



United States Department of the Interior

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May 6, 2015

Chippewa National Forest
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Forest Supervisor
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FWS No. 03E19000-2015-F-0110 Batched Prescribed Fire and Fuels Projects CNF
Formal Consultation on Northern Long-Eared Bat

Dear Ms. Lenz:

This document transmits the U.S. Fish and Wildlife Service's (Service) Biological Opinion (BO) based on our review of the U.S. Forest Service's (USFS) proposed activities on the Chippewa National Forest (Forest or CNF), and their effects on the northern long-eared bat (*Myotis septentrionalis*; NLEB) in accordance with Section 7(a)(2) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

The USFS request for consultation was received on 23 March 2015, and the Biological Assessment (BA) for the *Batched Prescribed Fire and Fuels Projects from 2004-2013 NEPA decisions on the Chippewa National Forest* was received on 2 April 2015. The USFS determined that the actions addressed in the BA have had prior coordination/consultation for all other involved federally-listed species and critical habitat. Therefore, this BO addresses one species, the northern long-eared bat.

This biological opinion is based on the best available scientific and commercial data including meetings, electronic mail and telephone correspondence between Chippewa National Forest and the Service; information in the Service's files; pertinent scientific literature; and, other sources. A complete administrative record is on file at the Service's Twin Cities Ecological Services Field Office.

Please contact the Service if the project changes or new information reveals effects of the proposed action to proposed or listed species or critical habitat to an extent not covered in your biological assessment. If you have any questions or comments on this biological opinion, please contact Mr. Phil Delphey, Fish and Wildlife Biologist, at (612)725-3548 ext. 2206, or via email at phil_delphey@fws.gov.

Sincerely,

A handwritten signature in blue ink, appearing to read "Peter Fasbender". The signature is stylized and cursive.

Peter Fasbender
Field Supervisor

Enclosure

BIOLOGICAL OPINION

Effects to the Northern Long-eared Bat (*Myotis septentrionalis*) from Batched Prescribed Fire and Fuels Projects from 2004-2013 NEPA decisions on the Chippewa National Forest

Prepared by:
U.S. Fish and Wildlife Service
Twin Cities Ecological Services Field Office

May 2015

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INTRODUCTION

This document transmits the U.S. Fish and Wildlife Service's (Service) Biological Opinion (BO) based on our review of the U.S. Forest Service's (USFS) proposed activities on the Chippewa National Forest (Forest or CNF), and their effects on the northern long-eared bat (*Myotis septentrionalis*; northern long-eared bat) in accordance with Section 7(a)(2) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*). The USFS request for consultation was received on 23 March, 2015 and the Biological Assessment (BA) for the *Batched Prescribed Fire and Fuels Projects from 2004-2013 NEPA decisions on the Chippewa National Forest* was received on 2 April 2015. The USFS determined that the actions addressed in the BA have had prior coordination/consultation for all other involved federally-listed species and critical habitat. Therefore, this BO addresses one species, the northern long-eared bat.

This BO is based on information provided in the BA. A complete administrative record of this consultation is on file at the Service's Twin Cities Field 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 northern long-eared bat (80 FR 18032). 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 northern long-eared bat exempts the take of northern long-eared bat from the section 9 prohibitions of the ESA, as follows:

- (1) Take that is incidental to forestry management activities, maintenance/limited expansion of existing rights-of way, prairie management, projects resulting in minimal (<1 acre) tree removal, provided these activities:
 - a. Occur more than 0.25 mile (0.4 km) from a known, occupied hibernacula;
 - b. Avoid cutting or destroying known, occupied roost trees during the pup season (June 1–July 31); and
 - c. Avoid clearcuts (and similar harvest methods, *e.g.*, seed tree, shelterwood, and coppice) within 0.25 (0.4 km) mile of known, occupied roost trees during the pup season (June 1–July 31).
- (2) Removal of hazard trees (no limitations).
- (3) Purposeful take that results from
 - a. Removal of bats from and disturbance within human structures; and,
 - b. Take resulting from actions relating to capture, handling, and related activities for northern long-eared bats by individuals permitted to conduct these same activities for other species of bat until May 3, 2016.

Thus, any take of northern long-eared bat occurring in conjunction with these activities that complies with the conservation measures, as necessary, is exempted from section 9 prohibitions by the interim 4(d) rule, and does not require incidental take authorization. Note that no conservation measures are required as part of the interim 4(d) in areas with no known roost trees and no known hibernacula. The Chippewa National Forest does not contain any known roost trees or known hibernacula. Therefore, the incidental take that we anticipate will result from some of the proposed activities is exempt under the interim 4(d) rule.

The interim 4(d) rules do not afford exemption from the ESA's section 7 procedural 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. In addition, it also affords an opportunity for the Service and the action agency to discuss proactive conservation measures that may be implemented under the authority of section 7(a)(1) of the ESA.

Consultation History

On 23 March 2015, the Service received a request from USFS to confer or consult on a batch of projects that were proposed for implementation on three national forests in Minnesota and Wisconsin. Several of these "projects" were actually groups of similar projects for which the required planning and environmental review had been completed previously. The project that is the subject of this biological opinion, for example, includes 21 distinct projects that include either prescribed burns or mechanical fuels treatments. The USFS had concluded consultation with the Service under section 7(a)(2) on the actions that are the subject of this BO, but recognized that reinitiation would be required in the event that the Service listed the northern long-eared bat as threatened or endangered. Shortly after sending its March 23 letter, the Service listed the northern long-eared bat as threatened on April 2, 2015, with an effective date of May 4, 2015. The CNF provided its biological assessment for the proposed actions on April 3, 2015. Since then, the Service has requested minor clarifications with regard to the nature of the proposed actions and the CNF has responded with information that has been incorporated into this BO.

DESCRIPTION OF THE PROPOSED ACTION

As defined in the ESA Section 7 regulations (50 CFR 402.02), “action” means “all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by federal agencies in the United States or upon the high seas.” 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 direct and indirect effects of the actions and activities must be considered in conjunction with the effects of other past and present federal, state, or private activities, as well as the cumulative effects of reasonably certain future State or private activities within the action area.

The CNF reviewed its ongoing actions and identified a set of prescribed fire and mechanical fuels treatment projects for which final planning and environmental review had been completed previously, but that were likely to continue beyond the time when the northern long-eared bat would be listed. CNF reviewed its projects, including their previous consultation documents, to determine how they would affect the northern long-eared bat. The USFS included conservation measures to minimize potential adverse impacts of various activities as part of their project description.

The following project background and descriptions of the affected area are summarized from the BA.

Projects/Actions that Are Likely to Adversely Affect the northern long-eared bat

The USFS determined that 21 planned prescribed fire and mechanical fuels treatment projects are likely to adversely affect the northern long-eared bat on the CNF. All these projects involve prescribed fire and mechanical fuels treatment that will affect forested areas directly or indirectly and have the potential to adversely affect roosting and foraging northern long-eared bats. Planning for these projects, including section 7(a)(2) consultation for other listed species and NEPA decisions, was completed several years ago.

All of the proposed projects comply with the conservation measures that are contained in the interim 4(d) rule for northern long-eared bat (80 FR 18032). The entire CNF is in the area affected by white-nosed syndrome (WNS), as defined in the 4(d) rule – i.e., the WNS “buffer zone.” The 4(d) rule exempts incidental take that would occur as a result of “forest management”, which includes prescribed fire. Under the interim 4(d) rule actions that are implemented to maintain and manage forest ecosystems are considered forest management. The mechanical fuels treatment proposed by the CNF also falls within the category of forest management and the anticipated incidental take is also exempted. The projects are also likely to cause incidental take of northern long-eared bat as a result of hazardous tree removal during the implementation of prescribed fires. Although this incidental take would be covered under the forest management exemption, incidental take that is a result of hazard tree removal is also specifically exempted under the interim 4(d) rule.

There are no known occupied roost trees or hibernacula within 0.25 mile of the CNF; therefore, the incidental take exemptions apply across the forest with no areas excepted. This would change, of course, if occupied roost trees become known within 0.25 mile of the CNF. If that occurs, the CNF would ensure that known roosts are protected at least to the extent that each action adheres to applicable conservation measures contained in the interim 4(d) rule.

Table 1. Actions addressed in this biological opinion. UB = Upland Broadcast; UU = Upland Understory.

NEPA Decision	Habitat Type	Treatment Type	Summer Habitat (Y/N)	Removal of suitable roost trees?	USFS Acres	Non-USFS (Partner) Acres	Total Acres
Raven CE	Wet meadow	RX fire - Lowland	N	N	50	236	286
Eastside Wet Meadow	Wet meadow	RX fire - Lowland	N	N	350	1,700	2,050
Boy River Wet Meadow	Wet meadow	RX fire - Lowland	N	N	4,200	2,500	6,700
Multiple EA's	Pine Forest	Mechanical	Y	Y	106	0	106
Blowdown Restoration EA	Pine Forest	Mechanical	Y	Y	70	0	70
Wagner EA	Pine Forest	Mechanical	Y	Y	76	0	76
Blowdown Restoration EA	Pine Forest	RX fire - UB	Y	Y	365	0	365
Kitchi EA	Pine Forest	RX fire - UB	Y	Y	288	0	288
Upper East Winnie EA	Pine Forest	RX fire - UB	Y	Y	144	50	194
Rice River EA	Pine Forest	RX fire - UB	Y	Y	75	0	75
Upper East Winnie EA	Pine Forest	RX fire - UB	Y	Y	212	0	212
Conifer Thinning EA	Pine Forest	RX fire - UB	Y	Y	100	0	100
South Leech Lake II EA	Opening	RX fire - UB	N	Y	496	0	496
Lydick EA	Pine Forest	RX fire - UU	Y	Y	120	0	120
Mississippi EA	Pine Forest	RX fire - UU	Y	Y	40	0	40
Round Island EA	Pine Forest	RX fire - UU	Y	Y	151	0	151
Leech Lake River Resource Mgmt Project/Lower East Winnie Vegetation Mgmt Project	Pine Forest	RX fire - UU	Y	Y	214		214
Cuba Hill EA	Pine Forest	RX fire - UU	Y	Y	150	0	150
South Leech Lake II EA	Pine Forest	RX fire - UU	Y	Y	216	0	216
South Leech Lake EA	Pine Forest & Wet meadow	RX fire - UU, Lowland	Y	Y	1,332	60	1,392
Steamboat EA	Mixed forest & Wet meadow	RX fire - UU, Lowland	Y	Y	719	0	719

Upland Prescribed Fire Actions

The proposed actions include a total of 4,732 acres of upland prescribed fire. In the BA, the CNF stated that "...an annual average of approximately 300 acres of upland habitat treated each year." Therefore, these burns may be implemented over a period of approximately 15-16 years. Upland burns are divided into two types – upland understory burns and upland broadcast burns.

Upland broadcast burns are designed to promote regeneration, to reduce hazardous fuels that generally result from a timber harvest, or both. They are typically applied in recently harvested or thinned pine stands. This type of burn may also be applied to upland openings to reduce fuels and reduce woody shrub encroachment. These prescribed burns generally range from low to moderate intensity, with flame lengths from 2 to 4 feet. Overstory tree mortality may occur during these burns. If possible, fireline locations are also determined using tactics that minimize impacts to other resources – for example, by using existing natural and man-made barriers such as roads, lakes, rivers and lowland areas to limit spread of the fire. Along firelines, snags or other overstory trees considered potentially hazardous to firefighters are felled.

Upland understory burns designed to treat understory vegetation, typically in a red pine or jack pine stands. Objectives may include improvement of habitat for blueberry or wildlife, hazardous fuels reduction, and ecosystem restoration. Multiple objectives may apply to a given project area. These burns are generally low intensity, with typical flame lengths of 2 to 4 feet. Upland understory burns can occur in spring, summer or fall (May through October), although most occur in May and June. Understory prescribed burn project areas may be burned one time, or more than once to meet objectives or to maintain habitat, fuel or ecosystem conditions. Upland understory burns may often require some creation of firelines to limit the spread of the fire. These firelines are typically 2 to 8 feet wide, and are created using hand tools, bulldozers, or ATV disk plows. As with upland broadcast burns, fireline locations are determined using minimum impact suppression tactics (MIST) when possible. Along firelines, snags or other overstory trees considered potentially hazardous to firefighters are felled.

Lowland Prescribed Fire

Lowland prescribed fire is typically carried out in wet meadow habitat and so would not directly affect northern long-eared bat roosting habitat. Indirect effects may occur as a result of northern long-eared bat exposure to smoke generated by these fires. About half of lowland prescribed fires will likely be carried out in late winter or early spring when northern long-eared bats are not present.

Mechanical Fuels Treatment

Mechanical fuels treatments consist primarily of actions to reduce fuels present in forest understory. These treatments are typically carried out in areas where timber harvest has been carried out or where a natural disturbance, such as a blowdown, has occurred. Mechanical fuels treatment following timber harvest may include piling fuels with heavy equipment such as an

excavator, loader or dozer, and burning the resulting piles. In stands that have experienced a natural disturbance, the woody material is typically chipped. Finally, mowing may be used to reduce fuels and reduce woody shrub encroachment in upland openings.

Conservation Measures

Conservation measures are those actions taken to minimize any adverse effects of a proposed action and to benefit or promote the recovery of the species. These include actions taken by the federal agency that serve to minimize or compensate for project effects on the species under review and are included as an integral portion of the proposed action.

To be in compliance with the interim 4(d) rule for northern long-eared bat, the USFS has committed to the following conservation measures as part of the project description:

- 1) All proposed activities will occur more than 0.25 mile (0.4 km) from any known, occupied hibernacula.
- 2) The USFS will avoid cutting or destroying known, occupied roost trees during the pup season (June 1–July 31).

As stated above, no known hibernacula or occupied roost trees occur within 0.25 mile of the CNF. Therefore, this measure would only be implemented if either type of feature is identified in the CNF or within 0.25 mile of its external boundary. Discovery of hibernacula in the action area or within 0.25 mile may be unlikely, but if radio telemetry studies are conducted in the vicinity of the CNF occupied roost trees is likely to occur.

As stated in the description of each type of prescribed fire above, CNF will use existing features (rivers, roads, etc.) and snow as fire breaks where feasible to minimize the need to construct fire breaks. In addition, it will construct fuel breaks only deep enough and wide enough to control the spread of the fire. These measures will minimize the need to remove potential northern long-eared bat roost trees to construct fire breaks. As stated above the Forest will not cut any known occupied roost trees for fire break construction during the pup season, if any such trees are identified on the CNF. Such trees may be felled, however, if they are considered potentially hazardous to firefighters. The interim 4(d) rule exempts incidental take of northern long-eared bats that may occur as a result of the removal of hazardous trees to protect human life.

Prescribed fires in forested habitat is likely to kill some trees that could serve as roosting habitat for northern long-eared bat. To minimize tree mortality, the CNF will write burn plans to keep tree mortality below 10% in accordance with silvicultural standards.

When treating mechanical fuels, the Forest must occasionally remove standing trees incidental to removing dead and down fuels. Although these trees are generally less than 8 inches diameter at breast height (DBH), the CNF will follow Minnesota Forest Resources Council guidance to retain any snag that is greater than 12 inches DBH.

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. For the purposes of this BO, the action area includes the entire Chippewa National Forest. The Forest boundary encompasses 1.6 million acres and includes Federal, state, county, and land under other ownerships. Over 666,000 acres in the action area are forested lands managed specifically by the Forest.

STATUS OF THE SPECIES

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

Life History and Biology

The northern long-eared bat 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. Northern long-eared bats generally hibernate between mid-fall through mid-spring each year. Spring migration period likely runs from mid-March to mid-May each year, with timing varying depending on the portion of the range. Females depart shortly after emerging from hibernation and are pregnant when they reach their summer area. Parturition (birth) likely occurs in late May or early June (Caire *et al.* 1979, p.406; Easterla 1968, p. 770; Whitaker and Mumford 2009, p. 213), but may occur as late as July (Whitaker and Mumford 2009, p. 213). Females nurse young until shortly after they become volant – typically until mid- to late-July. Fall migration likely occurs between mid-August and mid-October.

Summer habitat and ecology

Suitable summer habitat¹ for northern long-eared bat 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 northern long-eared bat, consistently avoid foraging in or crossing large open areas, choosing instead to use tree-lined pathways or small openings (Patriquin

¹ See the Service's current summer survey guidance for our latest definitions of suitable habitat – <http://www.fws.gov/midwest/Endangered/mammals/inba/surveys/pdf/2015IndianaBatSummerSurveyGuidelines01April2015.pdf>. Note that although the title of this document mentions only Indiana bat, it does contain a definition of potential summer habitat for the northern long-eared bat.

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. Northern long-eared bats 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, typically every 2 to 3 days (Sasse and Pekins 1996; Foster and Kurta 1999; Owen et al. 2002; Carter and Feldhamer 2005; Timpone et al. 2010). Northern long-eared bat maternity colonies range widely in size, although a maximum of 30-60 individuals may be most common early in the season, with the colony size decreasing post-lactation of young (U.S. Fish and Wildlife Service 2014). The species shows some degree of inter-annual fidelity to single roost trees and maternity areas. Male northern long-eared bats are routinely found with females and young in maternity colonies. The species uses networks of roost trees often centered around one or more central-node roost trees (Johnson et al. 2012). Roost networks also include multiple alternate roost trees. Male and non-reproductive females may also roost in cooler places, like caves and mines (Barbour and Davis 1969, Amelon and Burhans 2006).

Northern long-eared bats roost in cavities, underneath bark, crevices, or hollows of both live and dead trees, typically greater than 3 inches DBH. The species is known to use a wide variety of roost types, using tree species based on presence of cavities or crevices or presence of peeling bark. Northern long-eared bats have also been found occasionally roosting in structures like barns and sheds, particularly when suitable tree roosts are unavailable.

Females give birth to a single offspring, typically in late-May or early June (Caire *et al.* 1979, p. 406; Easterla 1968, p. 770; Whitaker and Mumford 2009, p. 213). Lactation then lasts 3 to 5 weeks, with pups typically 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 further from their hibernaculum. The northern long-eared bat is not considered to be a long distance migrant. It typically migrates 40-50 miles from hibernacula. Migration is an energetically demanding behavior for the northern long-eared bat, 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, such as abandoned or active mines and railroad tunnels. Other landscape features may also be used by northern long-eared bats during the winter that have yet to be documented. Generally, northern

long-eared bats remain at hibernacula from October to April, depending on local climate. In southern portions of the species' range, it may be at hibernacula only from November to December; in some northern areas that may leave hibernacula for summer habitat between March and mid-May.

Hibernacula for northern long-eared bats typically have significant cracks and crevices for roosting; relatively constant, cool temperatures (0-9 degrees Celsius); high humidity; and, minimal air currents. Specific areas where they hibernate have very high humidity and droplets of water are often visible on their fur. Surveyors may find them in small crevices or cracks, often with only the nose and ears visible.

Northern long-eared bats tend to roost singly or in small groups, with hibernating population sizes ranging from a just few individuals to around 1,000 (U.S. Fish and Wildlife Service 2014 and unpublished data). The northern long-eared bat exhibits more winter activity than other cave species; individuals often move between hibernacula throughout the winter (Griffin 1940, Whitaker and Rissler 1992, Caceres and Barclay 2000). Northern long-eared bats have shown a high degree of philopatry to the hibernacula used, returning to the same hibernacula every year.

Spring Staging and Fall Swarming habitat and ecology

Upon arrival at hibernacula in mid-August to mid-November, northern long-eared bats “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 begin hibernation. Most 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 – or as late as May in some northern areas – most northern long-eared bats migrate to summer roosts. Females emerge from hibernation before males. Reproductively active females store sperm from autumn copulations through winter and 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, northern long-eared bat use roosts in the spring and fall similar to those selected during the summer. Suitable spring staging and fall swarming habitat is typically within 5 miles of a hibernaculum and consists of forested habitats similar to where they may roost, forage, and travel. This includes forested patches and linear forested features such as fencerows, riparian forests, and other wooded corridors. These wooded areas may be comprised of 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 or immediate for the northern long-eared bat as is white-nose syndrome (WNS). It is unlikely that northern long-eared bat 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 northern long-eared bat have declined by 99 percent in the Northeast, which along with Canada, has been considered the core of the species' range. WNS is expected to spread throughout the entire range of the species, but the likely rate of spread is uncertain. In general, WNS has significantly reduced the redundancy and resiliency of the northern long-eared bat.

Although significant northern long-eared bat 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. Populations affected by WNS may be increasingly vulnerable to other stressors that they may have previously had the ability to withstand. The impacts of these stressors may be seen on two levels. First, individual northern long-eared bats that are sick or struggling with WNS infection may be less able to survive other stressors. Second, northern long-eared bat populations affected by WNS are likely comprised of fewer individuals that are also suffering from reduced fitness. Bats affected sub-lethally by WNS during hibernation may be weakened by the effects of the disease and may have extremely reduced fat reserves and damaged wing membranes (see next paragraph). These conditions may reduce their capability to fly or to survive long-distance migrations to summer roosting or maternity areas. Populations comprised of individuals in this condition are likely at increased vulnerability to extirpation. The status of populations with regard to these factors varies across the range of the species.

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), which combine to make migration and foraging more challenging. Females that survive migration to summer habitat must partition energy resources between foraging, keeping warm, successful pregnancy, pup-rearing, and healing and may experience reduced reproductive success. In addition, wing damage may decrease the ability of bats to avoid death or injury as a result of exposure to human actions, such as tree felling. This is especially likely if timber harvest or burns are conducted early in the spring (April – May) when bats have just returned to summer habitats, have damaged wings, and are exposed to colder temperatures when torpor is used more frequently.

Sustainable forestry benefits northern long-eared bat by maintaining suitable habitat across a mosaic of forest treatments. Forest practices can have a variety of impacts on the northern long-eared bat, however, depending on the quality, extent, and location of the affected habitat relative to activity centers and the time of year when management activities take place. Depending on their characteristics and location relative to hibernacula, forested habitats may serve as summer maternity habitat, staging and swarming habitat, migration or foraging habitat, or combinations

thereof. The impacts of tree removal to individual northern long-eared bats or to their colonies likely range in their levels of severity. For example, minor amounts of timber harvest that are outside of northern long-eared bat summer home ranges or away from hibernacula may only affect northern long-eared bats indirectly. Timber harvest in largely forested areas and where northern long-eared bat populations are robust may have only minor effects to the species. Actions that remove large percentages of summer home ranges or that take place in highly fragmented landscapes or areas where bats are already affected by WNS may have major consequences for the affected populations.

Finally, there is growing concern that bats, including the northern long-eared bat (and other bat species) may be threatened by the recent surge in construction and operation of wind turbines across the species' range. Mortality of the northern long-eared bat 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 northern long-eared bat 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' ranges 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. Historically it 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

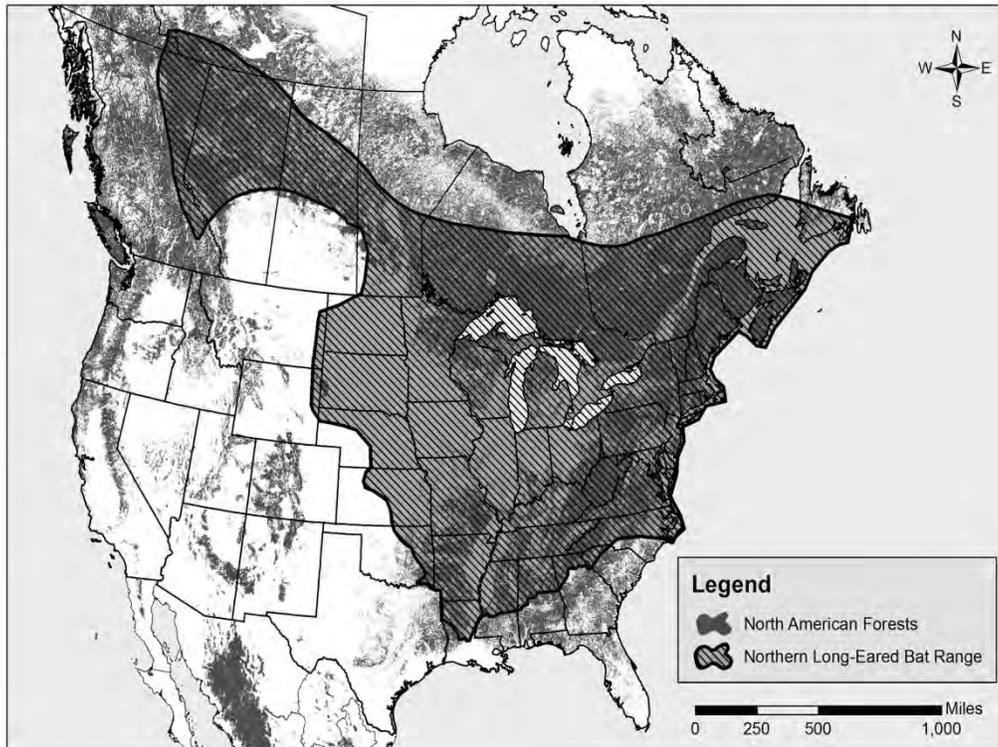


Figure 1. Range of northern long-eared bat.

Although they are typically found in low numbers in inconspicuous roosts, most records of northern long-eared bat 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). Northern long-eared bats are documented in hibernacula in 29 of the 37 States in the species' range. Other States within the species' range have no known hibernacula.

The current range and distribution of the northern long-eared bat must be described and understood within the context of the impacts of WNS. Before the onset of WNS, the best available information on northern long-eared bat came primarily from surveys [primarily focused on Indiana bat (*M. sodalis*) or other bat species] and some targeted research projects. In these efforts, the northern long-eared bat was frequently encountered and was considered the most common

myotis 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 northern long-eared bat in the northeast, where the species was believed to be most abundant. There are data supporting substantial declines in northern long-eared bat populations in portions of the Midwest due to WNS. In addition, WNS has been documented at more than 100 northern long-eared bat 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.

Status of the Northern Long-eared Bat in Minnesota

Before 2014, there was little information on northern long-eared bat summer populations in Minnesota. In 2014, passive acoustic surveys conducted at a new proposed mining area in central St. Louis County detected the presence of northern long-eared bat at each of 13 sites sampled. Calls that were assigned to northern long-eared bat accounted for approximately 14 percent of all recorded bat calls (Smith *et al.* 2014). Mist-net surveys in 2014 at 7 sites on Camp Ripley Training Center, Morrison County, resulted in capture of 4 northern long-eared bats (5 percent of total captures); mist-net surveys at 5 sites on the Superior National Forest, Lake and St. Louis Counties, resulted in the capture of 24 northern long-eared bats (Fig. 2; 55 percent of total captures) (Catton 2014). Acoustic and mist-net data were collected by a pipeline project proponent in 2014, which surveyed an approximately 125-foot wide and 300-mile-long (483-km) corridor through the northern third of the state. Positive detections were recorded in Hubbard, Cass, Crow Wing, Aitkin, and Carlton counties. Northern long-eared bats were the most common species captured by mist-net during this survey (Fig. 2; Merjent 2014). Mist-net surveys were conducted in 2013 on the Kawishiwi District of the Superior National Forest, resulting in the capture of 13 northern long-eared bats (38 percent of total captures) over 9 nights of netting at 8 sites (Grandmaison *et al.* 2013).

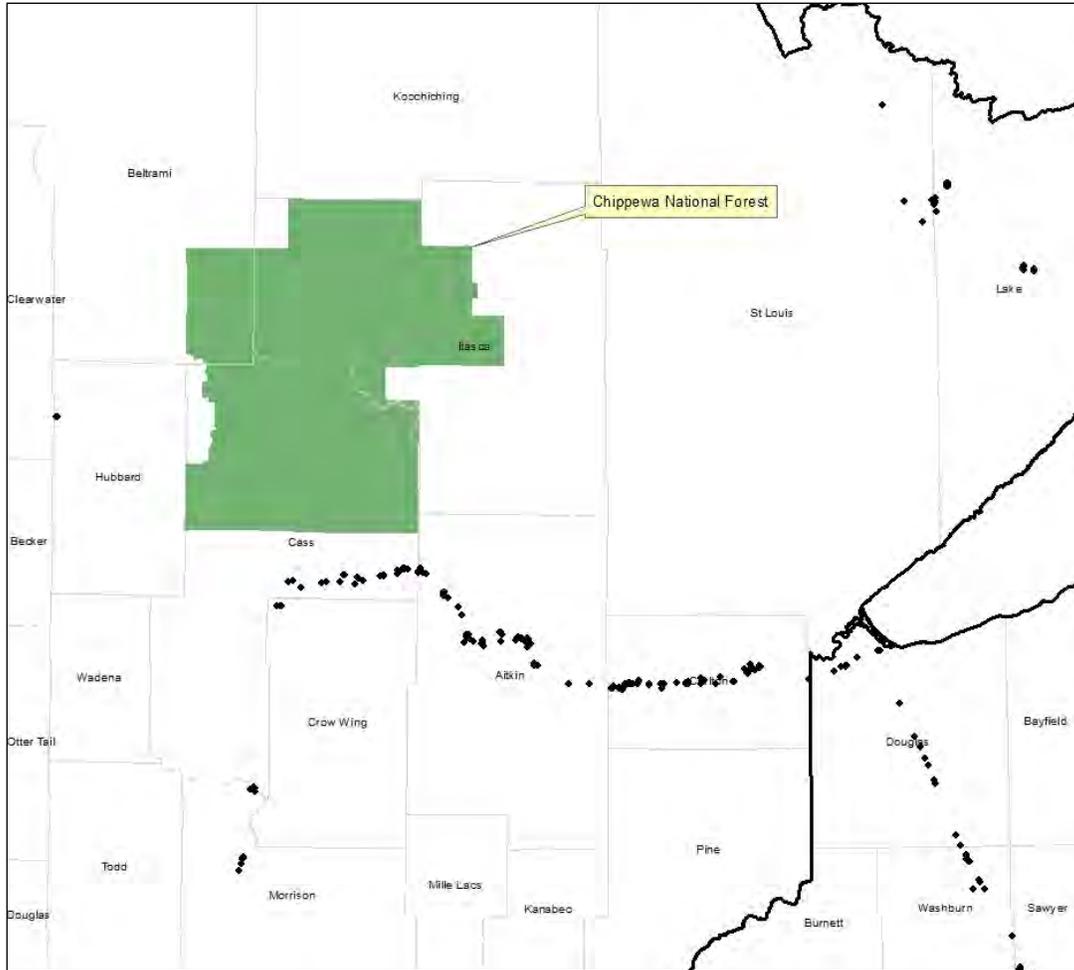


Figure 2. Locations in Minnesota where northern long-eared bats were captured in mist-nets and where their presence in roost trees was confirmed during surveys conducted in 2013-2014. These data are not based on an exhaustive inventory of the area shown; the lack of data for any geographic area shall not be construed to mean that no northern long-eared bats are present. No mist-net studies were conducted on Chippewa National Forest in 2013-2014.

The northern long-eared bat is known from 11 hibernacula in Minnesota; the status of the species in most of them is unknown. The largest known hibernaculum in Minnesota is the Soudan Mine in St. Louis County; an estimated 3,000 northern long-eared bats are thought to hibernate within the mine. WNS has not been detected in Minnesota, although the fungus that causes WNS was detected in the state in 2011–2012. Only Soudan Mine and Mystery Cave in Minnesota are known to harbor the fungus that causes WNS currently and to our knowledge, the fungus has not actually caused WNS in bats within the state.

Critical Habitat

Critical habitat has not been proposed for the northern long-eared bat.

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. There is no recovery plan or recovery outline available at this time, but we will outline the conservation needs based on our current understanding of the species.

The primary conservation need of the northern long-eared bat is to reduce the threat of WNS. This includes minimizing mortality in areas where the species is affected by WNS and slowing the rate of spread into areas unaffected currently. In addition, threats in areas where the northern long-eared bat continues to exist in spite of the presence of WNS must be reduced to prevent reductions in the species' range. Therefore, efforts to protect hibernacula from disturbances must continue in these areas. Protection efforts should include restricting human access to hibernacula, particularly during the hibernation period, constructing and maintaining appropriately designed gates, where appropriate, and restoring microhabitat conditions in hibernacula that have been altered. In some cases, efforts should also be made to protect and restore adequate fall swarming habitat around hibernacula. Known maternity habitat should be maintained; the removal of known roost trees, particularly when pregnant females or young are present, should be reduced. Research and surveys 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.

Action Area

Action area, as defined by the ESA's implementing regulations (50 CFR 402.02), 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 (our emphasis). Action is defined in the regulations as "...all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas. Examples include, but are not limited to: (a) actions intended to conserve listed species or their habitat; (b) the promulgation of regulations; (c) the granting of licenses, contracts, leases, easements, rights-of-way, permits, or grants-in-aid; or (d) actions directly or indirectly causing modifications to the land, water, or air.

For the Forest's proposed actions, the area where "land, water, or air" that is likely to be affected includes land administered by the USFS where prescribed fire, mechanical fuels treatments, and associated actions authorized by the Forest would occur. The proposed actions are dispersed throughout the Forest; therefore, we consider the lands within the entire Forest boundary as the action area (Fig. 2). The Forest boundary encompasses 1.6 million acres (includes Federal, state, county, and other ownerships) – of which over 666,000 acres are forested lands managed specifically by the Forest.

Status of the Species in the Action Area

The northern long-eared bat is assumed to be present throughout the Forest based on the widespread distribution of suitable habitat. The trend in the numbers of northern long-eared bats that inhabit the Forest (action area) is unknown and no project-specific surveys have been conducted. According to the CNF BA, there are an estimated 757,430 acres of suitable habitat for the northern long-eared bat present on USFS and State/County public lands in the action area (Fig. 2). Data have been collected on three permanent acoustic monitoring routes on the Forest since 2011. These data will be used to identify baseline bat activity levels and observe how those levels may change in response to WNS, but completed data analyses are not expected until later in 2015. We assume northern long-eared bat presence throughout the Forest; however, because analyses of survey data are incomplete, we cannot estimate roost tree density or the proportion of the Forest that is inhabited by northern long-eared bat within a useful level of precision.

The Forest is also working with the Minnesota Department of Natural Resources, the Superior National Forest, and the Service to increase our collective knowledge of northern long-eared bat distribution and habitat use in northern Minnesota. Currently, there are no known hibernacula in the action area; the closest (Soudan Mine) is approximately 70 miles away. Therefore, suitable hibernacula sites would not be affected by the proposed actions. As stated above, there are also no known roost trees in the CNF. If northern long-eared bats are captured and radio-tracked on or near the Forest, we would expect occupied roost trees to be found within the CNF boundaries or within 0.25 mile. Based on the frequency and proximity to CNF of positive northern long-eared bat detections in Minnesota, the lack of surveys that would contraindicate the presence of the species in the action area, and the prevalence of suitable habitat for the species on the Forest, it is reasonable to assume that the species is widespread in the action area.

Habitat Conditions in the Action Area

Overall, the Forest provides an abundance of well-distributed, suitable summer habitat (Fig. 3). Approximately 798,000 acres in the action area are considered potential northern long-eared bat summer habitat, which is defined as all forested areas greater than or equal to 10 years old. Of this, approximately 546,000 acres are on National Forest System lands and approximately 252,000 acres are on state and county lands. Summer habitat that is currently in a suitable condition for northern long-eared bat encompasses approximately 522,000 acres (96 percent) and 236,000 acres (94 percent) under Federal and state/county land ownerships, respectively. Currently unsuitable habitat, defined as forested habitats less than 10 years old and non-forested areas, covers approximately 23,884 acres (4 percent) on the Forest and 16,481 acres (6 percent) on state/county lands.

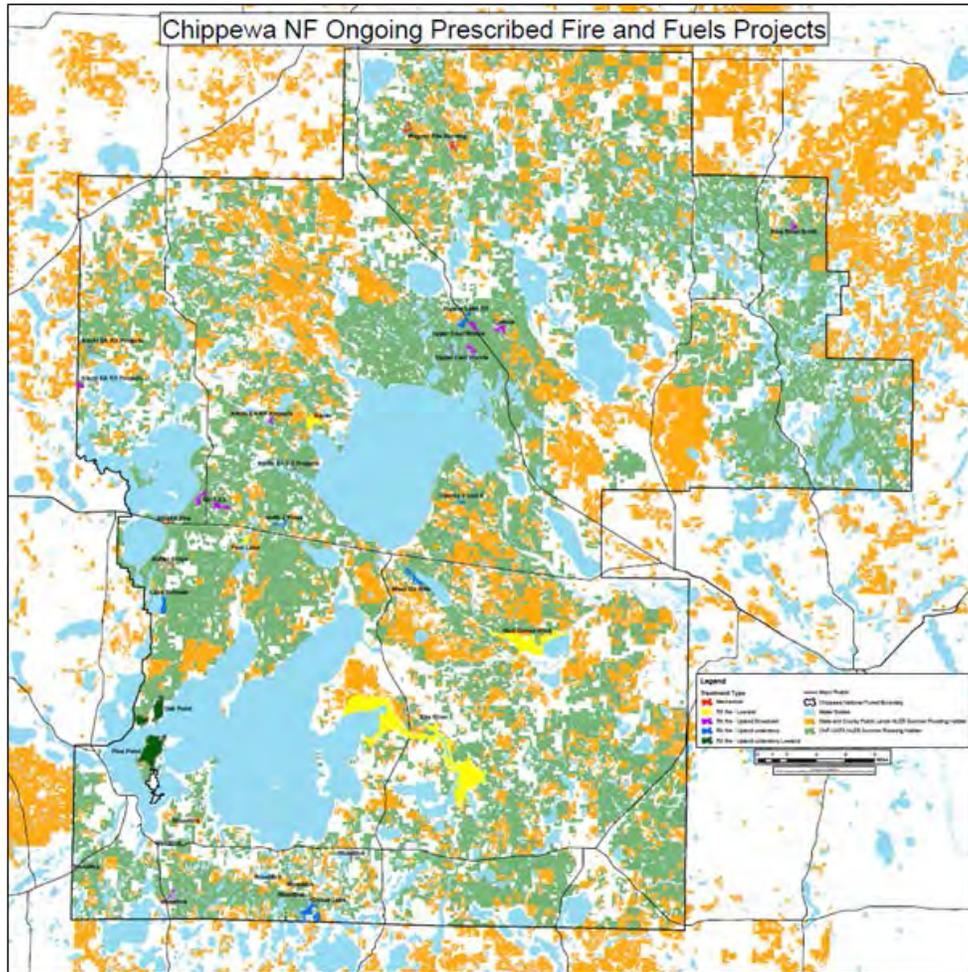


Figure 3. The distribution of suitable summer roosting habitat for northern long-eared bat on USFS lands (green) and other ownerships (orange).

Northern long-eared bat summer habitat includes both conifer and hardwood tree species (pine, spruce/fir, lowland conifer, upland and lowland hardwood, and aspen/birch). Suitable summer habitat currently ranges from 92 percent of aspen/birch to 98 percent of lowland hardwood, and averages over 95 percent forest-wide. In summary, the Forest has a large area of well distributed summer habitat that provides suitable roosting and foraging opportunities for northern long-eared bat.

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 Chippewa National Forest provides habitat for summering northern long-eared bat and may also provide habitat for the species during migration. Therefore, within the action area the conservation needs include: 1) providing suitable habitat conditions for northern long-eared bat foraging and roosting; 2) reducing the removal of roost trees; 3) searching for previously

unidentified areas of maternity and hibernation activity; and 4) conducting research to understand the migration patterns of northern long-eared bat that use the area during the summer or winter.

The BA indicated that the Forest has initiated northern long-eared bat acoustic monitoring routes to identify baseline bat activity levels and observe how those levels change over time. It also indicated that the number of acoustic surveys will be increased across the Forest beginning in 2015. The Forest is also working in partnership with the Minnesota Department of Natural Resources, the Superior National Forest, and the Service to further their knowledge of northern long-eared bat distribution and habitat use in northern Minnesota. These measures, in addition to the continued implementation of conservation measures required under the Forest Plan, will contribute to conservation needs of the northern long-eared bat in general and within the action area.

EFFECTS OF THE ACTION

This BO evaluates the anticipated effects of 21 projects on the CNF. These projects will directly affect a total of 14,020 acres on the Forest, which includes 9,474 acres of USFS lands and 4,546 acres under non-USFS ownership. Upland prescribed fire will directly affect approximately 4,732 acres; lowland prescribed fire will directly affect approximately 9,036 acres; and, mechanical treatments will be carried out on 252 acres. Lowland prescribed fire will generally not directly affect northern long-eared bat roosting habitat because the areas burned are typically non-forested wet meadows. Smoke from these fires, however, may drift into northern long-eared bat roosting habitat and we attempt to approximate that effect below. Approximately 300 acres of upland fire will be implemented each year. Therefore, the 15 prescribed fires that include upland acres may occur over a period of approximately 15-16 years.

Our analysis of project effects to northern long-eared bat entails: (1) evaluating the potential for individual northern long-eared bats to be exposed to action-related stressors and attempting to predict their likely responses; (2) integrating those individual effects (potential for exposure and subsequent response) to discern the consequences to the populations to which those individuals belong; and (3) determining the consequences of any population-level effects to the species as a whole.

Direct and Indirect Effects

Effects to Hibernating Bats and/or Hibernacula, Bats during Fall Swarming

Neither direct nor indirect effects are anticipated to wintering northern long-eared bat or their hibernacula from the proposed action. The nearest known hibernaculum is at least 60 miles from any point on the CNF.

Effects to Bats during Spring/Summer and/or to Spring/Summer Habitat

Tree Felling – Removal of Hazard Trees, Construction of Fire Breaks, and Mechanical Fuels Treatments

The proposed action includes the intentional felling of standing live or dead overstory trees to remove hazards to firefighters; the felling of trees to construct fire breaks; and the occasional felling of trees incidental to the removal of dead and down fuels. The Forest estimates that about one hazard tree is felled for each five acres of upland burned. The extent of tree removal that is anticipated to occur as a result of fire break construction may not be predicted with a reasonable level of precision, but a conservatively high figure could be estimated by multiplying the width of fire breaks by the anticipated length of fire break that will be constructed through areas that contain suitable roosting habitat for northern long-eared bat. Some trees, up to 12 inches DBH, may also be felled in the 252 acres affected by mechanical fuels treatments.

Risk of Death or Injury and Effects on Habitat Suitability

The risk of death or injury to individual northern long-eared bats due to tree removal varies depending on its timing, intensity, and the extent of the area affected. Although some bats may flee as trees are felled, the removal of occupied roosts when bats are present is likely to cause injury or mortality to at least some roosting bats. Adult bats are at increased risk of death or injury when they are in a state of torpor – a temporary unresponsive state that bats enter to conserve energy when temperatures are cool and prey availability is low. Northern long-eared bats are likely to use torpor in the spring when prey may be limiting and even during cool summer evenings. Bats are also at increased risk of death or injury during early to mid-summer when flightless pups or inexperienced flying juveniles are present. The latter is the basis for the interim 4(d) rule's conservation measure to avoid felling known occupied roost trees during June and July.

The proposed actions include only localized tree removal, which will minimize the effects to roosting northern long-eared bat. During the approximately 16 year duration of the proposed action, about 60 trees are likely to be felled per year to remove hazards when conducting upland burns – about one for every five upland acres burned. Trees may also be felled to construct fire breaks, but this will be minimized by the use of existing features for fire breaks, where safe and feasible, and by minimizing the width of fire breaks. According to the Forest, fire breaks vary in width from 2 to 8 feet, but may average 6 feet in width. If we assume that fire breaks constructed through suitable roosting habitat for northern long-eared bat will be 6-foot wide and that approximately 53,920 linear feet of fire breaks will be constructed, trees may be felled in approximately 7 acres of suitable roosting habitat. Although this activity is likely to affect some roosting northern long-eared bats, it would affect only a very small proportion of suitable roosting habitat in the action area. Some trees, up to 12 inches DBH, may also be felled in areas affected by mechanical fuels treatments (MFT); MFT, however, will affect only 0.03% of suitable roosting habitat in the action area.

The proposed actions will likely result in mostly single tree removal or the removal of a few trees from localized areas. In addition, the actions include measures that will minimize the extent of tree removal. For each type of action, only small portions of home ranges will be affected. Within a home range, northern long-eared bat use multiple roosts throughout the season. Therefore, bats that are not killed or injured during tree removal are unlikely to be forced to abandon established home ranges as a result of the proposed actions because effects are mostly localized and temporary. Therefore, the tree removal that will occur as a result of the proposed actions is unlikely to cause northern long-eared bat to abandon established home ranges. Moreover, trees will eventually regrow in most or all of the areas affected by tree removal. Therefore, any effects on local habitat suitability will be temporary.

Effects of Tree Removal – Summary

The proposed action includes the intentional felling of standing live or dead overstory trees to remove hazards to firefighters; the felling of trees to construct fire breaks; and the occasional felling of trees incidental to the removal of dead and down fuels. The Forest estimates that about one hazard tree is felled for each five acres of upland burned. Tree removal to construct fire breaks may take place in as much as 7 acres and could cause adverse effects to some northern long-eared bats, but will have no appreciable impact on the status of the species in the action area. Some trees, up to 12 inches DBH, may also be felled in the 252 acres affected by mechanical fuels treatments, but this effect will also be minimal and likely not perceptible to the status of the species in the action area.

Although some bats may be harmed, harassed, or killed as a result of tree removal activities, the overall effects are minor and are unlikely to have a significant impact on the numbers, reproduction, or distribution of northern long-eared bat in the action area. Only a small proportion of suitable roosting habitat will be affected and bats are likely to be present in few trees that are felled. Moreover, these activities will be distributed both spatially and temporarily across the Forest over a period of about 15-16 years.

Effects from Noise, Disturbance

Noise and vibration and general human disturbance are stressors that may disrupt normal feeding, sheltering, and breeding activities of the northern long-eared bat. Northern long-eared bats may be exposed to noise, vibration, or disturbance from various USFS activities near their roosting, foraging, or swarming areas.

Significant changes in noise levels may cause bats to alter their behavior, at least temporarily, or to change their use of the affected area permanently. The novelty of noises and their relative volume levels will likely dictate the range of responses by individuals and the effects on bat colonies. Although bats may be startled initially by low noise levels or noises that are far away, they would likely become habituated to such disturbances. At closer range and louder noise levels – particularly if accompanied by physical vibrations from heavy machinery and the crashing of falling trees, for example – many bats would probably be startled to the point of fleeing from their

day-time roosts. In some cases this may increase predation risk. For projects with noise levels greater than are usually experienced by bats and that continue for multiple days, bats roosting in affected areas are likely to shift their focal roosting areas and may abandon the area.

There is limited literature available regarding impacts from noise (outside of road/traffic) on bats. Gardner et al. (1991) had evidence that a northern long-eared bat conspecific, Indiana bat, continued to roost and forage in an area with active timber harvest. They suggested that noise and exhaust emissions from machinery could disturb roosting bats, but that they would have to be severe to cause roost abandonment. Callahan (1993) noted that the likely cause of the bats in his study area abandoning a primary roost tree was disturbance from a bulldozer clearing brush adjacent to the tree. Indiana bats have been documented roosting within approximately 300 meters of a busy state route adjacent to Fort Drum Military Installation (Fort Drum) and adjacent to housing areas and construction activities on Fort Drum (U.S. Army 2014). Bats roosting or foraging in all of the examples above have likely become habituated to noise, vibration, and disturbance. Novel noises would be expected to result in some changes to bat behaviors.

In summary, northern long-eared bat currently present in the forest are expected to be tolerant of existing noise, vibration, and disturbance levels and are not expected to result in any response by bats. However, temporary and novel noise/vibration/disturbance associated with heavy equipment operation and tree cutting may result in responses by bats that are roosting or foraging in these areas. We expect that affected bats are likely to shift their focal roosting areas further away or may temporarily abandon the affected areas completely.

Roosting northern long-eared bats could be exposed to noise and vibration by firebreak construction and felling of hazardous trees. This could reduce survival of adults or volant pups if disturbed to the extent that they leave roosts during the day or are disturbed to the degree that they abandon roosts. Adult females may be likely to return to roosts that contain dependent young, but temporary separation could result in adverse effects to non-volant pups. These adverse effects will be minimized by the Forest's use of existing features, such as roads and water bodies, for fire breaks.

Mechanical fuels treatments will include piling fuels with heavy equipment such as an excavator, loader or dozer, and burning or chipping the resulting piles. In addition, mowing will be used to reduce fuels in upland openings. Noise and vibration from these activities also have the potential to adversely affect northern long-eared bats for the reasons summarized above, but any adverse effects will be localized. Only about 0.03% of suitable roosting habitat in the CNF will be affected directly by this activity. Effects of noise and vibration are likely to carry outside of the area directly affected, but even if northern long-eared bat in twice that area were affected it would still constitute only a small proportion of the suitable roosting habitat in the action area.

Although we expect that some adverse effects to roosting northern long-eared bat will occur as a result of the noise and vibration caused by felling trees to remove hazards and for fire break construction and by mechanical fuels treatments, the overall effects on the numbers, reproduction, and distribution of northern long-eared bat will be minimal. The Forest has included conservation

measures to reduce the amount of fire break that will need to be constructed and less than 0.1% of the suitable habitat in the action area is likely to be affected by noise and vibration associated with mechanical fuels treatments. Moreover, these activities will be distributed in the action area both temporally and spatially.

Prescribed Burning and Burning of Slash Piles

The proposed prescribed burns include both upland and lowland fires. Upland fires will cause both direct and indirect effects to roosting bats, whereas lowland fires are carried out in wet meadow habitat and will only affect northern long-eared bat indirectly as a result of smoke exposure.

Table 2. The types and extent of prescribed fire included in the proposed action.

Type of Prescribed Burn (No. Projects)	Total Acres	Timing of Burns	Comments
Lowland (3)	9,036	typically March - May	Northern long-eared bat expected to be absent from action area for about 50% of burns and little or no roosting habitat is likely to be affected; fire break construction minimal.
Upland Understory (8)	3,002	May-October, but mostly in May and June	Direct effects to roosting habitat, although only 2-4' flame lengths expected; conducted mostly in May and June when northern long-eared bat – including non-volant pups – may be present.
Upland Broadcast (7)	1,730		Timing similar to upland understory burns.

Death and Injury – Exposure to Flames, Heat, and Smoke

Prescribed fires conducted outside the spring/summer roosting period could result in direct mortality or injury to northern long-eared bats by burning, heat exposure, or smoke inhalation. Bats also may be exposed to elevated concentrations of potentially harmful compounds within the smoke (e.g., carbon monoxide and irritants) (Dickinson et al. 2009). Exposure risk depends on a variety of factors including height of roosts, timing and behavior of fire, winds, and proximity of fire to roosts. Risk of direct mortality and injury to bats from prescribed fire is low as long as fire intensity and crown scorch height are low (Dickinson 2010). Northern long-eared bats may be more likely to flush from trees to avoid injury as spring progresses, temperatures increase, and less time is spent in a state of torpor (Dickinson 2010). Burning in mid-summer (e.g., July) may increase the chances that adults will have pups that may be too heavy to carry and may increase the intensity of the pups' exposure to heat and smoke. Due to the anticipated timing of the burns that are part of the proposed action, effects to torpid adults and non-volant young may be minimized and most bats may be mobile when burns are conducted. We expect minimal lethal take from the proposed prescribed fires. Northern long-eared bats may be forced to flee from roosting and foraging areas, which could increase predation risk temporarily. These adverse effects are expected to be short-term and localized.

As a result of the proposed actions, northern long-eared bats could be exposed to smoke and heat while roosting and when foraging at night, although flame lengths for upland burns are expected to be limited to 2-4 feet, generally. Northern long-eared bats may only be infrequently exposed to flames, but males may be more exposed due to tendency to roost in smaller trees. Non-volant pups may also be more likely to be exposed to the effects of smoke and heat because when they are too heavy to carry, they would be unable to leave the affected area – about 50% of upland fires may occur during the non-volant period.

Effects of lowland fires are expected to be the least among all three fire types, although some northern long-eared bats are likely to be exposed to smoke when roosting. Lowland fires will directly affect only non-forested habitats (wet meadows) and only about 50% may occur during the spring/summer roosting period. Smoke may drift from the burned areas into surrounding forest that is inhabited by northern long-eared bat. There is no way to predict with a high level of precision the extent of forest that would be affected by smoke from these fires. The amount of smoke generated by the fires will depend on the nature of the fuels burned and its dispersion and settling will be affected by ambient weather conditions. Nevertheless, below we attempt to project a reasonable worst case scenario with regard to the extent of the action area that is likely to be indirectly affected by smoke that drifts from the proposed upland and lowland burns.

According to the Forest, prescribed burns will always be implemented when conditions for smoke dispersion are “Fair” to “Excellent”, as described in the Minnesota Smoke Management Plan (Prescribed Fire/Fuels Working Team. 2007, p. 24). We do not know precisely the conditions that will prevail during the proposed lowland fires, so we will assume that on average, conditions will always be intermediate between “Fair” and “Excellent” – that is, they will always be “Good.” Under those conditions, smoke from “landscape burns in grass” may affect sensitive resources within 0.5 mile (Prescribed Fire/Fuels Working Team. 2007, p. 22). If we assume for this analysis that lowland fire areas are round and that only the area downwind from the burn area would be affected by smoke, then we can estimate the total area that could be affected by smoke from lowland fires as approximately 1906 acres. This may be a conservatively high estimate of the area affected and not all of the area is likely to be suitable roosting habitat for northern long-eared bat. In addition, about half of lowland fires will be implemented when northern long-eared bat is not present. Therefore, smoke from lowland fires may affect only about 953 acres when northern long-eared bat are present – or less than about 1% of the suitable roosting habitat in the action area. If we make similar assumptions for the proposed upland fires, smoke from those fires would affect less than about 2% of the suitable roosting habitat in the action area. Moreover, northern long-eared bat exposure to smoke would occur intermittently over a period of about 15-16 years when the fires are implemented.

In summary, northern long-eared bat could be exposed to burning, heat exposure, or smoke inhalation as a result of the proposed prescribed fire action, but only a small proportion of the individuals that inhabit the action area is likely to be affected. Less than 2% of the suitable roosting habitat in the action area would be exposed to smoke, heat, and flames and the exposure would occur only intermittently over an approximately 16-year period. On average only about 0.1% of the entire action area will be affected in any single year.

Response to Removal or Alteration of Roosting/Foraging Habitat

Indirect effects to northern long-eared bats from prescribed fire may include short-term loss of roost trees and decreased prey abundance, followed by long-term increases in roost abundance and suitability and in prey abundance (Boyles and Aubrey 2006, Dickinson 2010, Dickinson et al. 2009, Johnson et al. 2009, Johnson et al. 2010, Lacki et al. 2009, Timpone et al. 2009). That is, effects of upland prescribed fires are expected to be adverse in the short term, but beneficial in the long term.

Prescribed fire can create a greater abundance of potential roost trees for northern long-eared bat because fires can cause bark of live trees to peel away from the sapwood creating the sloughing bark that is often used for roosting (Johnson et al. 2010). The availability of suitable roosts – including roosts with cavities and exfoliating bark – is greater in burned areas compared to unburned areas (Boyles and Aubrey 2006, Dickinson et al. 2009, Johnson et al. 2010). The northern long-eared bat roosts extensively in areas soon after they are burned and to shift from roosts beneath bark to cavities after burning (Lacki et al. 2009).

Fires can also create a more open canopy structure that can improve roost quality by increasing the amount of solar radiation reaching the roost. Canopy light penetration was higher and canopy tree density was lower in burned forest than in unburned forest (Boyles and Aubrey 2006). Additionally, canopy gaps in the burned area are associated with slightly higher maximum daily temperatures at roost trees (Johnson et al. 2009). Higher roost temperatures could facilitate more rapid growth of developing juvenile bats (Johnson et al. 2009). As a result, the abundance of trees with characteristics suitable for roosting, and the percentage of the forested area with suitable bat roosts, should be increased after fires (Boyles and Aubrey 2006).

Studies in West Virginia found that the northern long-eared bat responded favorably to prescribed fire by using new roost trees that were located in canopy gaps created as a result of the fire (Johnson et al. 2009). Conversely, fire may also destroy or accelerate the decline of existing roost trees, particularly of older snags, by burning the bases of the trees and weakening their structure, causing them to fall over quicker (Johnson et al. 2009, Dickinson et al. 2009). One study found that up to 20 percent of existing standing snags were lost post-fire, and that few new snags were created (Lacki et al. 2009).

In summary, prescribed fire may result in both adverse and beneficial effects on roosting habitat. It results in the immediate loss of some roost trees, but also creates new roosts and may enhance the suitability of affected trees that remain standing for a period after the fire. Fire likely results in long-term trends in forest composition towards a greater abundance of trees that are likely to serve as suitable roosts.

Prescribed fire may affect foraging habitat by changing the structure of the forest and by changing the abundance of prey within the affected area (Dickinson et al. 2009). The northern long-eared bat has shown a preference for foraging in heavily forested mid-slope areas, regardless of burn

condition. This suggests that they feed in and around closed canopies and are likely clutter-adapted (Lacki et al. 2009). The size of female northern long-eared bat home ranges and core areas, however, did not differ among bats radio-tracked before and after fires and home ranges of the monitored bats were located closer to burned habitats after fires than to unburned habitats (Lacki et al. 2009). Northern long-eared bats may respond to the habitat alterations that result from prescribed fires by shifting the location of their foraging areas to take advantage of changes in insect prey availability (Lacki et al. 2009). Immediately after fires, insect abundance typically declines, but abundance of coleopterans (beetles), dipterans (flies), and all insects combined has been shown to increase after prescribed fires (Lacki et al. 2009). The increases among these prey taxa can occur within a year of the fire and may last for up to 16 years post-burn.

As a result of the proposed actions, fire may kill as many as 10% of overstory trees in affected stands. The death and collapse of the affected trees would likely occur over a span of several years. In the burned areas, northern long-eared bat may have fewer trees to select for roosting, but availability of trees for roosting is likely to be only marginally affected and the overall value of the stand as roosting habitat for the species will little affected. In fact, the net effect of the prescribed burns may be to increase the suitability of the burned areas for northern long-eared bat. Overall effects to northern long-eared bat in the action area will be localized – only 0.6% of the suitable roosting habitat in the action area will be burned over an approximately 16-year period. The beneficial effects of the upland prescribed fires – increased thermal input to roosts and an increase in prey availability – are likely to at least offset the short-term and localized negative effects.

Burning of slash piles as part of mechanical fuels treatments could result in localized exposure of roosting northern long-eared bat to smoke. Effects will be similar to those that result from the smoke exposure that results from prescribed burns, but will be much less extensive.

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 pursuant to section 7 of the ESA. Any actions conducted on Chippewa National Forest lands will either be conducted by the USFS, or will require approval by the USFS and thus will require separate section 7 consultation. Therefore, cumulative effects, as defined in the ESA, are not expected to occur on their Forest lands.

Numerous state, county, and private land use activities that may affect the northern long-eared bat occur within the action area including: timber harvest, recreational use, road maintenance and construction, and residential, industrial and agricultural development and related activities. The BA indicated (p. 10) that approximately 5400 acres are planned for timber harvest from 2015-2017 on state land within the Forest. Beltrami, Cass, and Itasca Counties have planned for 962 acres of regeneration harvest or thinning beyond 2016. Harvest on state and county lands may alter available northern long-eared bat summer roosting habitat. Based on the same rationale discussed above on Federal lands and that northern long-eared bat habitat is abundant and well distributed

within the Forest, state and county harvest activities will result in only minimal cumulative effects to the species and its habitat.

Summary of Effects

Impacts to Individuals

Potential effects of the action include direct effects to northern long-eared bats that are present within the action area when activities are being conducted and indirect effects that may habitat suitability.

Direct effects include mortality, injury, harm, or harassment as a result of removal of roost trees or exposure to fire, heat, and smoke during prescribed burns and burning of slash piles. The potential for direct effects from tree removal and prescribed fire is greatest during spring and early summer when bats return from hibernation; when cool temperatures result in periodic use of torpor; and, when non-volant young are likely to be present (June to July). In addition, bats affected by WNS have additional energetic demands and compromised flight ability.

Individual northern long-eared bats may be killed, harmed, or harassed if they are present in trees that are felled; in areas where they are exposed to significant noise or vibration; and, in areas where they are exposed to fire, heat, or smoke. The number or proportion of northern long-eared bats that will be affected cannot be described with any reasonable level of precision due to the large amount of uncertainty with regard to the density and distribution of northern long-eared bat in the action area; uncertainty associated with various aspects of the actions themselves, including their precise timing; fire behavior; and, the amount of tree removal that will be needed to construct fire breaks and to mechanically treat fuels. Nevertheless, each activity will affect only a small proportion of the suitable roosting habitat in the action area and will not affect northern long-eared bat during hibernation or swarming. Including timber harvest on county lands, all activities combined will affect less than 4% of the suitable roosting habitat in the action area. These activities will have only temporary effects on habitat; will affect only a small proportion of all northern long-eared bat present in the affected areas; are, in part, beneficial to northern long-eared bat; and, will be implemented over an approximately 16-year period. In an average year, the proposed activities will affect only about 0.2 of the suitable northern long-eared bat roosting habitat in the action area.

Although only a small proportion of northern long-eared bat present in the action area will be exposed to the effects of the proposed actions, this proportion may be reduced by the proposed conservation measures. These include the minimization of tree removal that will be carried out to construct fire breaks by using existing features in compliance with CNF Forest Plan guidelines and by retaining snags greater than 12 inches DBH during mechanical fuels treatments.

Indirect effects from the action may result from habitat modification and primarily involve changes to roosting and foraging suitability. The death of some overstory trees as a result of prescribed burns could have both adverse and beneficial effects on habitat suitability for the northern long-eared bat. This will occur through loss of existing roosts, creation of new roosts,

and long-term changes in forest composition that results in a greater abundance of suitable roosts and prey. The overall effect of the prescribed fire portion of the proposed action on habitat suitability may be neutral to beneficial. Given the scope of the projects in relation to the overall action area, these projects will not substantially alter the overall availability or suitability of northern long-eared bat roosting or foraging habitat.

None of the USFS's proposed actions will alter the amount or extent of mortality or harm to northern long-eared bat resulting directly from WNS. Despite the likelihood for some adverse effects, the Forest's proposed action can be neutral or beneficial to northern long-eared bat. Monitoring efforts in the CNF would provide additional information on the effect of the USFS's actions on affected bats and would help to ensure that appropriate actions may be taken to ensure the species' conservation.

While analyzing the effects of the proposed action, we identified the life stages that would be exposed to the stressors associated with the proposed action, and analyzed how those individuals would respond upon exposure to the stressors. From this analysis, we determined that:

- 1) There is no proposed critical habitat for the northern long-eared bat, and thus, none will be adversely affected.
- 2) No known hibernating bats nor their hibernacula will be exposed to the project stressors as there are currently no known hibernacula within the vicinity of the action area.
- 3) Northern long-eared bats during the spring-fall period will be exposed to various project stressors and are likely to be adversely affected by some of them, but there are also significant beneficial aspects of the proposed action anticipated for the species.

Impacts to Populations

We have concluded that some northern long-eared bats are likely to experience reductions in either their annual or lifetime likelihood of survival or reproduction. Therefore, we need to assess the aggregated consequences of these effects on the population to which these individuals belong.

Affects to the integrity of any maternity colonies and or wintering populations are unlikely to occur. In fact, we find that many of the proposed actions of the USFS are likely to result in benefits to the species over the long term due to the maintenance of a mosaic of forest types that contain suitable roosting habitat. Thus, no component of the proposed action is expected to reduce the reproduction, numbers, or distribution of the northern long-eared bat rangewide. We recognize that the status of the species is uncertain due to WNS. In light of the environmental baseline in the action area and the intensity, frequency, and duration of anticipated project impacts, we find that the proposed actions are unlikely to have population-level impacts, and thus, are also unlikely to decrease the overall reproduction, numbers, or distribution of the northern long-eared bat.

Implementation of the interim 4(d) rule conservation measures should further reduce effects to individual bats if and when known roost trees are identified in or within 0.25 mile of the action area. The conservation measures will further protect known northern long-eared bat hibernacula, including a portion of the surrounding habitat.

Also according to the interim 4(d) rule, the Service anticipated that hazard tree removal will only have a minimal impact on northern long-eared bat habitat and individuals. This activity will collectively impact only small percentages of northern long-eared bat habitat and result in only low levels of take of individuals in the season during which they occur. As part of the proposed actions, only about 60 trees are expected to be removed each year during the implementation of upland prescribed burns. This is a small number of trees and only a small proportion of them may contain roosting bats when felled.

CONCLUSION

After reviewing the current status of this species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the northern long-eared bat. No critical habitat has been designated for this species; therefore, none will be affected.

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 northern long-eared bat (80 FR 18032). The Service's interim 4(d) rule for northern long-eared bat exempts the take of northern long-eared bat from the section 9 prohibitions of the ESA, when such take occurs as follows (see the interim rule for more information):

- (1) Take that is incidental to forestry management activities, maintenance/limited expansion of existing rights-of way, prairie management, projects resulting in minimal (<1 acre) tree removal, provided these activities:
 - a. Occur more than 0.25 mile (0.4 km) from a known, occupied hibernacula;
 - b. Avoid cutting or destroying known, occupied roost trees during the pup season (June 1–July 31); and,
 - c. Avoid clearcuts (and similar harvest methods, *e.g.*, seed tree, shelterwood, and coppice) within 0.25 (0.4 km) mile of known, occupied roost trees during the pup season (June 1–July 31).
- (2) Removal of hazard trees (no limitations).
- (3) Purposeful take that results from
 - a. Removal of bats from and disturbance within human structures; and,
 - b. Capture, handling, and related activities for northern long-eared bats for 1 Year following publication of the interim rule.

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) rule includes all of the activities that are part of the proposed actions.

AMOUNT OR EXTENT OF TAKE

If northern long-eared bat are present or utilize an area that will be affected by the proposed actions, incidental take of northern long-eared bat could occur. The Service anticipates incidental take of the northern long-eared bat will be difficult to detect for the following reasons: (1) the individuals are small and occupy summer habitats where they are difficult to find; (2) northern long-eared bat form small, widely dispersed maternity colonies under loose bark or in the cavities of trees, and males and non-reproductive females may roost individually which makes finding the species or occupied habitats difficult; (3) finding dead or injured specimens during or following project implementation is unlikely; (4) the extent and density of the species within its summer habitat in the action area is unknown; and (5) in many cases incidental take will be non-lethal and undetectable.

Monitoring to determine actual take of individual bats within an expansive area of forested habitat is a complex and arduous task. Unless every individual tree that contains suitable roosting habitat is inspected by a knowledgeable biologist before management activities begin, it would be impossible to know if a roosting northern long-eared bat is present in an area proposed for harvest or prescribed burn. Inspecting individual trees is not considered by the Service to be a practical survey method and is not recommended as a means to determine incidental take. However, the areal extent of potential roosting and foraging habitat affected can be used as a surrogate to monitor the level of take.

The Service anticipates that only those actions that are described in Table 1 of this BO and in Appendix D of the biological assessment will be implemented under this consultation. The Service anticipates that the nature of the proposed actions will not change. That is, the intent of each of the proposed activities covered under this consultation will only be to maintain and manage forest ecosystems. In addition, no more than 14,020 acres will be directly affected by the proposed actions, including 9,036 acres from lowland prescribed burns; 3,002 acres from upland understory burns; 1,730 acres from upland broadcast burns; and, 252 acres from mechanical fuels treatments.

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 northern long-eared bat. No critical habitat has been designated for northern long-eared bat, so none would be impacted.

REASONABLE AND PRUDENT MEASURES

Since all anticipated incidental take will be from activities addressed by the 4(d) rule and are therefore already exempted, no reasonable and prudent measures will be required.

TERMS AND CONDITIONS

Since all anticipated incidental take will be from activities addressed by the 4(d) rule and are therefore already exempted, no terms and conditions will be required.

REPORTING REQUIREMENTS

1. The USFS shall provide the Service with a report summarizing the activities completed as part of the proposed actions and the extent of the area affected by each. This report shall be provided to the Service no later than January 31 each year until all activities are complete.

2. The USFS shall make all reasonable efforts to educate personnel to report any sick, injured, and/or dead bats (regardless of species) located on the Chippewa National Forest immediately to the Forest Biologist. The USFS point of contact will subsequently report to the Service's Twin Cities Field Office (TCFO) (612-725-3548) and/or the Minnesota Department of Natural Resources (MNDNR; see <http://www.dnr.state.mn.us/wns/index.html> or call 1-888-345-1730). No one, with the exception of trained staff or researchers contracted to conduct bat monitoring activities, should attempt to handle any live bat, regardless of its condition. If needed, TCFO and/or MNDNR will assist in species determination for any dead or moribund bats. Any dead bats believed to be northern long-eared bat will be transported on ice to the TCFO or MNDNR. If a northern long-eared bat is identified, TCFO will contact the appropriate Service law enforcement office. Care must be taken in handling dead specimens to preserve biological material in the best possible state. In conjunction with the care of sick and injured fish or wildlife and the preservation of biological materials from dead specimens, the USFS has the responsibility to ensure that information relative to the date, time, and location of northern long-eared bat, when found, and possible cause of injury or death of each is recorded and provided to the Service. In the extremely rare event that someone has been bitten by a bat, please keep the bat in a container and contact the local health department.

In the extremely rare event that someone has been bitten by a bat, please keep the bat in a container and contact the local health department.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid the adverse effects of a proposed action on listed species or critical habitat, to help carry out recovery plans, or to develop information.

The Service has identified the following actions that, if undertaken by the USFS, would further the conservation of the northern long-eared bat. We recognize that limited resources and other agency priorities may affect the ability of the USFS to conduct these activities at any given time.

1. Assist with WNS investigations, where feasible. For example:
 - a. Monitor the status/health of known colonies;
 - b. Collect samples for ongoing or future studies; and,
 - c. Allow USFS staff to contribute to administrative studies related to WNS (on or off of USFS lands, as appropriate).

2. Monitor pre- and post-WNS distribution of the northern long-eared bat on the Chippewa National Forest.
 - a. Search for hibernacula within the National Forest;
 - b. Conduct inventory surveys;
 - c. Conduct radio telemetry to monitor status of northern long-eared bat colonies; and,
 - d. Participate in North American Bat Monitoring Program (NABat; a national effort to monitor and track bats) through submission of survey data.

3. Encourage research and administrative studies on the summer habitat requirements of the northern long-eared bat on the Chippewa National Forest that:
 - a. Investigate habitat characteristics of the forest in areas where pre- and post-WNS northern long-eared bat occurrences have been documented (acoustically or in the hand) (e.g. forest type, cover, distance to water).
 - b. Investigate the northern long-eared bat use (acoustics, radio telemetry) of recently managed areas of different prescriptions.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the conservation recommendations carried out.

REINITIATION NOTICE

This concludes formal consultation for the USFS's actions outlined in your request dated 23 March 2015 – the biological assessment was received in our office on 2 April 2015. 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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