, Caceres and Barclay 2000). NLEB have shown a high degree of philopatry to the hibernacula used, returning to the same hibernacula annually.

Spring Staging and Fall Swarming habitat and ecology

Upon arrival at hibernacula in mid-August to mid-November, NLEB "swarm," a behavior in which large numbers of bats fly in and out of cave entrances from dusk to dawn, while relatively few roost in caves during the day. Swarming continues for several weeks and mating occurs during the latter part of the period. After mating, females enter directly into hibernation but not necessarily at the same hibernaculum as they had been mating at. A majority of bats of both sexes hibernate by the end of November (by mid-October in northern areas).

After hibernation ends in late March or early April (as late as May in some northern areas), most NLEB migrate to summer roosts. Females emerge from hibernation prior to males. Reproductively active females store sperm from autumn copulations through winter. Ovulation takes place after the bats emerge from hibernation in spring. The period after hibernation and just before spring migration is typically referred to as "staging," a time when bats forage and a limited amount of mating occurs. This period can be as short as a day for an individual, but not all bats emerge on the same day.

In general, NLEB use roosts in the spring and fall similar to those selected during the summer. Suitable spring staging/fall swarming habitat consists of the variety of forested/wooded habitats

where they roost, forage, and travel, which is most typically within 5 miles of a hibernaculum. This includes forested patches as well as linear features such as fencerows, riparian forests and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure. Isolated trees are considered suitable habitat when they exhibit the characteristics of a suitable roost tree and are less than 1,000 feet from the next nearest suitable roost tree, woodlot, or wooded fencerow.

Threats

No other threat is as severe and immediate for the NLEB as the disease white-nose syndrome (WNS). It is unlikely that NLEB populations would be declining so dramatically without the impact of WNS. Since the disease was first observed in New York in 2007 (later biologists found evidence from 2006 photographs), WNS has spread rapidly in bat populations from the Northeast to the Midwest and the Southeast. Population numbers of NLEB have declined by 99 percent in the Northeast, which along with Canada, has been considered the core of the species' range. Although there is uncertainty about how quickly WNS will spread through the remaining portions of these species' ranges, it is expected to spread throughout their entire ranges. In general, the Service believes that WNS has significantly reduced the redundancy and resiliency of the NLEB.

Although significant NLEB population declines have only been documented due to the spread of WNS, other sources of mortality could further diminish the species' ability to persist as it experiences ongoing dramatic declines. Specifically, declines due to WNS have significantly reduced the number and size of NLEB populations in some areas of its range. This has reduced these populations to the extent that they may be increasingly vulnerable to other stressors that they may have previously had the ability to withstand. These impacts could potentially be seen on two levels. First, individual NLEB sickened or struggling with infection by WNS may be less able to survive other stressors. Second, NLEB populations impacted by WNS, with smaller numbers and reduced fitness among individuals, may be less able to recover making them more prone to extirpation. The status and potential for these impacts will vary across the range of the species.

Bats affected but not killed by WNS during hibernation may be weakened by the effects of the disease and may have extremely reduced fat reserves and damaged wing membranes. These effects may reduce their capability to fly or to survive long-distance migrations to summer roosting or maternity areas.

In areas where WNS is present, there are additional energetic demands for northern long-eared bats. For example, WNS-affected bats have less fat reserves than non-WNS-affected bats when they emerge from hibernation (Reeder et al. 2012; Warnecke et al. 2012) and have wing damage (Meteyer et al. 2009; Reichard and Kunz 2009) that makes migration and foraging more challenging. Females that survive the migration to their summer habitat must partition energy resources between foraging, keeping warm, successful pregnancy and pup-rearing, and healing and may experience reduced reproductive success.

Forest conversion and forest management actions may have a chance of directly or indirectly killing or harming bats. Over the long-term, sustainable forestry benefits NLEB by maintaining suitable habitat across a mosaic of forest treatments. However, forest practices can have a variety of impacts on the NLEB depending on the quality, amount, and location of the lost habitat, and the time of year of clearing. Depending on their characteristics and location, forested areas can function as summer maternity habitat, staging and swarming habitat, migration or foraging habitat, or sometimes, combinations of more than one habitat type. Impacts from tree removal to individuals or colonies would be expected to range from indirect impact (e.g., minor amounts of forest removal in areas outside NLEB summer home ranges or away from hibernacula) to minor (e.g., largely forested areas, areas with robust NLEB populations) to significant (e.g., removal of a large percentage of summer home range, highly fragmented landscapes, areas with WNS impacts).

Lastly, there is growing concern that bats, including the NLEB (and other bat species) may be threatened by the recent surge in construction and operation of wind turbines across the species' range. Mortality of NLEB has been documented at multiple operating wind turbines/farms. The Service is now working with wind farm operators to avoid and minimize incidental take of bats and assess the magnitude of the threat.

Rangewide Status

The NLEB ranges across much of the eastern and north central United States, and all Canadian provinces west to the southern Yukon Territory and eastern British Columbia (Nagorsen and Brigham 1993; Caceres and Pybus 1997; Environment Yukon 2011)(Figure 1). In the United States, the species' range reaches from Maine west to Montana, south to eastern Kansas, eastern Oklahoma, Arkansas, and east through the Gulf States to the Atlantic Coast (Whitaker and Hamilton 1998; Caceres and Barclay 2000; Amelon and Burhans 2006). The species' range includes the following 37 States (plus the District of Columbia): Alabama, Arkansas, Connecticut, Delaware, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Vermont, Virginia, West Virginia, Wisconsin, and Wyoming. Historically, the species has been most frequently observed in the northeastern United States and in Canadian Provinces, Quebec and Ontario, with sightings increasing during swarming and hibernation (Caceres and Barclay 2000). However, throughout the majority of the species' range it is patchily distributed, and historically was less common in the southern and western portions of the range than in the northern portion of the range (Amelon and Burhans 2006).

Northern Long-Eared Bat (*Myotis septentrionalis*) Range

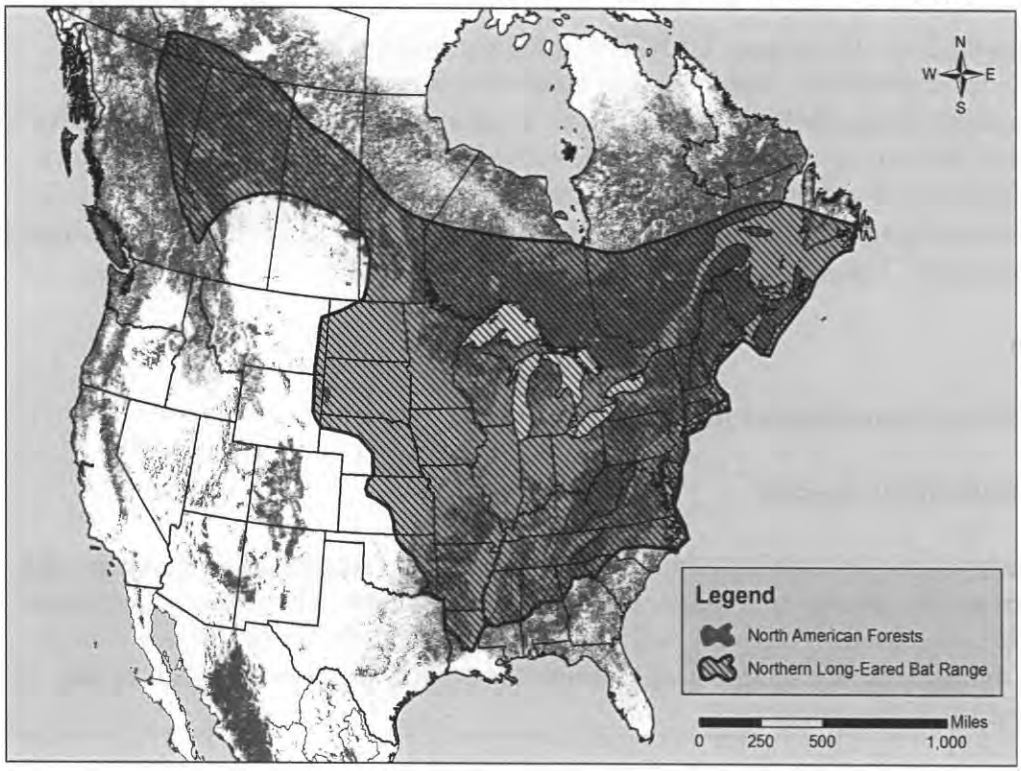

Figure 1.

Although they are typically found in low numbers in inconspicuous roosts, most records of NLEB are from winter hibernacula surveys (Caceres and Pybus 1997). More than 780 hibernacula have been identified throughout the species' range in the United States, although many hibernacula contain only a few (1 to 3) individuals (Whitaker and Hamilton 1998). Known hibernacula (sites with one or more winter records of northern long-eared bats) include: Alabama (2), Arkansas (41), Connecticut (8), Delaware (2), Georgia (3), Illinois (21), Indiana (25), Kentucky (119), Maine (3), Maryland (8), Massachusetts (7), Michigan (103), Minnesota (11), Missouri (more than 269), Nebraska (2), New Hampshire (11), New Jersey (7), New York (90), North Carolina (22), Oklahoma (9), Ohio (7), Pennsylvania (112), South Carolina (2), South Dakota (21), Tennessee (58), Vermont (16), Virginia (8), West Virginia (104), and Wisconsin (67). NLEB are documented in hibernacula in 29 of the 37 States in the species' range. Other States within the species' range have no known hibernacula (due to no suitable hibernacula present, lack of survey effort, or existence of unknown retreats).

The current range and distribution of NLEB must be described and understood within the context of the impacts of WNS. Prior to the onset of WNS, the best available information on NLEB came primarily from surveys (primarily focused on Indiana bat or other bat species) and some targeted research projects. In these efforts, NLEB was very frequently encountered and was

considered the most common myotid bat in many areas. Overall, the species was considered to be widespread and abundant throughout its historic range (Caceres and Barclay 2000).

WNS has been particularly devastating for NLEB in the northeast, where the species was believed to be the most abundant. There are data supporting substantial declines in NLEB populations in portions of the Midwest due to WNS. In addition, WNS has been documented at more than 100 NLEB hibernacula in the southeast, with apparent population declines at most sites. WNS has not been found in any of the western states to date and the species is considered rarer in the western extremes of its range. We expect further declines as the disease continues to spread across the species' range.

Critical Habitat

Critical habitat has not been proposed for the NLEB.

Conservation Needs of the Species

The species' conservation needs define what is needed in terms of reproduction, numbers, and distribution to ensure the species is no longer in danger of extinction. The conservation needs should be defined in the species' recovery outline or plan. Since there is no recovery plan or recovery outline available at this time, we will outline the conservation needs based on our current understanding of the species.

We find that the primary conservation need of the NLEB is to reduce the threat of WNS. This includes minimizing mortality in WNS-affected areas, and slowing the rate of spread into currently unaffected areas. In addition, NLEB that continue to exist within WNS-affected areas need to be able to continue to survive and reproduce in order to stabilize and/or increase the populations. This can be done by reducing the other threats to the species, as listed above. Therefore, efforts to protect hibernacula from disturbances need to continue. This should include restricting human access to hibernacula particularly during the hibernation period, constructing and maintaining appropriately designed gates, and restoring microhabitat conditions in hibernacula that have been altered. Efforts should also be made to protect and restore (in some cases) adequate fall swarming habitat around hibernacula. Known maternity habitat should be maintained, and the removal of known roost trees, particularly when pregnant females and/or young are present should be reduced. Research to identify important hibernacula and summer areas and to delineate the migratory relationship between summering and wintering populations should also be pursued.

ENVIRONMENTAL BASELINE

The Environmental Baseline analyzes the effects of past and ongoing human and natural factors leading to the current status of the species, its habitat, and the ecosystem within the action area.

Status of the Species in the Action Area

The northern long-eared bat occurs over a wide range in the action area. The species is captured during summer mist-net surveys in varying abundance throughout most of the Midwest, and historically was considered one of the more frequently encountered bat species in the region. However, the species was historically observed infrequently and in small numbers during hibernacula surveys throughout the majority of its range in the Midwest. WNS has since been documented in Illinois, Indiana, Iowa, Ohio, Michigan, Wisconsin, and Missouri. In Minnesota, the presence of the fungus that causes WNS has been confirmed, but the disease itself has not been observed. Overall, clear declines in winter populations of northern long-eared bats have been observed in Ohio and Illinois (Service 2014, unpublished data). Surveys suggest declines are also occurring in Wisconsin, Indiana and Missouri.

There are no firm population size estimates for the northern long-eared bat rangewide; nor do we have the benefit of a viability analysis; however, a rough estimate of the population size in a portion of the Midwest has been calculated. That estimate shows there may have been more than four million bats in the six-State area that includes the States of Illinois, Indiana, Iowa, Ohio, Michigan, and Missouri (Meinke 2015, pers. comm.). This population size estimate (for the northern long-eared bat) was developed for the Midwest Wind Energy Multi-Species Habitat Conservation Plan (MSHCP) and was calculated by adjusting the 2013 Indiana bat winter population size (within the 6 States) based on the ratio of northern long-eared bats compared to Indiana bats in summer mist-net surveys. This estimate has limitations, however. The amount and quality of data available to estimate the population result in substantial uncertainty. The principal limitation is that the estimate is based on data that were primarily gathered prior to the onset of WNS in the Midwest; thus declines that have occurred in WNS affected States are not reflected in the estimated number. Although declines of over 90% have been documented in some Midwest hibernacula, other hibernacula still show no signs of WNS. The data available are too limited to estimate declines across the six-State area. Taking into account the documented effects of WNS in the Midwest to date (declines currently limited primarily to Ohio and Illinois), there may still be a few million bats within the six-State area. Because of the limited data available on declines, there is uncertainty as to the accuracy of this revised estimate, and it should be considered a rough estimate.

Factors Affecting Species in the Action Area

White-nose syndrome is now affecting large portions of the Midwest Region. To date WNS has been documented in 61 counties across 7 states, and is suspected in another 38 counties. The most recent observations indicate a continued westward spread of the disease, with most new reports from the winter 2014-2015 season coming from Missouri, Illinois, Wisconsin and Michigan. Only portions of western Iowa and Minnesota are currently thought to be free from immediate risk, and these areas have relatively little forested area to provide summer habitat for NLEB.

Development of wind turbine power generation facilities has been higher in the Midwest Region

than other areas of the NLEB range, with over 15,000 megawatts of currently installed capacity. Wind turbines can injure or kill bats that are struck by turbine blades. Eight NLEB fatalities have been documented at wind facilities in the action area to date, but detection rates of NLEB fatalities are thought to be low. An estimate of fatalities due to existing wind turbine operations developed for the Midwest Wind Energy Multi-Species Habitat Conservation Plan indicates that approximately 1,176 NLEBs are being killed each year from existing wind projects in the Midwest Region. Projections suggest installed capacity in the region could as much as triple by 2030, leading to increased affects to NLEB.

Conversions of forest lands to other uses, such as agricultural or urban development, are common in the Midwest Region. Conversion is more likely on private lands than public forests. According to the US Forest Service and Northeastern Area Association of State Foresters (2011) "Private forest land is being fragmented, parcelized, and converted to nonforest uses at an alarming rate, making 'Keeping Forests as Forests' one of the most critical issues facing natural resources managers throughout the Northeast and Midwest." The US Forest Service (2012) projects between 16 and 34 million acres of non-Federal forest in the conterminous US will be lost by 2060. Of this, 5-10 million acres are expected to be forests in the Northeast and Midwest. Acres of forest loss may not fully express the potential effects to NLEB. From 2001 to 2006, there was a net loss of 1.2 % of forest across the coterminous US, but this corresponded to a 4.3% net loss of interior forest (USFS 2014). This suggests that forest losses are fragmenting forests and creating smaller patches of forest, which results in less intact habitat for NLEB. Forest management practices are also common in many areas of the Midwest. These activities are expected to have similar affects in the Midwest Region as to the entire species range as discussed above.

Conservation Needs of the Species in the Action Area

The conservation needs of the species in the action area are similar to the needs rangewide. The primary conservation need of the NLEB in the Midwest Region is to reduce the threat of WNS. Therefore, within the action area the conservation needs include: 1) reducing WNS-related mortality and injury; 2) maintaining suitable conditions within hibernacula and protecting them from disturbance; 3) providing suitable habitat conditions for NLEB swarming, foraging, and roosting; 4) maintaining suitable habitat conditions in identified maternity areas and reducing the removal of roost trees; 5) searching for previously unidentified areas of maternity and hibernation activity; 6) conducting research to understand the migration patterns of NLEB throughout the region; and 7) reducing of threats in migratory corridors during the migratory seasons.

EFFECTS OF THE ACTION

All activities authorized by the Service under Section 10(a)(1)(A) must meet permit issuance criteria at 50 CFR 17.22, .32, or .52. All activities considered in this biological opinion must be justified in relation to enhancement of propagation or survival and recovery, effects to the wildlife species, peer review, and qualifications of permittees. By definition then, authorized

activities should benefit species recovery with minimal adverse effect by qualified permittees. Effects that occur are described below, grouped by types of activity.

Potential adverse effects associated with Section 10(a)(1)(A) permits are described below:

(1) Non-invasive activities that do not involve handling of bats include surveys conducted with visual counting and electronic monitoring techniques. Monitoring via electronic equipment in caves is used for continual monitoring of roosting bat populations with minimal disturbance. These activities have the potential to affect feeding, sheltering, and reproductive behavior resulting in harassment to the bats.

(2) Minimally invasive activities that involve handling of bats but have a low potential for physical damage to bats are conducted by experienced biologists who are recognized as bat handlers and who have demonstrated an ability to minimize potential harm to bats. These activities include hair clipping, banding, harp trapping, mist netting, collection of fecal material, attachment of light tags, attachment of radio transmitters, and collection of information (e.g., species, sex, band data, wing damage, weight, forearm length, and reproductive condition). These activities have the potential to affect the bats' feeding, sheltering, and reproductive behavior resulting in harassment to the bats, and, since the bats are being handled, the bats may be harmed although that harm has been minimized through the use of experienced biologists.

(3) Invasive activities which will cause or have the potential to cause direct physical damage to bats are also conducted by experienced biologists that are recognized as bat handlers and have demonstrated the ability to minimize potential harm to bats. These activities include wing punches and hair removal. In addition to direct physical harm to bats, stress and subsequent adverse effects upon feeding, resting, or reproductive behavior could result from these activities resulting in additional harassment.

Duration: The effects of the majority of proposed activities covered through the issuance of this programmatic biological opinion are considered single, short-term events or pulse effects (e.g., those non-invasive activities occurring at sites where bats are encountered). Although short-term effects occur at sites where bats are encountered, longer-term effects or press effects from invasive activities may occur as bats disperse across the landscape after the completion of sampling events. For instance, wing punches are not typically believed to have long-term negative effects on affected bats; however, it is possible that listed bats with wing punches may develop secondary infections, may suffer temporary foraging or maternity care inefficiencies, or, at worst, delayed mortality.

Disturbance Frequency: The mean number of disturbance events is expected to vary depending upon the specific objectives of the activity proposed. Activities taking place within winter hibernacula and/or summer roosts may have a higher number of disturbance events than activities accomplished randomly across the summer landscape. The number of disturbances at these winter and summer roosts will largely be determined by the site specific conditions (e.g., species present, ease of access, WNS presence, etc.). However, the work conducted with permits issued under this biological opinion must be related to recovery; therefore, the frequency of

disturbance from the proposed activities is always anticipated to be less than the recovery rate for the northern long-eared bat.

Disturbance Intensity: None of the take associated with the recovery-related activities covered under this biological opinion is expected to be at a scale measurable at the population level after the disturbance. More specifically, the only potential loss of an individual from a population either in their winter hibernaculum or summer roost is if: (1) disturbances to maternity roosts cause non-volant pups to be dropped, injured, and/or killed; and, (2) mist net and harp trap surveys create an opportunity for harm or mortality to occur through injury. If a single listed bat was removed from a winter hibernaculum or summer population, the disturbance intensity and loss of one individual is expected to be insignificant to the population from which it was removed.

Disturbance Severity: None of the recovery-related activities covered under this biological opinion are expected to be at a scale measurable at the affected population or species level after the disturbance. More specifically, the most severe disturbance would result in the potential loss of one individual from a population either in their winter hibernaculum or summer roost if the individual is disturbed in their maternity roost causing a non-volant pup to be dropped, injured, and/or killed or the unlikely event that an individual is injured during capture in a harp trap or mist net leading to harm or mortality. If a single listed bat was removed from a winter hibernaculum or summer population, the disturbance severity is not expected to make the population from which it was removed or the species overall more susceptible to the effects of other actions. Furthermore, we expect the overall impact of a permitted recovery activity would always be positive. Otherwise, the recovery permit would be denied.

Analyses for Effects of the Action

Beneficial Effects: While these permitted recovery activities are expected to always have a beneficial impact on recovery of the northern long-eared bat, there are no wholly beneficial effects tied to the proposed action because any form of take is considered an adverse effect.

Direct Effects: The proposed activities will have a variety of direct adverse effects on the northern long-eared bat, and these effects will be influenced by the severity, duration, and other factors related to the proposed action.

- Entering summer or winter roosts may cause unnatural arousal of bats, which may have adverse effects ranging from minor harassment to short-term harm. For example, we would expect greater arousal rates to occur during counts for population or WNS monitoring than for installation of detection equipment, because equipment installation would typically occur at roost entrances instead of roosting sites (i.e., a greater distance from bats) and result in less time within the roost (i.e., a lower time of exposure to disturbances). Similarly, disturbances of roosts will cause bats to unnaturally expend energy and disturbances of maternity roosts may cause disruptions to feeding of pups or may cause non-volant pups to be dropped, injured, and/or killed. However, this is only

likely to happen where unknown maternity populations exist, because such activities are typically not conducted in known maternity colonies to avoid just these types of effects.

- The salvage of dead bats may cause disturbance to other bats in hibernacula or roost sites where the dead bats are found, the effects of which would be the same as those described for entering summer or winter roosts (above).
- Mist net and harp trap surveys during the non-hibernation season will have direct effects on captured bats by altering their foraging behavior, harassing bats while being handled, and creating an opportunity for harm or mortality to occur. In addition, maternal behavior may be altered by temporarily delaying the return of lactating females to nursing non-volant pups.
- Collecting data from individual bats, hair clipping, banding, attachment of radio transmitters and light tags, and collection of wing punches or blood samples will have direct effects on handled bats, because the bats will be harassed or harmed during handling and the collection of data. For hair clipping, attachment of radio transmitters and light tags, and collection of wing punches or blood samples, direct harm will occur due to the purposeful removal of tissues or blood from the bats. Collection of wing punches or blood samples is expected to be more harmful than these other activities; collection of external data and banding are expected to be the least harmful of these activities.

Interrelated and Interdependent Actions

No interrelated or interdependent actions were identified. Each permit application will be evaluated on its merits considering issuance criteria at 50 CFR 17.22(a)(2) or 17.32(a)(2). Also, each permit that is issued will have independent utility in that each permittee will accomplish specific permitted activities that do not depend on any other similar permit or take authorization that may be issued by the Service's Midwest Region.

Indirect Effects

The installation and use of remote monitoring equipment may result in disturbance to bats. However, the intensity and frequency of disturbance during installation of equipment is usually minimal. Although extremely rare, the duration of ultrasonic disturbance from some monitoring equipment (e.g., I-buttons for microclimate monitoring) can extend for weeks or months, and bats may alter their roosting locations as a result.

Other indirect effects that may occur are related to latent effects on individuals and populations that may result from proposed activities. For instance, wing punches are not typically believed to have long-term negative effects on affected bats; however, it is possible that listed bats with wing punches may develop secondary infections, may suffer temporary foraging or maternity care inefficiencies, or, at worst, delayed mortality.

Species' Response to the Proposed Action

It is not expected that the disturbance to northern long-eared individuals or populations will significantly reduce the numbers of individuals/populations or their recovery rates due to the frequency, duration, and nature of the effects from the proposed action. Little or no mortality of individuals is expected. In addition, permitted recovery actions are expected to result in a long-term net benefit to the species (by definition).

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation under Section 7 of the Act.

Activities such as logging and development on private lands are ongoing and are reasonably certain to occur in the future in the Midwest Region. These activities affect listed bat species by removing forest habitat that serves as roosting and foraging habitat and travel corridors between caves and foraging areas. It may also result in significant sedimentation of adjacent streams that provide important foraging habitat.

Construction and operation of wind turbines is occurring in many parts of the action area, and will likely expand in the future. Operation of wind turbines may adversely affect NLEB by causing harm or death. While some wind turbine operators have sought or are likely to seek Section 10 permits for incidental take of NLEB, it is reasonably certain that some turbine operators will not seek Section 10 permits. In addition to the loss of individual bats, the continued construction and operation of wind turbines could result in the loss of particular NLEB populations or migratory routes, although the extent of these losses are not certain.

Recreational caving may adversely affect bats through disturbance of roosting or hibernating individuals. Entering a cave that has been infected by *P.d.*, the fungus believed to be responsible for the death of more than six million bats in the U.S. from WNS, can result in the transmission of this disease to other caves yet to be infected if proper steps (e.g., decontamination of gear and clothing and avoiding the use of potentially infected gear in unaffected caves) are not taken by individuals visiting these sites. Once WNS is transmitted to a new cave, it may spread throughout the bat population present within the new site leading to potential future mortality events. These disturbances may also cause bats to awaken and prematurely use some of their stored fat reserves. Multiple disturbances may cause the bats to leave a hibernaculum early in search of food items. Some recreational uses of caves have led to the mortality of listed bats (i.e., people entering caves have purposefully killed bats); however, the extent to which this may occur in the future is unknown.

CONCLUSION

After reviewing the current status of the northern long-eared bat, the environmental baseline for the action area, the effects of the proposed activities, and the cumulative effects, it is our

biological opinion that the activities, as proposed and including the protective measures described, are not likely to jeopardize the continued existence of the northern long-eared bat. Many of the proposed activities have been undertaken by permitted bat biologists for many years without significant effects on listed bat populations and have contributed greatly to their recovery. Therefore, we believe that the implementation of the proposed activities can be accomplished without jeopardizing this species. No critical habitat has been proposed for the northern long-eared bat; therefore, none will be affected.

Further, we have determined that the activities addressed in this biological opinion are not likely to result in jeopardy to the northern long-eared bat at this time because of the reasons outlined in the two previous paragraphs and because:

(1) The surveillance and monitoring of WNS impacts will result in low levels of harassment and/or harm to listed bats;
(2) The other activities have been conducted for many years by qualified biologists without significant population effects on these species;
(3) All categories of activities have incorporated minimization measures via standardized protocols (See Appendix B) that reduce the amount and/or effect of any take that might occur.
(4) To date, we have not received reports of significant bat fatalities during implementation of any of these activities. Permitted biologists, researchers, and facilities have demonstrated that they have the knowledge and experience to collect and handle bats with minimum stress and potential for mortality, and we expect that permits in the future will only be issued to biologists, researchers, and facilities that have such knowledge and experience in conducting the activities addressed in this biological opinion.

INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering (50 CFR § 17.3). Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering (50 CFR § 17.3). Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

On April 2, 2015, the Service published an interim species-specific rule pursuant to section 4(d) of the ESA for NLEB (80 FR 17974). The Service's interim 4(d) rule for NLEB exempts the take of NLEB from the section 9 prohibitions of the ESA in several ways. The interim 4(d) rule section relevant to the proposed action excepts take of NLEB when such take occurs as follows (see the interim rule for more information):

> For a limited period of 1 year from the effective date (May 4th, 2015) of this interim 4(d) rule, purposeful take that is caused by the authorized capture, handling, and related activities (attachment of radio transmitters and tracking) of northern long-eared bats by individuals permitted to conduct these same activities for other bats will be excepted from the prohibitions.

The incidental take that is carried out in compliance with the interim 4(d) rule does not require exemption in this Incidental Take Statement. Accordingly, there are no reasonable and prudent measures or terms and conditions that are necessary and appropriate for these actions because all incidental take has already been exempted. The activities that are covered by the interim 4(d) are as follows: activities described in the proposed action carried out by individuals with permits to conduct these activities for other bats between May 4th, 2015 and May 4th, 2016. The remainder of this analysis addresses the incidental take resulting from those elements of the proposed action that are not covered by the 4(d) rule.

The measures described below are non-discretionary, and must be undertaken by the Service so that they become binding conditions of any section 10(a)(1)(A) permit issued, as appropriate, for the exemption in section 7(o)(2) to apply. The Service has a continuing duty to regulate the activities covered by this incidental take statement. If the Service: (1) fails to assume and implement the terms and conditions or (2) fails to require a permittee to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the section 10(a)(1)(A) permit, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, permittees must report the progress of the action, and its impact on the species to the Service as specified in the incidental take statement. [50 CFR Section 402.14(I)(3)]

AMOUNT OR EXTENT OF TAKE

The proposed activities do not allow us to derive quantitative take estimates for the northern long-eared bat with any certainty. For example, we expect that incidental take due to mortality will be difficult to detect for several reason(s): (1) the species is small, so finding a dead or injured individual after handling would be difficult; (2) many of the activities addressed in this biological opinion are conducted at night and consist of handling an individual for a short period and releasing it; (3) entrance into hibernacula is done once for a short period of time, so it is unlikely that dead or injured individuals would be found so that death or injury could be attributed to that activity; and (4) data to support the use of a surrogate measure of take (e.g., number of cave intrusions per year, cumulative number of mist net nights of sampling, number of harp trap captures, or number of wing punches collected) for the incidental take of individuals

is not currently available. For these reasons and because the proposed action is a programmatic action and not a specific, defined action whereby an accurate take calculation could be made, we have established sidebars that define annual incidental take limits not to be exceeded through implementation of the proposed action. The defined sidebars, in turn, provide support for our jeopardy determination.

In order to define annual incidental take limits for the proposed action, we considered the types and extent of take identified and then evaluated in the effects analysis of this biological opinion. Basically, incidental take will occur from traditional bat research activities. Traditional bat research activities will cause harassment of the northern long-eared bat, and possibly of other listed bat species if such activities occur in close proximity to them (e.g., winter cave surveys). The number of bats harassed is difficult to estimate, as a large portion of the research activities will be done for the purpose of determining presence or density of bats in an area. Rapid changes in population numbers expected due to WNS exacerbate this difficulty. However, current capture methods for bats in spring, summer, and fall are known to have low capture rates relative to local bat population numbers, so only a small proportion of any population are expected to be harassed through these surveys.

Traditional bat research activities may also harm the northern long-eared bat; however, we do not anticipate that any of these activities will cause injury or death due to the expertise of the biologists doing the work and the standard bat permit conditions put in place to ensure proper avoidance and minimization measures are followed. While take in the form of injury or death is not expected from these traditional bat research activities, we recognize that situations beyond a permittee's control may, albeit rarely, occur resulting in injury or death to a listed bat. Therefore, we have set an annual incidental take (i.e., injury or mortality) threshold (limit) for traditional bat activities that are not to be exceeded through implementation of the proposed action. The annual incidental take threshold, in the form of reported injury or death, for the northern long-eared bat as a result of all permitted activities is 9 individuals.

From May 4th, 2015 to May 4th, 2016, any take of NLEB caused by individuals permitted to conduct the above activities for other bats is excepted from section 9 prohibitions by the interim 4(d) rule. This excepted take is not included in the annual incidental take threshold for 2015 or 2106, but is expected to be subset of the 9 individuals expected annually, and the effect of this take will not be additive.

EFFECT OF THE TAKE

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to NLEB. No critical habitat has been designated for NLEB, so none would be impacted.

REASONABLE AND PRUDENT MEASURES

We believe the following reasonable and prudent measure is necessary and appropriate to minimize impacts of incidental take of the northern long-eared bat:

1. The Service will ensure that any section 10(a)(1)(A) permits that are issued in the Service's Midwest Region are based on (a) current biological information for the species and standard practices that have been scientifically derived for the collection and handling of the species addressed in this biological opinion, and (b) an analysis of the qualifications of permit applicants that demonstrates and provides evidence that permittees are qualified (for new permits) and are adhering to permit conditions (e.g., submitting reports, contacting field offices, etc...) for amended or renewed permits.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the Service must comply with the following terms and conditions, which carry out the reasonable and prudent measure described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

1. The Section 10 permit coordinator will provide appropriate field offices in the Service's Midwest Region, and appropriate regional offices in other Service regions, with copies of permit requests for listed bats. Field Office biologists will review the applications to determine the qualifications of the applicant(s) to ensure that they are qualified to perform the proposed activities. The permit will contain appropriate contact information for each state (i.e., Ecological Services and Law Enforcement offices for each state).

2. Permits will include conditions containing contingency procedures in the event that mortality to a listed bat occurs during the performance of proposed activities. Given the history of the ongoing activities authorized by the Service, we do not anticipate injury or mortality to individuals of listed bat species, unless associated with a specific permitted action (e.g., wing punches). If unintended mortality or injury should occur, authorized activities will stop after completion of the current day's activities and the permittee will contact the appropriate Service office noted in the permit conditions by the next workday. Based on discussions between the Service office and the Service's Law Enforcement Division, a decision will be made as to whether or not the authorized activities will be allowed to continue. A decision will also be made as to the disposition of any dead or injured bats.

3. All current and subsequent white nose syndrome-related decontamination protocols approved by the Service and deemed necessary to address the disease, will be followed by permittees covered under Section 10(a)(1)(A) permits.

4. The Service will ensure that all minimization measures discussed in the description of the proposed activities and contained in Appendix B are incorporated as permit conditions for any permits proposing to implement those activities.

5. The Service will ensure that all permittees provide reports on all covered activities that include estimates and/or actual amounts of take (permitted (i.e., purposeful) take activities and incidental take) that occurs as a result of permitted activities. Such reports must be received on an annual or more frequent basis.

The reasonable and prudent measure, with its implementing terms and conditions, is designed to minimize the impact of incidental take that might otherwise result from the proposed action. If the Service or permittees observe or become aware of incidental take that occurs during implementation of permitted activities that exceeds or is different from the incidental take authorized by this biological opinion, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measure provided. The Service and/or permittee must immediately provide an explanation of the causes of the taking and review, and the Service must evaluate the need for possible modification of the reasonable and prudent measure.

REPORTING REQUIREMENTS

The Service shall routinely evaluate the proposed activities to ensure that they are not having adverse effects that exceed those described in this biological opinion or leading to levels of take that are greater than authorized in this biological opinion.

REINITIATION NOTICE

This concludes formal consultation for the Service's issuance of section 10(a)(1)(A) permits throughout the Midwest Region. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over an action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat is designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such a take must cease pending reinitiation.

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APPENDIX A – CONSULTATION HISTORY

On October 2, 2013, the Service published a proposed rule to list the northern long-eared bat as endangered throughout its range (78 FR 61045). The comment period was extended three times since then, on December 2, 2013 (78 FR 72058), June 30, 2014 (79 FR 36698), and November 18, 2014 (79 FR 68657).

On January 16, 2015 the Service proposed a rule under Section 4(d) of the Act to consider possible exceptions to Section 9 prohibitions should the northern long-eared bat be listed as threatened (80 FR 2371), which was subsequently corrected on January 30, 2015 (80 FR 5079).

A final determination to list the northern long-eared bat as threatened was published April 2, 2015, with an interim 4(d) rule and an additional request for comment (80 FR 17973). The threatened listing became effective on May 4, 2015.

In the past year, the Midwest Region has received several section 10(a)(1)(A) permit applications from individuals requesting take of the threatened northern long-eared bat for recovery purposes. The existing process and requirements for permits for other bats species were reviewed and modified as appropriate for the northern long-eared bat. This biological opinion represents the final product resulting from the review of this process.

APPENDIX B – PERMIT TERMS

C. 1. The following individuals are authorized to conduct activities as authorized by this permit: **List personnel**

Trained assistants not named on this permit may work on permitted bat activities under the direct and on-site supervision of the individuals named above. However, trained assistants may not work independently at a site. Trained assistants are individuals who are considered qualified by the permitted biologist(s) to select sampling sites, deploy sampling equipment and nets, and handle bats in the field.

At least one named permittee must remain present at each mist-net site while it is being operated.

D. ACCEPTANCE OF THIS PERMIT SERVES AS EVIDENCE THAT THE PERMITTEE UNDERSTANDS AND AGREE TO ABIDE BY THE TERMS OF THIS PERMIT AND ALL SECTIONS OF TITLE 50 CODE OF FEDERAL REGULATIONS, PARTS 13 AND 17, PERTINENT TO ISSUED PERMITS. SECTION 11 OF THE ENDANGERED SPECIES ACT OF 1973, AS AMENDED, PROVIDES FOR CIVIL AND CRIMINAL PENALTIES FOR FAILURE TO COMPLY WITH PERMIT CONDITIONS.

E. PERMITTEE IS AUTHORIZED TO TAKE (ENTER HIBERNACULA OR MATERNITY ROOST CAVES, SALVAGE DEAD BATS, CAPTURE WITH MIST NETS OR HARP TRAPS, HANDLE, IDENTIFY, COLLECT HAIR SAMPLES, BAND, RADIO TAG, LIGHT-TAG, AND WING-PUNCH) INDIANA BATS (Myotis sodalis), GRAY BATS (Myotis grisescens), NORTHERN LONG-EARED BATS (Myotis septentrionalis), VIRGINIA BIG-EARED BATS (Corynorhinus townsendii virginianus), AND OZARK BIG-EARED BATS (Corynorhinus townsendii ingens) FOR SCIENTIFIC RESEARCH AIMED AT RECOVERY OF THE SPECIES, SUCH AS: PRESENCE/ABSENCE SURVEYS, STUDIES TO DOCUMENT HABITAT USE, POPULATION MONITORING, AND TO EVALUATE POTENTIAL IMPACTS OF WHITE-NOSE SYNDROME OR OTHER THREATS AS CONDITIONED BELOW.

F. Activities at the following locations require written site-specific approval from the USFWS Field Supervisor in the State(s) where the project will occur (as outlined in Condition G):

F.1. Locations within Region 2 of the USFWS: Oklahoma

F.2. Locations within Region 3 of the USFWS: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin

F.3. Locations within Region 4 of the USFWS: Alabama, Arkansas, Georgia, Kentucky, Mississippi, North Carolina, Louisiana, Florida, South Carolina, and Tennessee

F.4. Locations within Region 5 of the USFWS: Connecticut, Delaware, Maryland, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia and West Virginia

F.5. Locations within Region 6 of the USFWS: Kansas, Nebraska, North Dakota, South Dakota, Wyoming, Montana

G. Permittee shall notify the USFWS Field Supervisor for the state in which activities are proposed to occur at least 15 days prior to conducting any activities. Contact information is in Condition P., below. Your request for this site-specific approval must be in writing and must indicate:

G.1. The purpose and a description of the activities proposed (e.g., surveys, radio telemetry studies, etc.).

G.2. Location of proposed activities, including project site (legal description and lat/long), county, and state.

G.3. Dates when the project is proposed to take place.

G.4. You may proceed with activities only upon receipt of written concurrence from the applicable USFWS Field Supervisor. *Your concurrence letter must be carried with this permit to authorize site-specific activities.*

H. Permittee shall adhere to the following conditions involving capture and handling of bats:

H.1. Federally-listed bats may be captured (e.g., mist-nets and harp traps) following the protocol(s) provided by the USFWS, when available. Permittees must contact the USFWS FO in the state(s) which activities are proposed to ensure correct protocol(s) are used. For example, the current Range-wide Indiana Bat Summer Survey Guidelines are available at: http://www.fws.gov/midwest/endangered/mammals/inba/inbasummersurveyguidance.html. The monitoring interval for mist nets is once every 10 minutes. Harp traps must be continually monitored.

H.2. Captured bats may be held for a maximum of 30 minutes, unless injured. If an exception is required to this prohibition, Permittee must receive prior written approval from the USFWS Field Supervisor for the state in which the activities are proposed to occur.

H.3. Permittees shall carry out non-intrusive measurements on all captured bats. Data shall be recorded for all bats captured and include, but not be limited to, the data requested in any automated or species specific data form provided by the USFWS (e.g., INDIANA BAT SURVEY AND BANDING DATA form). Handling should be limited to the maximum extent practicable and should cease immediately at signs of undue stress (e.g., bat becoming unresponsive, etc.). Bats that appear stressed from handling should be placed in a dark, quiet location away from activity where it can safely fly away after recovery, and should be checked to ensure successful recovery before leaving the study site. Photographs of the identifying characteristics for each individual federally-listed species captured are encouraged. The Permittee may be requested to provide individual photographs after submittal of annual reporting data.

H.4. If bands are applied, these must be lipped metal bands having a unique identifier. Bands should be applied to the forearm of captured bats prior to release. No more than one band per bat may be used. Position the band on the wing so that when the bat is hanging upside down, the band numbers are right-side up. A single band should be placed on the right forearm of each male and the left forearm of each female bat.

H.5. Radio transmitters may be applied during spring, summer, and fall roosting and migration periods via nontoxic skin bond adhesive. The total weight of the transmitter may not exceed 5% of the bat's body weight and the total weight of the package (transmitter and adhesive) may not exceed 6% of the bat's body weight. The lightest package (both transmitter and adhesive) capable of accomplishing the required task should be used, especially with pregnant females and newly volant juveniles. Bats carrying transmitters must be monitored daily for at least five days, or until the transmitter falls off, whichever occurs first.

H.6. No capture activities shall occur within 20 meters of a known or potential summer or winter roost site, either natural or artificial, of a federally-listed bat. If an exception is required to this prohibition, Permittee must receive prior written approval from the USFWS Field Supervisor for the state in which the activities are proposed to occur.

H.7. Permittee may collect dorsal hair samples, wing biopsy tissue samples, fungal lift tape and swab samples from captured bats for scientific study. Hair samples shall be obtained via clipping fur from between scapula from females and juvenile males. The clipped area is the same area frequently clipped for radio transmitter attachment. Wing tissue samples may be taken using a new, sterile biopsy punch (2mm) for each endangered bat sampled. No more than two samples, one from each wing, may be obtained per individual. All boards and equipment used to obtain samples must be disinfected according to the protocol cited in Condition H.9.

H.8. Cyalume light tags may be affixed to the back of unmarked bats during summer roosting period via non-toxic skin bond adhesive to aid in identification of individuals for echolocation recordings. Light tags shall not be affixed to bats carrying radio transmitters. Light tag cannot exceed 2 cm in length or 0.15 g in weight. The light tag must be resistant to tooth puncture and sealed to prevent bats from ingesting cyalume compound. Any light tag that has the potential to expose bats to the cyalume compound is prohibited; the compound is known to be toxic to bats.

H.9. Equipment used to capture and handle bats shall be cleaned and decontaminated, including personal gear such as boots and gloves, using products cited in decontamination guidelines and in compliance with label directions. The most recent decontamination guidance is found on the web at: http://whitenosesyndrome.org/

H.10. Caves, mines, or other suitable hibernation sites may be quietly searched in a manner that minimizes disturbance by utilizing the minimum number of people and time required to complete the survey. Surveys of known hibernacula conducted during the winter hibernation season shall follow the guidelines established in the recovery plans for each federally listed bat species with regards to how often a site may be visited and other species-specific requirements related to entering hibernaculum (for example, for Indiana bats, winter surveys should not be repeated more often than once every other year in any given hibernaculum; for gray bats, winter surveys should not be repeated more often than once every three years in any given hibernaculum), unless authorized by the appropriate Service Recovery Lead identified in Condition O (below).

Under no circumstances should multiple trips to the hibernation area occur within the same year without written approval of the USFWS Field Supervisor for the state in which activities are proposed.

Bats may be handled during winter surveys in order to collect band information and confirm the identification of listed species. When possible, bands should be read without touching the bat. Banded bats should only be handled if easily accessible and removal of the bat does not disturb a large number of additional bats and is unlikely to result in injury to the bat. Detailed photographs should be taken to document the presence of listed species in previously undocumented hibernaculum. Where hibernacula area and safety conditions allow, individuals entering hibernacula are recommended to utilize night vision goggles or red-filtered light and to remain in the site no more than 90 minutes to complete the work.

H.11. Surveys of gray bat, Ozark big-eared bat, or Virginia big-eared bat maternity roosts and their other known summer roost sites shall be conducted by observing the bats with night vision equipment and/or infrared light sources (e.g., thermal infrared) as they emerge from their roosts to avoid any possible disturbance to these bats. At previously undocumented sites for these species, the accepted method to determine if they are present is to carefully and slowly enter the potential roost site to check for evidence of presence/use, such as visual observation of bats, significant quantities or a strong smell of guano, or the audible sounds produced by bats roosting at the site. As soon as any evidence is obtained that the roost site is being used by a federally-listed bat species, survey team members shall immediately exit the roost site and make further observations from outside the entrance to the roost. All further observations shall be made from the entrance during the evening emergence.

I. Upon determination that endangered bats are present, Permittee shall notify the following offices immediately (not to exceed 1 business day): the appropriate USFWS Regional Office (Condition N.), and the USFWS Field Office within the geographic location of study areas (Condition O.).

J. Permittee must carry a copy of this permit at all times when conducting the authorized activities. Shipments of collected biological materials should also be accompanied by a copy of this permit. NOTE: This permit is limited to the above activities and identified species.

K. Issuance of this permit does not constitute permission to conduct these activities on National Wildlife Refuges or any other public or private lands; such permission must be obtained separately from the appropriate landowner or land manager before beginning these authorized activities. This permit, neither directly nor by implication, grants the right of trespass.

L. Accidental injury or mortality may not exceed one specimen. In the event that any accidental injury or mortality occurs, all activities must cease and the injury or mortality reported immediately (not to exceed 1 business day) to the applicable office listed in condition N. and to the Lead Recovery Biologist for the species (condition _). The USFWS will work with the permittee to determine the cause of injury or mortality and whether such could be avoided should activities be allowed to proceed. Dead or moribund bats may be retained for further study only with the written permission of the USFWS. Any bats that are not authorized for retention are to be chilled and promptly transferred to the USFWS for potential necropsy and/or for scientific or educational purposes.

Upon locating a dead, injured, or sick bat, or any other threatened or endangered species, under circumstances not addressed in this authorization, initial notification must be made immediately (not to exceed 1 business day) to the USFWS Office identified in condition N., below, including a description of the circumstances, location information, and photo documentation. Notification should also be made at the same time to the USFWS Field Office identified in condition P., below. Care should be taken in handling sick, injured, or dead specimens to ensure effective treatment or to preserve biological materials for later analysis. In conjunction with the care of sick or injured threatened or endangered species, and the preservation of biological materials from a dead animal, the permittee should take responsible steps to ensure that the site is not unnecessarily disturbed. Prior to collecting the specimen(s), you must photograph the specimen(s) to document the conditions in which they were found. You may preserve the specimen(s) by freezing them or other suitable method to allow scientific study. Disposition of collected specimen(s) shall be determined by the USFWS Field Office.

M. Reports are due on January 31 following each year this permit is in effect. At a minimum, your report shall include:

M.1. The date, time, geographic locations (including datum and projection information).

M.2. All locations surveyed (regardless of whether federally-listed bats were captured/observed).

M.3. Band numbers of all bats banded and all bats recovered/observed.

M.4. Information on any injuries and/or mortalities and disposition of specimens.

M.5. Location and characteristics of roost trees and bat colonies.

M.6. Copies of any separate reports and/or publications resulting from work conducted under the authority of this permit.

M.7. Data shall be submitted for all bats captured and include, but not be limited to, the data requested in any automated or species-specific data form provided by the USFWS (e.g., INDIANA BAT SURVEY AND BANDING DATA forms, the data collection forms found in the current Rangewide Indiana Bat Summer Survey Guidelines cited in Condition H.1., or other species specific forms). Photographs of the identifying characteristics for each individual federally-listed species captured are encouraged. The Permittee may be requested to provide individual photographs after submittal of annual reporting data.

M.8. Copies of all site specific authorization letters required under Condition G.

If no activities occurred over the course of the year, indication of such shall be submitted as an annual report.

N. Copies of your reports shall be sent to the offices listed below. When possible, electronic copies shall be submitted in lieu of hard copies in MS Word, Portable Document Format, Rich Text Format, or other file format that is compatible with the receiving office.

N.1
Regional Recovery Permits Coordinator
U.S. Fish and Wildlife Service – Midwest Region (Region 3)
Ecological Services – Endangered Species
5600 American Blvd. W., Suite 990
Bloomington, Minnesota 55437-1458
(612/713-5343; fax 612/713-5292)
permitsR3ES@fws.gov

N.2.
Regional Recovery Permits Coordinator
U.S. Fish and Wildlife Service – Southeast Region (Region 4)
1875 Century Boulevard, Suite 200
Atlanta, Georgia 30345-3301
(404/679-7101; fax 404/679-7081)
permitsR4ES@fws.gov

N.3.
Regional Recovery Permits Coordinator
U.S. Fish and Wildlife Service – Northeast Region (Region 5)
Endangered Species Division
300 Westgate Center Drive
Hadley, Massachusetts 01035-9589
(703/358-2402; fax 413/253-8482)
permitsR5ES@fws.gov

N.4.
Regional Recovery Permits Coordinator
U.S. Fish and Wildlife Service – Southwest Region (Region 2)
500 Gold Ave., SW
P.O. Box 1306
Albuquerque, New Mexico 87103-1306
(505/248-6665; fax 505/248-6788)
permitsR2ES@fws.gov

N.5.
Regional Recovery Permits Coordinator & Assistant Regional Recovery Coordinator

U.S. Fish and Wildlife Service – Mountain-Prairie Region (Region 6)
Endangered Species Permits Office
Denver Federal Center, P.O. Box 25486
Denver, Colorado 80225-0489
(303/236-4212; fax 303/236-0027)
permitsR6ES@fws.gov

O. Additionally, based on species, reports and publications shall be submitted to the following:

O.1. For Studies involving Indiana Bats:

Lori Pruitt
U.S. Fish and Wildlife Service
Indiana Ecological Services Field Office
620 S. Walker Street
Bloomington, Indiana 47403-2121
(812/334-4261 x1213; fax 812/334-4273)

O.2. For Studies involving Gray Bats:

Shauna Marquardt
U.S. Fish and Wildlife Service
Missouri Ecological Services Field Office
101 Park De Ville Drive, Suite A
Columbia, Missouri 65203
(573/234-2132 x174; fax 573/234-2181)

O.3. For Studies involving Virginia Big-eared Bats:

Barbara Douglas
U.S. Fish and Wildlife Service
West Virginia Ecological Services Field Office
694 Beverly Pike
Elkins, West Virginia 26241
(304/636-6586 x19; fax 304/636-7824)

O.4. For Studies involving Ozark Big-eared Bats:

Richard Stark
U.S. Fish and Wildlife Service
Ozark Plateau National Wildlife Refuge
9014 East 21st Street
Tulsa, Oklahoma 74129
(918/382-4520; fax 918/581-7467)

O.5. For Studies involving Northern Long-eared Bats:

Jill Utrup
U.S. Fish and Wildlife Service
Twin Cities Ecological Services Field Office
4104 American Blvd. E
Bloomington, Minnesota 55425

(612/725-3548 x207; fax 612/725-3609)

P. Additionally, based on geographic area, reports and publications shall be submitted to the following:

P.1. For studies conducted in Illinois:

P.1.a.
Kristen Lundh
Endangered Species Coordinator for Illinois/Iowa
U.S. Fish and Wildlife Service
Ecological Services Field Office
1511 47th Ave.
Moline, Illinois 61265
(309/757-5800, x215; fax 309/757-5807)

P.1.b.
Ann Holtrop
Illinois Department of Natural Resources
Division of Natural Heritage
One Natural Resource Way
Springfield, Illinois 62702-1271

P.2. For studies conducted in Indiana:

P.2.a.
Lori Pruitt
Endangered Species Coordinator for Indiana
U.S. Fish and Wildlife Service
Ecological Services Field Office
620 S. Walker Street
Bloomington, Indiana 47403-2121
(812/334-4261 x1213; fax 812/334-4273)

P.2.b.
Scott Johnson
Indiana Department of Natural Resources
5596 East State Road 46
Bloomington, IN 47401
(812/334-1137, ext. 3400)

P.3. For studies conducted in Iowa:

P.3.a.
Kristen Lundh
Endangered Species Coordinator for Illinois/Iowa
U.S. Fish and Wildlife Service
Ecological Services Field Office
1511 47th Ave.
Moline, Illinois 61265
(309/757-5800, x215; fax 309/757-5807)

P.3.b.
Kelly Poole

Endangered Species Coordinator
Iowa Department of Natural Resources
Parks, Recreation, and Preserves
Wallace State Office Building
East 9th and Grand Avenue
Des Moines, Iowa 50319-0034
(515/281-8524)

P.4. For studies conducted in Michigan:

P.4.a.
Barbara Hosler
Endangered Species Coordinator for Michigan
U.S. Fish and Wildlife Service
2651 Coolidge Road
East Lansing, Michigan 48823
(517/351-6326; fax 517/351-1443)

P.4.b.
Dan Kennedy
Endangered Species Coordinator
Michigan Department of Natural Resources
Wildlife Division
P.O. Box 30444
Lansing, Michigan 48909-7444
((517) 284-6194; fax 517/373-6705)

P.5. For studies conducted in Missouri:

P.5.a.
Amy Salveter
Field Supervisor
U.S. Fish and Wildlife Service
Missouri Ecological Services Field Office
101 Park DeVille Drive, Suite A
Columbia, Missouri 65203-2132
(573/234-2132; fax 573/234-2181)

P.5.b.
Tara Jennings
Scientific Collecting Permit Coordinator
Missouri Department of Conservation
Endangered Species and Natural History Division
2901 W. Truman Blvd., P.O. Box 180
Jefferson City, Missouri 65102-0180
(573/522-4115 ext. 3322; fax 573/751-4864)

P.6. For studies conducted in Ohio:

P.6.a.
Angela Boyer
Endangered Species Coordinator for Ohio
U.S. Fish and Wildlife Service

Ohio Ecological Services Field Office
4625 Morse Road, Suite 104
Columbus, Ohio 43230
(614/416-8993, x22; fax 614/416-8994)

P.6.b.
Terrestrial Program Administrator
Ohio Department of Natural Resources
Division of Wildlife
2045 Morse Road, Building G
Columbus, Ohio 43229-6693
(614-265-6329; fax 614/262-1143)

P.7. For studies conducted in Minnesota and Wisconsin:

P.7.a.
Phil Delphey
Endangered Species Coordinator for Minnesota and Wisconsin
U.S. Fish and Wildlife Service
Ecological Services Field Office
4101 American Blvd E.
Bloomington, Minnesota 55425
(612/725-3548 x2206; fax 612/725-3609)

P.7.b.
Owen Boyle
Wisconsin Department of Natural Resources
P.O. Box 7921
Madison, Wisconsin 53707-7921
(608/266-5244)
Owen.Boyle@wisconsin.gov

P.7.c.
Richard Baker
Minnesota Endangered Species Coordinator
Division of Ecological and Water Resources
Minnesota Department of Natural Resources
500 Lafayette Rd., Box 25
St. Paul, MN 55155
Phone: 651/259-5073
richard.baker@state.mn.us

P.8. For studies conducted in Alabama:

Alabama Field Office
Bill Pearson, Field Supervisor
1208-B Main Street
Daphne, Alabama 36526-4419
(251) 441-5181

P.9. For studies conducted in Arkansas:

Arkansas Field Office
Jim Boggs, Field Supervisor
110 South Amity Road
Suite 300
Conway, Arkansas 72032-8975
(501) 513-4470

P.10. For studies conducted in Connecticut, Massachusetts, New Hampshire, Rhode Island and Vermont:

New England Field Office
Tom Chapman, Field Supervisor
70 Commercial Street, Suite 300
Concord, NH 03301
(603) 223-2541

P.11. For studies conducted in Delaware and Maryland:

Chesapeake Bay Field Office
Genevieve LaRouche, Field Supervisor
177 Admiral Cochrane Drive
Annapolis, MD 21401
(410) 573-4573

P.12. For studies conducted in Georgia:

Georgia Field Office
Field Supervisor
105 Westpark Drive, Suite D
Athens, GA 30606-3175
(706) 613-9493; fax 706/613-6059

P.13. For studies conducted in Kansas:

Kansas Field Office
Heather Whitlaw, Field Supervisor
2609 Anderson Avenue
Manhattan, Kansas 68502
785/539-3474; fax 785/539-8567

P.14. For studies conducted in Kentucky:

Frankfort Field Office
Lee Andrews, Field Supervisor
J C Watts Federal Bldg., Rm 265
330 West Broadway
Frankfort, KY 40601-8670
(502) 695-0468

P.15. For studies conducted in Mississippi:

Mississippi Field Office
Steve Ricks, Field Supervisor

6578 Dogwood View Pkwy, Ste A
Jackson, MS 39213-7856
(601) 321-1122

P.16. For studies conducted in New Jersey:

New Jersey Field Office
Field Supervisor
927 N. Main Street, Building D
Pleasantville, NJ 08232-1454
(609) 646-9310

P.17. For studies conducted in New York:

New York Field Office
David Stilwell, Field Supervisor
3817 Luker Road
Cortland, NY 13045
(607) 753-9334

P.18. For studies conducted in North Carolina:

Asheville Field Office
Janet Mizzi, Field Supervisor
160 Zillicoa Street
Asheville, NC 28801-1082
(828) 258-3939

P.19. For studies conducted in Oklahoma:

P.19.a.
Oklahoma Field Office
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P. 25. For studies conducted in North Florida:

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P. 26. For studies conducted in Maine:

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