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FISH AND WILDLIFE SERVICE



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May 27, 2015

Superior National Forest
Chip Weber
Acting Forest Supervisor
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Duluth, Minnesota 55808-4300

FWS No. 03E19000-2015-F-0102 37 Batched Vegetation Management 2015-2017 SNF
Formal consultation on Northern Long-Eared Bat

Dear Mr. Weber:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion and is based on our review of the Superior National Forest's (Forest) On-going Timber Harvest, Tree Removal for Planting or Fuels Reduction, and Prescribed Burning Projects (2015-2027) Biological Assessment and potential effects to the northern long-eared bat (*Myotis septentrionalis*; NLEB). The Biological Assessment (BA or Project), dated March 12, 2015, and letter, dated March 13, requesting formal conferencing on the Projects were received in our office on March 16, 2015. The BA subsequently was revised and sent via electronic mail on March 17. The Forest provided the Service with a second letter, dated March 23, 2015, which was also on behalf of the Chequamegon-Nicolet and Chippewa National Forests, similarly initiating conferencing/consultation for NLEB. Specifically, the three Forests requested that if conferencing could not be completed by April 2, 2015, the date for listing NLEB under the Endangered Species Act of 1973, as amended, that conferencing be concluded to move into formal consultation. The Service agreed to prepare a biological opinion to conclude formal consultation on the Project.

This biological opinion is based on the best available scientific and commercial data including meetings, electronic mail and telephone correspondence with Superior National Forest officials, Service files, pertinent scientific literature, discussions with recognized species authorities, and other scientific sources. A complete administrative record is on file at the 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 Ms. Ann Belleman, Fish and Wildlife Biologist, via email at ann_belleman@fws.gov.

Sincerely,

A handwritten signature in blue ink, appearing to read "Peter Fasbender". The signature is fluid and cursive, with a large initial "P" and a long, sweeping underline.

Peter Fasbender
Field Supervisor

Enclosure

cc: Susan Catton, Forest Wildlife Biologist

BIOLOGICAL OPINION

Effects to the Northern Long-eared Bat From the On-going Timber Harvest, Tree Removal for Planting or Fuels Reduction, and Prescribed Burning Projects (2015-2027) on the Superior National Forest

FWS No. 03E19000-2015-F-0102 37
Batched Vegetation Management 2015-2017 Superior National Forest

Prepared by:
U.S. Fish and Wildlife Service
Twin Cities 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 proposed activities on the Superior National Forest's (USFS, Forest, or SNF) On-going Timber Harvest, Tree Removal for Planting or Fuels Reduction, and Prescribed Burning Projects (2015-2027), 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 Biological Assessment (BA or Project), dated March 12, 2015, and letter, dated March 13, requesting formal conferencing on the Projects were received in our office on March 16, 2015. The BA was then revised and sent via electronic mail on March 17. A subsequent request for formal conferencing or consultation, as appropriate, was sent and received on March 23, 2015 (see Consultation History section below). The USFS determined that all activities addressed in the BA are unlikely to result in adverse effects to any other federally-listed species or have had prior coordination/consultation for all other involved federally-listed species. Therefore, this BO addresses one species, the NLEB.

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.

Interim 4(d) for the NLEB

On April 2, 2015, the Service has published a species-specific rule pursuant to section 4(d) of the ESA for NLEB (80FR17974). Section 4(d) of the ESA states that:

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

The Service's interim 4(d) rule for NLEB exempts the take of NLEB 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 hibernaculum;
 - 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, if the actions comply with all applicable State regulations; and
- b. Capture, handling, and related activities for NLEBs by individuals permitted to conduct these same activities for other species of bat until May 3, 2016.

Thus, any take of NLEB resulting from activities that are implemented in compliance with the conservation measures, as necessary, is exempted from section 9 prohibitions by the interim 4(d) rule, and does not require further incidental take authorization. Note that no conservation measures are required as part of the interim 4(d) rule for forest management actions that would affect only areas with no known roost trees and no known hibernacula. The Forest currently contains known roost trees and one suspected hibernaculum and will incorporate the above conservation measures into its proposed actions.

However, 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 agencies 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.

Consultation History

The SNF initially requested formal conferencing and submitted the BA on March 13, 2015. The BA subsequently was revised and sent via electronic mail on March 17. The SNF then provided the Service with a letter, dated March 23, 2015, which was also on behalf of the Chequamegon-Nicolet and Superior National Forests, requesting initiation of conferencing/consultation for NLEB. Specifically, the three Forests requested that if conferencing could not be completed by April 2, 2015, the date for listing NLEB under the ESA, that conferencing be concluded to move into formal consultation. Attached to the letter was a list of 22 projects on all three Forests that were prioritized for subsequent consultation. The Service agreed and is issuing this final BO in May 2015, concluding formal consultation on the Project. The BA, meetings, telephone discussions, and email transmissions with Ms. Susan Catton, Forest Biologist, and Ms. Lissa Grover, Biologist, form the basis for this BO.

DESCRIPTION OF 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 USFS reviewed all their ongoing actions and determined that a total of 35 forest management projects will continue to be implemented after the date when NLEB would be listed. They then reviewed these projects, including their previous consultation documents, to determine how these projects would affect the NLEB. The USFS included conservation measures to minimize potential adverse impacts of various activities as part of their project description. The Service has analyzed the effects of the proposed actions considering that the projects will be implemented as proposed, which include the conservation measures listed below.

The following project background and area descriptions are summarized from the BA. Additional information on the Superior National Forest background and description can be found in the BA, which is incorporated by reference.

The Forest proposes to implement the on-going timber harvest, tree removal for planting or fuels reduction, and prescribed burning within the Forest boundary, which includes five Ranger Districts (Gunflint, Kawishiwi, La Croix, Laurentian, and Tofte). All projects included in the BA were previously signed under “Finding of No Significant Impact” decisions from 2004 to 2015 and approved for implementation. Proposed timber harvest and other associated activities are expected to begin in spring 2015 and are expected to be completed in 2027.

The Forest proposes to carry out timber harvest, tree removal for planting or fuels reductions, and temporary roads, and prescribed burning activities on approximately 64,424 acres.

- A majority of the timber harvest and tree removal for planting or fuels reduction (81 percent of 32,815 acres or approximately 26,580 acres) will occur outside the summer roost season (April 1 – September 30); however, at least 19 percent (approximately 6,960 acres) of timber harvest and tree removal for planting and fuels reduction are proposed to take place during the summer roost season.
- Temporary roads will be constructed or reconstructed to access some harvest units and later decommissioned upon project completion. The Forest estimates that approximately 400 miles of 20foot-wide temporary roads totaling 971 acres will be constructed for this batch of projects. Twelve percent (116 acres) of road construction will occur in the summer roosting season and 88 percent (855 acres) would occur outside the summer roost season.
- Approximately 75 percent (21,454 acres) of the broadcast burning and underburning (28,605 acres) will take place outside of the NLEB summer roost season while 25 percent (7,310 acres) would take place during the summer roosting season. Pile burning takes place in the vegetation management stands or in gravel pits that are much larger than the burn piles and therefore 10 percent of the acres are analyzed. Piles are burned in October and November.

The proposed action includes the following types of harvest, tree removal for planting and fuels reduction and prescribed burn treatments (the BA provides a full description of each treatment in

appendix D on pp. 29-36; see Table 1 below for acres of proposed activity by treatment type):

1. Treatments that create young forest through even aged harvest:
 - a. Clearcut with reserves – an even aged management technique where most merchantable trees in the stand are harvested in a single cutting;
 - b. Seed-tree cut – an even aged management technique where most merchantable trees are cut, but about 10 trees per acre of the desired species are retained for seed production;
 - c. Patch clearcut – an even aged management technique involving harvest of most merchantable trees within small patches (typically 3-7 acres) or strips within a stand; and
 - d. Shelterwood cut 30 with reserves – even aged regeneration method where the most merchantable trees are harvested and some mature trees (at least 30 square feet basal area) are retained.
2. Treatments that create or maintain two or more age classes through uneven age harvest:
 - a. Shelterwood cut with reserves – an uneven aged regeneration method where some trees are harvested fairly uniformly across a stand but a larger amount of trees are retained; and
 - b. Selection cut – an uneven aged regeneration method where individual trees or groups of trees of specified size classes and species are removed from the stand to produce an uneven aged structure.
3. Treatments that improve stand conditions through intermediate harvest treatment:
 - a. Commercial thinning – An intermediate harvest where trees are removed to improve growing conditions for remaining trees; and
 - b. Variable thinning – An intermediate harvest where trees are removed to improve growing conditions. This method removes trees of variable basal areas rather than uniformly throughout the stand.
4. Treatments that restore stands through a variety of non-harvest activities:
 - a. Understory fuels reduction – A mechanical treatment that reduces understory fuels, including dead and down material; and
 - b. Mechanical site preparation – A mechanical treatment that prepares an area for regeneration and reduces competition from brush and undesirable species.
5. Secondary reforestation or fuel reduction treatments (prescribed burns):
 - a. Under burn – a low intensity fire that burns beneath the canopy;
 - b. Slash disposal – disposal of slash created from management activities through chipping, biomass removal, burning or other methods;
 - c. Broadcast burning – prescribed burn where fire is applied generally to most or all of an area within well-defined boundaries;
 - d. Site preparation burn – a broadcast burn applied across a harvest unit; and pile burn – burn piles of hand-piled timber harvest debris and slash.

The Forest also proposes post-harvest treatments including: planting or seeding, animal control (deer repellent), planted seedling release, and slash treatments (to reduce fire hazards; slash is scattered to avoid build-up and it typically decomposes within a few years; most slash is not

piled and burned).

Table 1. Proposed number of forested acres impacted by treatment type (adapted from 2015 BA; roads are not included; all burn pile acres are included).

Project Name	District	Acres Impacted by Treatment			
		Timber Harvest	Fuel Reduction or Planting Site Preparation	Prescribed Burning	TOTAL
Administrative Sites-East Zone		0	141	804	945
Administrative Sites-West Zone		0	141	79	220
Birch		1,200	41	459	1,700
Border		2,296	0	0	2,296
BWCAW EIS 2001-East Zone		0	0	11,403	11,403
BWCAW EIS 2001-West Zone		0	1	6,816	6817
Cascade		532	264	575	1371
Clara		639	27	584	1250
Devil Trout		0	0	163	163
Dunka		404	0	0	404
East Side Wildlife Opening and Pine Stand Maintenance		260	0	742	1002
Echo Trail Forest Management		1,503	0	0	1503
Glacier		1,741	1	453	2195
Holmes/Chipmunk		0	0	515	515
Inga South		85	0	638	723
Lima Green		4,876	146	396	5418
Maple Hill		31	0	234	265
Mid-Temperance Vegetation Management		172	126	85	383
North Arm		0	5	1,052	1057
North Shore Restoration		4,547	1,040	63	5650
Oak/Blueberry		0	0	60	60
Pelican		1,395	9	135	1539
Plantation		50	0	0	50
Red Pine Thinning		3	0	0	3
Red Pine White Spruce Thinning		52	0	0	52
Silver Island		192	0	175	367
Skibo		323	0	744	1067
Tomahawk		864	0	602	1466
Toohey		5,400	619	1,556	7575
Tracks		3,516	125	10	3651

Twins		607	265	243	1115
Virginia		317	0	19	336
White Forest Management		1,543	53	0	1596
Windy Red Pine Thinning and Pagami Fire Salvage/Restoration		267	0	0	267
TOTAL ACRES		32,815	3,004	2928,605	64,424

Note: Acres may vary between this table and those described in the document due to rounding errors.

Projects/Actions that Will Have No Effect or Are Not Likely to Adversely Affect the NLEB

Actions that would have no effect on NLEB are those that involve no tree clearing and/or no removal of vegetation, and would not alter the suitability of any potential NLEB habitat, including known NLEB hibernacula or any cave habitats. The SNF identified those activities that will have no effect to NLEB and they include planting, seeding, deer repellent, bud capping, and release of planted seedlings. These activities occur in NLEB habitat that is no longer suitable. The Service acknowledges this determination and activities with no effect to NLEB will not be discussed further.

Activities that may affect, but are not likely to adversely affect the bat include those occurring during the winter (October-March) that will not alter habitat to the extent that indirect adverse effects are likely to occur to NLEBs when they return to the affected area after hibernation; taking place when bats are absent from summer roosting habitat; and not affecting any known or suspected staging or swarming areas. Specifically, activities based on these criteria include uneven-aged timber harvest, intermediate harvest treatments (thinning), construction of and decommissioning temporary roads, under burns and site preparation burns, slash disposal, and pile burns.

As described above, when these activities take place outside of staging and swarming areas or in summer roosting habitat during the period when the NLEB is absent, they may affect, but are not likely to adversely affect the species. As a result of the above explanations, the Service concurs that these activities are not likely to adversely affect the NLEB. No further consultation or coordination under the ESA is required for the above-listed projects that will have no effect or are not likely to adversely affect the NLEB. Should project plans change, or if additional information on listed and proposed species become available, this determination may be reconsidered.

Projects/Actions that Are Likely to Adversely Affect the NLEB

Any tree removal activity that takes place in summer roosting habitat during the summer roosting period (April 1 to September 30) may affect and is likely to adversely affect the NLEB. Activities such as even-aged timber harvest and mechanical site preparation are likely to adversely affect the NLEB when they affect suitable summer roosting habitat even when they occur outside of the summer roosting period.

The USFS determined that the effects of implementation of on-going timber harvest, tree clearing for fuels reduction and tree planting, and prescribed burning are likely to adversely affect individuals and summer roosting habitat on the Superior National Forest, several actions are likely to adversely affect the NLEB. These include the majority of site preparation for planting/reforestation and fuels reduction, followed by a lesser amount of timber harvest and burning occur during this period. In total, 22% of the acres in the batch of 35 projects are treated during the summer.

All these activities have the potential to adversely affect NLEB roosting and/or foraging habitat. The interim 4(d) rule (80 FR 17974) states that in areas affected by WNS, all incidental take prohibitions apply except that take attributable to forest management practices, maintenance and limited expansion of transportation and utility rights-of-way, removal of trees and brush to maintain prairie habitat, and limited tree removal projects shall be excepted from the take prohibition, provided these activities protect known maternity roosts and hibernacula. The proposed types of timber harvest and other associated activities are all included under the definition of forest management used for the rule, which states: “(F)orestry management is the practical application of biological, physical, quantitative, managerial, economic, social, and policy principles to the regeneration, management utilization and conservation of forests to meet specific goals and objectives (Society of American Foresters (SAF)(a), http://dictionaryofforestry.org/dict/term/forest_management). Forestry management includes the suite of activities used to maintain and manage forest ecosystems, including, but not limited to: timber harvest and other silvicultural treatments, prescribed burning, invasive species control, wildlife openings, and temporary roads.” Therefore, all proposed activities in the Windy Project that may adversely affect NLEB are within the scope of activities covered by the interim 4(d) rule. Moreover, any incidental take that results from their implementation is exempt from the section 9 prohibitions as long as they include the interim 4(d) rule’s conservation measures. The Service concurs that these activities are likely to adversely affect the NLEB and the remainder of the BO will address these activities.

Conservation Measures

Conservation measures are those actions taken to benefit or promote the recovery of the species. These 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 a known, occupied hibernaculum.
- 2) The USFS will avoid cutting or destroying known, occupied roost trees during the pup season (June 1–July 31).

3) The USFS will 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).

Per the 2004 Forest Plan, the Forest incorporates and is consistent with the following applicable Objectives, Standards, and Guidelines that also function to conserve and protect NLEB and their habitat:

- O-WL-4 (maintain, protect, or improve habitat): site level guidelines to retain live trees and snags in harvested area;
- O-WL-5 (see opportunity to benefit T&E species): Inter- and underplanting of conifers in harvested areas to improve habitat diversity;
- O-WL-6 (reduce or eliminate adverse effects on T&E species): retain snags and unmerchantable trees and apply mitigations to protect known sensitive species;
- G-WS-15 (wetlands managed to prevent reduction of habitat): standard operating guideline applied during timber layout;
- O-VG-19 (maintain/increase ≥ 300 acre mature forest patches): contributes to maintaining patches >300 acres across the Forest;
- G-VG-1 (maintain 19 mature forest patches $\geq 1,000$ acres Forest-wide): 23 patches of $>1,000$ acres are maintained Forest-wide;
- S-VG-2 (maintain 85,000 acres of patches ≥ 300 acres in size): contributes to maintaining 106,718 acres of patches >300 acre maintained Forest-wide;
- G-TM-5 (in stands 20 acres or larger that are regenerated with clearcuts, retain a minimum of 5% of the stand in legacy patches): legacy patches are incorporated into silvicultural prescriptions;
- S-WS-8 (winter harvest restricted to frozen ground at a depth of 4 inches or more): minimizes ground disturbance on wet, fertile sites.

Minnesota Forest Resources Council guidance is incorporated as follows:

- On clearcut sites, in general leave 6-12 live trees/acre, trees can be retained as individual trees or clumps;
- Leave all snags possible standing in harvest area; and
- In upland stands, seasonal (vernal) ponds and other small lowland inclusions identified during layout will be protected with a minimum 50-foot filter strip

Minnesota Smoke Management Plan guidance is incorporated as follows:

- Burn plans will be used to evaluate the amount and type of vegetation to be burned, burn size, location and terrain;
- Minimize emissions by minimizing area burned, reducing fuel load, reducing the amount of fuel consumed by the fire, and minimizing emissions per ton of fuel by using mass ignition techniques; and

- Evaluate smoke dispersion to mitigate effects of smoke on sensitive areas.

STATUS OF THE SPECIES

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

Life History and Biology

The NLEB is a temperate, insectivorous, migratory bat that hibernates in mines and caves in the winter and spends summers in wooded areas. The key stages in its annual cycle are: hibernation, spring staging and migration, pregnancy, lactation, volancy/weaning, fall migration and swarming. NLEB generally hibernate between mid-fall through mid-spring each year. 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) 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), with nursing continuing until weaning, which is shortly after young become volant in mid- to late-July. Fall migration likely occurs between mid-August and mid-October.

Summer habitat and ecology

Suitable summer habitat¹ for NLEB consists of a wide variety of forested/wooded habitats where they roost, forage, and travel and may also include some adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, old fields and pastures. This includes forests and woodlots containing potential roosts, as well as linear features such as fencerows, riparian forests, and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure.

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

Upon emergence from the hibernacula in the spring, females seek suitable habitat for maternity colonies (typically consisting of females and young). NLEB actively form colonies in the summer (Foster and Kurta 1999) and exhibit fission-fusion behavior (Garroway and Broders 2007), where members frequently coalesce to form a group (fusion), but composition of the group is in flux, with individuals frequently departing to be solitary or to form smaller groups (fission) before returning to the main unit (Barclay and Kurta 2007). As part of this behavior,

¹ See the Service's current summer survey guidance for our latest definitions of suitable habitat: <http://www.fws.gov/midwest/Endangered/mammals/inba/inbasummersurveyguidance.html>.

NLEBs switch tree roosts often (Sasse and Pekins 1996), typically every 2 to 3 days (Foster and Kurta 1999; Owen et al. 2002; Carter and Feldhamer 2005; Timpone et al. 2010). NLEB maternity colonies range widely in size, although a maximum of 30-60 individuals may be most common early in the season, with the colony size decreasing post-lactation of young (Service 2014). NLEB show some degree of interannual fidelity to single roost trees and/or maternity areas. Male NLEB are routinely found with females and young in maternity colonies. NLEB use networks of roost trees often centered around one or more central-node roost trees (Johnson et al. 2012). NLEB roost networks also include multiple alternate roost trees and male and non-reproductive female NLEB may also roost in cooler places, like caves and mines (Barbour and Davis 1969, Amelon and Burhans 2006).

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

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 (e.g. abandoned or active mines and railroad tunnels). Other landscape features that may also be used by NLEBs during the winter have yet to be documented. Generally, NLEBs remain at hibernacula from October to April, depending on local climate. In southern portions of the species' range, they may be at hibernacula only from November to December; in some northern areas they may leave hibernacula for summer habitat between March and mid-May.

Hibernacula for NLEBs 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.

NLEBs 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, NLEB “swarm,” a behavior in which large numbers of bats fly in and out of cave entrances from dusk to dawn, while relatively few roost in caves during the day. Swarming continues for several weeks and mating occurs during the latter part of the period. After mating, females 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 (as late as May in some northern areas), most NLEB 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, NLEB 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 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 and immediate for the NLEB as the disease white-nose syndrome (WNS). It is unlikely that NLEB populations would be declining so dramatically without the impact of WNS. Since the disease was first observed in New York in 2007 (later biologists found evidence from 2006 photographs), WNS has spread rapidly in bat populations from the Northeast to the Midwest and the Southeast. Population numbers of NLEB have declined by 99 percent in the Northeast, which along with Canada, has been considered the core of the species’ range. Although there is uncertainty about how quickly WNS will spread through the remaining portions of these species’ ranges, it is expected to spread throughout their entire ranges. In general, the Service believes that WNS has significantly reduced the redundancy and resiliency of the NLEB.

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

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

In areas where WNS is present, there are additional energetic demands for NLEBs. For example, WNS-affected bats have less fat reserves than non-WNS-affected bats when they emerge from hibernation (Reeder et al. 2012; Warnecke et al. 2012) and have wing damage (Meteyer et al. 2009; Reichard and Kunz 2009) that makes migration and foraging more challenging. Females that survive the migration to their summer habitat must partition energy resources between foraging, keeping warm, successful pregnancy and pup-rearing, and healing and may experience reduced reproductive success. In addition, with wing damage, there may be an increased chance of WNS-affected bats being killed or harmed as a result of proposed actions. Again, this is particularly likely if timber harvest or burns are conducted early in the spring (April – May) when bats have just returned, have damaged wings, and are exposed to colder temperatures when torpor is used more frequently.

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

Lastly, there is growing concern that bats, including the NLEB (and other bat species) may be threatened by the recent surge in construction and operation of wind turbines across the species' range. Mortality of NLEB has been documented at multiple operating wind turbines/farms. The

Service is now working with wind farm operators to avoid and minimize incidental take of bats and assess the magnitude of the threat.

Rangewide Status

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

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

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

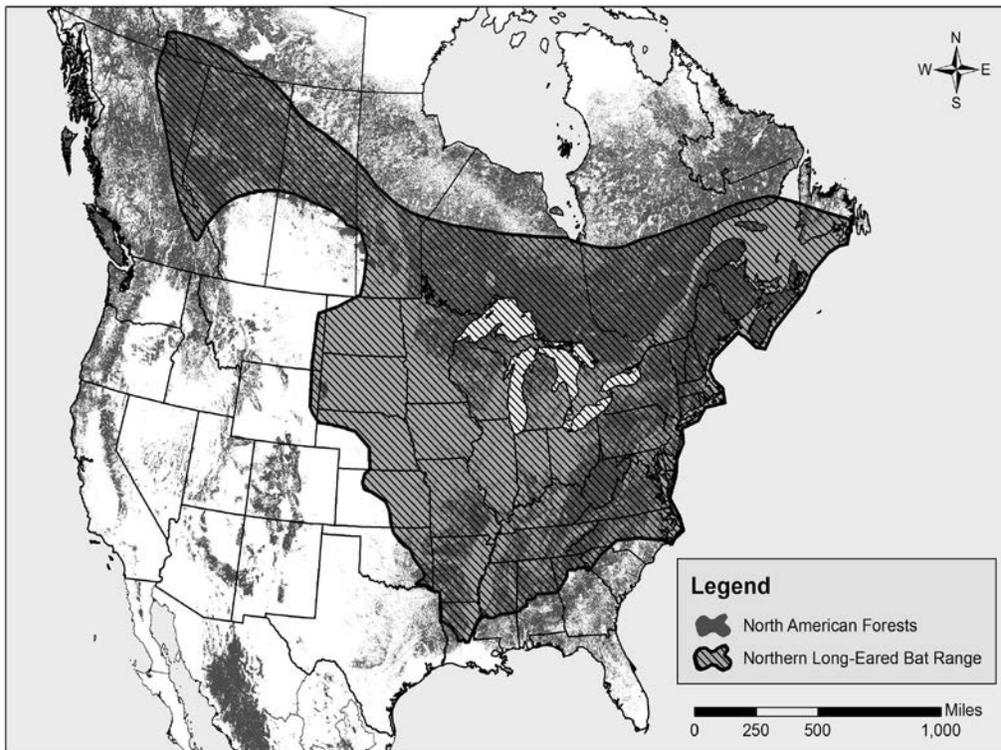


Figure 1. Northern long-eared bat range.

The current range and distribution of NLEB must be described and understood within the context of the impacts of WNS. Prior to the onset of WNS, the best available information on NLEB came primarily from surveys (mostly focused on Indiana bat or other bat species) and some targeted research projects. In these efforts, NLEB was very frequently encountered and was considered the most common myotid bat in many areas. Overall, the species was considered to be widespread and abundant throughout its historic range (Caceres and Barclay 2000).

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

Status of the Northern Long-eared Bat in Minnesota

Prior to 2014, there was little information on NLEB summer populations in the state. In 2014, passive acoustic surveys conducted at a new proposed mining area in central St. Louis County

detected the presence of NLEB at each of 13 sites sampled. Calls that were assigned to NLEB 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 NLEB (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 NLEBs (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-footwide 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, and NLEBs were the most common species captured by mist-net (Merjent 2014). Mist-net surveys were conducted the previous year (2013) on the SNF's Kawishiwi District, and resulted in capture of 13 NLEBs (38 percent of total captures) over 9 nights of netting at 8 sites (Grandmaison *et al.* 2013). The SNF has been conducting acoustic surveys since 2009 on five permanent driving transects; these data are still being analyzed (Catton, pers. comm. 2015).

The NLEB is known from 15 hibernacula in Minnesota; however, the status of most is unknown. An estimated 3,000 NLEB are thought to hibernate within the largest known hibernaculum in Minnesota, the Soudan Mine in St. Louis County. WNS has not been detected in Minnesota; however, the fungus that causes WNS was detected in 2011–2012. Currently, only Soudan Mine and Mystery Cave in Minnesota are known to harbor the fungus that causes WNS 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 NLEB.

Conservation Needs of the Species

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

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

particularly when pregnant females and/or young are present should be reduced. Research to identify important hibernacula and summer areas and to delineate the migratory relationship between summering and wintering populations should also be pursued.

ENVIRONMENTAL BASELINE

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

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. 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 SNF's Project, the area where "land, water, or air" that is likely to be affected is land administered by the USFS where timber harvest, prescribed burning, and associated actions authorized by the Forest would occur. The activities considered in this biological opinion are dispersed throughout the SNF; therefore, we consider the lands within the entire SNF boundary as the action area. The Forest boundary encompasses over 3 million acres (includes Federal, state, county, and other ownerships), of which 445,000 acres are water.

Status of the Species in the Action Area

The SNF initiated annual acoustic monitoring in 2009. In 2013 and 2014, mist-netting, radio-telemetry, habitat characterization, and acoustic survey efforts were initiated and while the sample size is still small, available data are providing insights into bat presence and reproductive female NLEB habitat use. Acoustic monitoring 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 June of 2015. In 2013, 34 bats were captured at eight locations, of which 13 were NLEB. In 2014, 44 bats were captured at 5 sites on the SNF, of which 24 were NLEB. Both reproductive adults and non-reproductive juveniles were captured and 5 reproductive female NLEB in 2013 and 10 reproductive female NLEB in 2014 were equipped with radio-transmitters, which resulted in subsequent detections of multiple maternity roost sites. In 2013, three maternity roosts were identified in live aspen and four additional maternity roosts were in dead aspen and white pine. In 2014, 14 maternity roosts were in aspen (13 live and 1 dead), 2 in live red maple, 1 in live black ash and 1 in an unknown snag.

Other results of mist-net surveys conducted in 2013 and 2014 in Minnesota have found a range of relative abundance for NLEB. Based on the frequency and proximity to SNF of positive NLEB detections in Minnesota and the prevalence of suitable habitat for the species on the SNF,

it is reasonable to assume that the species may be widespread in the action area. Because survey data analyses not yet complete, we cannot estimate roost tree density or the proportion of the SNF that is inhabited by NLEB within a useful level of precision. The SNF is also working with the Minnesota Department of Natural Resources, the Superior National Forest, and the Service to increase our collective knowledge of NLEB distribution and habitat use in northern Minnesota.

Habitat Conditions in the Action Area

The SNF assumes that forest comprised primarily of trees greater than 9 years old functions as suitable summer habitat for the NLEB in the action area. This type of habitat is abundant and well distributed across the SNF on public lands (Federal, state and county; see Table 5 in the BA). The NLEB typically uses summer habitats between early April and late September (Nordquist 2015). On the SNF, suitable summer habitat for the NLEB is distributed among several forest types, but is mostly comprised of hardwood forest types, especially aspen/birch forest (see Table 6 in the BA).

A pilot study initiated by the SNF in 2013 confirmed that northern long-eared bats utilize cracks and crevices in live and dead aspen (*Populus tremuloides*), live maple (*Acer rubrum*), live black ash (*Fraxinus nigra*) and white pine (*Pinus strobus*) (Grandmaison et al. 2013). Seven maternity roost trees were located in 2013 and 18 in 2014 on the SNF. Live aspen were the predominant trees used, ranging in size from 9-18 inches dbh (Catton 2014). Data from this study should be considered preliminary as the study continues, but thus far has confirmed the following: maternity roost trees were large (dbh > 11 in.) with heights ranging from 23.5 – 70.6 feet; canopy closure in the stands around roost trees was high (62 – 98%), although maternity roost trees had some level of exposure to sunlight during the day. In 2014, lactating females were found between mid-June and early July (Catton 2014).

There are four known or suspected NLEB hibernacula within 5 miles of the SNF. Section 30 Mine is located on private land just outside of Ely, Minnesota and NLEBs were documented wintering in this site in the 1990's. The mine is not monitored on a regular basis. Sudan Mine, the largest known hibernaculum in the state, is located approximately 5 miles outside the SNF boundary. A third known hibernaculum is located at Tettegouche State Park and is located approximately 4 miles outside of the SNF boundary - about 9 miles from the nearest USFS lands - and this site is also not regularly monitored but was known to house wintering NLEBs in 1990 and 2003. The fourth site is the Jack Lake mine, located within the Boundary Waters Canoe Areas Wilderness on the Tofte Ranger District. This is a suspected hibernaculum and has never been monitored in the winter for bats: however during a SNF site visit in September 2014, bats were found using it.

The Forest also contains a small amount of swarming and staging area. A total of 15,150 acres of National Forest lands meet the criteria for swarming or staging areas (1.3% of the Superior National Forest). Fall swarming dates at Soudan mine, one of the hibernacula near the Forest, have been documented as early August to mid-October and spring staging activity has been documented from late April to mid-June (Nordquist 2015).

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 SNF provides habitat for summering, migrating, staging and swarming NLEBs. Therefore, within the action area the conservation needs include: 1) providing suitable habitat conditions for foraging and roosting by the NLEB; 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 the NLEB that use the area during the summer; during spring and fall staging and swarming periods; and, if hibernacula are found in the action area, during winter.

The BA indicated that the Forest has initiated NLEB acoustic monitoring routes to identify baseline bat activity levels and observe how those levels change over time. Results of those studies are summarized above briefly (see, **Habitat Conditions in the Action Area**). The Forest is also working in partnership with the Minnesota Department of Natural Resources, the Chippewa National Forest, and the Service to further their knowledge of NLEB distribution and habitat use in northern Minnesota. The Forest indicated in its BA, for example, that the number of acoustic surveys will be increased across the Forest beginning in 2015. These measures, in addition to the continued implementation of conservation measures required under the Forest Plan, will contribute to conservation needs of the NLEB in general and within the action area.

EFFECTS OF THE ACTION

This BO evaluates the anticipated effects of 37 projects on the Superior National Forest. These projects will affect a total of 64,424 acres of potential NLEB habitat on the Forest – this includes timber harvest (32,815 acres); roads (971 acres); mechanical fuel reduction and mechanical site preparation (3,004 acres); and, prescribed burning (25,545). Potential effects to the NLEB include direct and indirect effects. Direct effects occur when bats are present while the activities are being conducted; indirect effects occur later in time. Effects will vary based on the type of the proposed activity.

Our analysis of effects for NLEB entails: (1) evaluating individual NLEB exposure to action-related stressors and the bats' likely responses; (2) integrating those individual effects (exposure risk 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 rangewide. If we find that the actions are unlikely to affect the rangewide numbers, reproduction, and distribution of the species in a way that can be measured or described, we conclude that the agency's actions are not likely to jeopardize the continued existence of the species.

Effects to Hibernating Bats at or Near Hibernacula

As described in more detail in the section, **Habitat Conditions in the Action Area**, above, there are four known or suspected NLEB hibernacula within 5 miles of the SNF. NLEBs present at these hibernacula, however, are not likely to be exposed to the direct or indirect effects of the proposed actions.

Fall swarming and spring staging typically occur within 5 miles of a hibernaculum. Therefore, the SNF contains some swarming and staging habitat. Tree clearing will affect 190 acres of staging/swarming habitat on the SNF. No tree clearing will occur within 0.25 miles of a known or suspected hibernaculum.

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

Tree Removal Associated with Timber Harvest and Other Activities

Tree clearing will occur as a result of timber harvest, temporary road construction, mechanical site preparation, and mechanical fuels reduction. Together these activities will take place on 6,960 acres of suitable summer habitat during the period when NLEB may be present. Within the areas affected by these activities, NLEBs are likely to be harmed, harassed, or killed as a result of tree removal during the spring to early fall roosting period, April 1 to September 30. Tree removal as a result of a similar suite of activities will take place in suitable summer habitat on an additional 29,830 acres outside of this period and will result in only indirect effects to NLEB.

Death/Injury

Risk of death or injury of individual NLEB from timber harvest or other tree removal varies depending on the timing of activities, their location, type of harvest, and extent of the area affected. In the BA, the Forest assumed that tree clearing that occurs between April 1 and September 30 in habitat comprised of trees greater than nine-years old could result in direct impacts to NLEB.

The timing of forest management activities greatly influences the likelihood of exposure and the extent of impacts on individual bats and their populations. Female NLEB typically roost colonially, with their largest population counts occurring in the spring or early summer, presumably as one way to reduce thermal costs for individual bats (Foster and Kurta 1999). Although bats may flee their roosts during tree removal, removal of occupied roosts during the active season while bats are present (spring through fall) is likely to cause injury or mortality to some roosting bats. Bats are likely to be injured or killed as a result of tree felling in the spring when bats often use torpor (temporary unresponsive state) to survive periods of cool weather and low prey availability. Bats are also likely to be killed or injured during early to mid-summer (approximately June-July) when flightless pups or inexperienced flying juveniles are present. Removal of trees outside these periods is less likely to result in direct injury or mortality when the majority of bats can fly and are more dispersed.

Lastly, the likelihood and extent of impacts are influenced by the type of the timber harvest or tree removal relative to the amount of remaining suitable roosting and foraging habitat from which affected bats may select. NLEBs use multiple roosts throughout the season. Therefore, only a certain number of roosts are anticipated to be occupied in a single day or year. Larger areas of treatment have greater risk than when smaller areas are affected. Similarly, clearcuts

have greater risk than selective harvest treatments (individual or group) because more trees will be removed in the treatment area.

In about 14% percent (29,830 acres) of the area that will be affected by tree clearing, tree removal will occur only outside of the summer roosting period. No direct effects to the NLEB will occur in these areas because the species will not be present during tree removal. In areas affected by even-aged timber harvest and mechanical site preparation, however, the NLEB could be adversely affected as a result of the significant alteration of habitat. That type of effect is described below under Response to Removal or Alteration of Roosting/Foraging Habitat.

NLEBs could be harmed, harassed, or killed as a result of tree removal activities that take place when the species is present in summer roosting habitat. The NLEB will only be exposed to these types of adverse effects, however, in about 0.3% of the action area. SNF actions that will affect the NLEB in this manner include timber harvest, temporary road construction, mechanical site preparation, and mechanical fuels reduction. Effects will not occur simultaneously across the affected areas, but will instead occur over an approximately 10-year time period. NLEB habitat is abundant and well distributed throughout the Forest and there will be large areas of intact forested habitat adjacent to each treatment area. There are 2,650,931 acres of potential NLEB habitat in the action area, of which 2,434,526 acres (92 percent) are currently considered suitable for NLEB use during the summer roosting period.

Response to Removal or Alteration of Roosting/Foraging Habitat

The best available data indicate that the NLEB shows a varied degree of sensitivity to timber harvesting practices (Menzel et al. 2002, Owen et al. 2002). In central Arkansas, the three classes of mixed pine-hardwood forest that supported the majority of the roosts were partially harvested or thinned, unharvested (50–99 years old), and group selection harvest (Perry and Thill 2007). Forest size and continuity are also factors that define the quality of habitat for roost sites for NLEB. Lacki and Schwierjohann (2001) stated that silvicultural practices could meet both male and female roosting requirements by maintaining large-diameter snags, while allowing for regeneration of forests.

In addition to impacts on roost sites, timber harvest practices can also affect foraging and traveling habitat, and thus, NLEB fitness. In southeastern Missouri, the NLEB showed a preference for contiguous tracts of forest cover (rather than fragmented or wide open landscapes) for foraging or traveling, and different forest types (rather than monoculture) interspersed on the landscape increased likelihood of occupancy (Yates and Muzika 2006). Similarly, in West Virginia, female NLEBs spent most of their time foraging or travelling in intact forest, diameter-limit harvests (70–90 year-old stands with 30–40 percent of basal area removed in the past 10 years), and road corridors, with no use of deferment harvests (similar to clearcutting) (Owen et al. 2003). In Alberta, Canada NLEB avoided the center of clearcuts and foraged more in intact forest than expected (Patriquin and Barclay 2003). On Prince Edward Island, Canada, female NLEBs preferred forested areas more than open areas, with foraging areas centered along forest-covered creeks (Henderson and Broders 2008). In general, NLEBs prefer intact mixed-type

forests with small gaps (i.e., forest trails, small roads, or forest covered creeks) in forests with sparse or medium vegetation for foraging and traveling, rather than fragmented habitat or areas that have been clearcut.

Sustainable timber harvest activities do not typically lead to permanent losses of suitable roosting, foraging, or traveling habitat for NLEB. On the contrary, sustainable timber harvest activities are compatible with the long-term maintenance of suitable forested habitat for the species. Many sustainable timber harvest practices will result in little change in terms of the amount or quality of roosting or foraging habitat for NLEB. For example, selective harvest regimes are not anticipated to result in alterations of forest to the point where NLEB would be expected to significantly alter their normal behaviors within the affected areas. The treatment areas will still be forested with only small openings left by the harvest treatment. Similarly, small patch cuts, wildlife openings, and forest roads would be expected to serve as foraging areas or travel corridors and not as barriers to movement. Therefore, the only impacts of concern from many forest treatments are the potential for death or injury during active season tree removal.

However, localized long-term reductions in suitable roosting and/or foraging habitat can occur from various forest practices. For example, large clearcuts (that remove a large portion of a known or assumed home range) would result in a temporary “loss” of forest for NLEB. In these cases, “temporary” would be for many years (amount of time to reproduce suitable roosting/foraging habitat; approximately 9 years on the SNF). Foraging would be possible prior to roosting depending on the juxtaposition of cuts to other forest regimes.

As stated above, NLEB have been found in forests that have been managed to varying degrees and as long as there is sufficient suitable roosting and foraging habitat within their home range and travel corridors between those areas, we would expect NLEB colonies to persist in managed landscapes.

In addition to the type of timber harvest, the extent of impact from timber harvest-related habitat modifications is influenced by the amount of suitable habitat available within and nearby NLEB home ranges. Some portions of the NLEB’s range are more forested than others. In areas with little forest or highly fragmented forests (e.g., western U.S. edge of the range, central Midwestern states; see Figure 1), impact of forest loss would be disproportionately greater than similar sized losses in heavily forested areas (e.g., Appalachians and northern forests). Also, the impact of habitat loss within a NLEB’s home range is expected to vary depending on the scope of removal. Silvis et al. (2014) modeled roost loss of NLEBs and Silvis et al. (2015) removed known NLEB roosts during the winter in the field to determine how this would impact the species. Once removals totaled 20–30 percent of known roosts, a single maternity colony network started showing patterns of break-up. As explained in the Status of Species section, sociality is hypothesized to increase reproductive success (Silvis et al. 2014); thus, smaller colonies are expected to have lower reproductive success.

Clearcutting and similar harvest methods that result in low density of potential roost trees may prompt the need for longer flights and increased energetic demands by NLEB at a time when

they may already be energetically challenged. NLEB emerge from hibernation with their lowest annual fat reserves and soon thereafter must return to their summer home ranges. The spring staging period precedes migration to summer habitats. During this period, NLEB remain near hibernacula. They feed and reenter hibernacula daily, where they enter torpor to minimize energy loss during the day. Individuals may increase fat reserves during this period, but are unlikely to regain the large amounts of fat lost during hibernation.

For several reasons, winter tree harvest that substantially alters summer roosting habitat for NLEB could result in adverse effects to affected individuals. NLEBs have summer home range fidelity (Foster and Kurta 1999; Patriquin et al. 2010; Broders et al. 2013). Activities that take place during the winter that render summer habitats unsuitable may force NLEB to rely on low energy reserves to find new roosts or foraging areas. This may put additional stress on females that are often pregnant. Hibernation and reproduction are the most energetically demanding periods for temperate-zone bats, including the NLEB (Broders et al. 2013). Bats may reduce metabolic costs of foraging by concentrating efforts in areas of known high prey profitability, a benefit that could result from the bat's local roosting and home range knowledge and site fidelity (Broders et al. 2013). Cool spring temperatures provide an additional energetic demand, as bats need to stay sufficiently warm or enter torpor (state of mental or physical inactivity). Entering torpor comes at a cost of delayed parturition, which may affect the fitness of yearling NLEB. Bats born earlier in the year have a greater chance of surviving their first winter and breeding in their first year of life (Frick et al. 2009). Delayed parturition may also be costly because young of the year and adult females would have less time to prepare for hibernation (Broders et al. 2013). Female NLEB typically roost colonially, with their largest population counts occurring in the spring or early summer, presumably as one way to reduce thermal costs for individual bats (Foster and Kurta 1999). Therefore, similar to other temperate bats, NLEB have multiple high metabolic demands (particularly in spring) and must have sufficient suitable roosting and foraging habitat available in relatively close proximity to allow for successful reproduction.

In addition to effects to summer roosting habitat, tree clearing associated with mechanical fuels reduction will affect 108 acres of spring staging/fall swarming habitat in the action area.

In summary, timber harvests and tree clearing associated with timber harvest and other tree clearing activities could have both adverse and beneficial effects on habitat suitability for the NLEB. The approximately 64,424 acres of habitat that will be affected by these activities are scattered throughout the 3 million-acre action area and will occur over a 10-year period. There will be large amounts of unaffected, intact forested habitat adjacent to each treatment area throughout this period. In addition, the potential for direct effects from timber harvest/other tree removal will be minimized by temporal restrictions (winter harvest only) on 84 percent of acres where tree clearing activities will occur. Winter harvest may still result in adverse effects when tree densities are reduced to a level that decreases their suitability as summer habitat, but winter harvest has the advantage of avoiding direct mortality to roosting bats. We conclude that the overall habitat suitability or availability for NLEB foraging and roosting within the action area should be minimally affected by proposed tree clearing treatments.

Effects from Noise, Disturbance

Noise and vibration and general human disturbance are stressors that may disrupt normal feeding, sheltering, and breeding activities of the NLEB. Many activities may result in increased noise/vibration/disturbance that may result in effects to bats. Bats may be exposed to noise/vibration/disturbance from various USFS activities near their roosting, foraging, or swarming areas.

Significant changes in noise levels in an area may result in temporary to permanent alteration of bat behaviors. The novelty of these noises and their relative volume levels will likely dictate the range of responses from individuals or colonies of bats. At low noise levels (or farther distances), bats initially may be startled, but they would likely habituate to the low background noise levels. At closer range and louder noise levels (particularly if accompanied by physical vibrations from heavy machinery and the crashing of falling trees) many bats would probably be startled to the point of fleeing from their day-time roosts. For projects with noise levels greater than usually experienced by bats, and that continue for multiple days, the bats roosting within or close to these areas are likely to shift their focal roosting areas further away or may temporarily abandon these roosting areas completely.

There is limited literature available regarding impacts from noise (outside of road/traffic) on bats. Gardner et al. (1991) had evidence that an NLEB conspecific, Indiana bat, continued to roost and forage in an area with active timber harvest. Also see the timber harvest section above regarding other similar studies for NLEB. They suggested that noise and exhaust emissions from machinery could possibly disturb colonies of roosting bats, but such disturbances 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. However, his last exit count at this roost was conducted 18 days prior to the exit count of zero. Indiana bats have also been documented roosting within approximately 300 meters of a busy state route adjacent to Fort Drum Military Installation (Fort Drum) and immediately adjacent to housing areas and construction activities on Fort Drum (US Army 2014). Bats roosting or foraging in all of the examples above have likely become habituated to the noise/vibration/disturbance. Novel noises would be expected to result in some changes to bat behaviors.

In summary, NLEB currently present in the forest are expected to be tolerant to a certain degree of existing (prior to initiation of proposed activities) noise, vibration, and disturbance levels. 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 these roosting areas completely.

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

Prescribed fires conducted during 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, heat, and flames while roosting and when foraging at night. Male NLEBs 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. In the BA, the SNF assumed that non-volant pups may be present in the action area between May 1 and July 31. Only about 4% of the prescribed fires implemented each year will occur during this period.

The NLEB is likely to be affected in areas that are burned during the summer roosting period, but the drift of smoke will expose the species to this stressor in additional areas. We assume that 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 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 burns in "Timber, slash, or piled fuels" may affect sensitive resources up to 0.75 mile away (Prescribed Fire/Fuels Working Team. 2007, p. 22). If we assume for this analysis that fire areas are round and that only the area downwind from a line equal to the diameter of the area burned would be affected by smoke, then we can estimate the total area that could be affected by smoke from fires conducted when NLEB may be present as approximately 1,830 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. This would result in the NLEB being exposed to smoke from fires in the area burned during the summer roosting season (7,310 acres, BA Indicator 2) and the area into which smoke may drift (1,830 acres) – a total of about 9,140 acres or about 914 acres per year. The affected area constitutes less than about 0.4% of

the suitable roosting habitat in the action area – about 0.04% would be affected during an average year.

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. Only about 0.4% 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 10-year period. On average only about 0.04% 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 NLEB roosts extensively in areas soon after they are burned and shifts from roosts beneath bark to cavities (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 increase 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 with 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 (Catton, pers. comm. 2015). 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 1.3% of the suitable roosting habitat in the action area will be burned over an approximately 10-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 Superior 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 NLEB 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. 22) that approximately 21,423 acres are planned for timber harvest from 2015-2020 on state and county lands in Cook, Lake, and St. Louis Counties. The season during which these activities will take place is not known nor are the types of harvest. If all of the affected area is suitable summer habitat for the NLEB and occurs during the summer roosting period, then direct effects and effects to the species' habitat could affect about 0.9% of the suitable habitat in the action area. This, in addition to the tree clearing activities proposed by the SNF, would result in total effects to about 1.2% of the suitable habitat in the action area. Harvest on state and county lands may alter available NLEB summer roosting habitat and may result in the death, harm, and harassment of individual NLEBs. Based on the same rationale discussed above on Federal lands and because NLEB habitat is abundant and well distributed within the action area, we anticipate that state and county harvest activities will result in minimal cumulative effects to the status of the species and its habitat in the action area.

Summary of Effects

Impacts to Individuals

Potential effects of the action include direct effects to NLEB present within the action area when activities are being conducted, and indirect effects as a result of changes in habitat suitability. The types of timber harvest activities that may affect habitat suitability include even-aged management (clearcut/coppice, shelterwood/seed tree), uneven-aged management (single tree and group selection), and non-regeneration methods (commercial thinning). Direct effects include mortality, injury, harm, or harassment as a result of removal of roost trees, noise, and general human presence.

Some of the actions proposed are likely to cause direct adverse effects to individual NLEBs. The potential for direct effects from timber harvest and other tree clearing activities and associated noise and disturbance is greatest during spring and summer (mid-April through July) when bats return from hibernation, spring temperatures result in periodic use of torpor, and non-volant young may be present. In addition, bats impacted by WNS have additional energetic demands and reduced flight capability. WNS has not been detected in Minnesota; however, the fungus that causes WNS was first detected in 2011–2012. The Forest's conservation measures will reduce the potential for direct effects to the NLEB. These measures include the protection of known locations of NLEB; minimization of areas burned through the use of non-fire treatments to achieve management objectives; the use of mechanical means to remove fuels and frequent low-intensity burns; and, the use of techniques to minimize emissions.

Indirect effects from the action may result from habitat modification and primarily involve changes to roosting and foraging suitability. Timber harvests and tree clearing associated with

road-related activities could have both adverse and beneficial effects on habitat suitability for the NLEB. Conservation measures that will be implemented as part of the proposed actions and that will minimize adverse effects of habitat modification include the maintenance or increase in patches of mature forest greater than 300 acres; no permanent road building; and Superior National Forest Plan guidelines for maintenance of at least 19 mature forest patches greater than 1,000 acres on the SNF. 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 NLEB roosting or foraging habitat in the action area.

While none of the USFS's proposed actions will alter the amount or extent of mortality or harm to NLEB resulting directly from WNS, the USFS's proposed action can be neutral, negative, or beneficial to bats. The continued implementation of the USFS's monitoring efforts will provide additional information on the effect of the USFS's actions on affected bats. Minimal cumulative effects are expected.

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) Neither 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.
- 2) The NLEB may be affected indirectly by tree removal that occurs in a small area of spring staging/fall swarming habitat.
- 3) The NLEB during the spring-fall period will be exposed to various project stressors and their responses to some of them are likely to be adverse.

We considered the possibility for NLEB to be exposed to the effects of project activities at currently unknown roost sites. We anticipate that this will result in the harassment of NLEBs that may flush bats during daylight and cause them to temporarily or permanently abandon their roosts (which may have pups) and minor respiratory effects from prescribed burning. In addition, mortality of pups and adults is possible from timber harvest and exposure to smoke and fire. In summary, there will be impacts to individual bats in terms of either reduced survival or reproduction.

Impacts to Populations

As we have concluded that individual bats are likely to experience reductions in either their annual or lifetime survival or reproductive rates, we need to assess the aggregated consequences of these effects to exposed individuals as they relate to the population to which these individuals belong.

The action area will continue to provide suitable habitat conditions for NLEB foraging and roosting during the summer while the proposed timber harvest and prescribed burning activities are implemented and after they are complete. There is potential for direct take of the species.

The extent of the area where direct take is likely due to the proposed action in relation to the entire action area, and the current distribution and abundance of NLEB habitat on the Superior National Forest (as described in the Environmental Baseline), the effects of the proposed activities are unlikely to reduce the likelihood that NLEB will continue to survive and reproduce on the Forest.

Impacts to the Species

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. While we recognize that the status of the species is uncertain due to WNS, given the environmental baseline, and the intensity, frequency, and duration of the project impacts, we find that the proposed project is unlikely to have appreciable impacts on the population that inhabits the action area. Thus, no component of the proposed action is expected to reduce the reproduction, numbers, or distribution of the NLEB rangewide. Therefore, we do not anticipate a reduction in the likelihood of both survival and recovery of the species as a whole.

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 to date 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 NLEB (80 FR 17974). The Service's interim 4(d) rule for NLEB exempts the

take of NLEB from the section 9 prohibitions of the ESA, 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 hibernaculum;
 - 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 because it is already exempted by the rule. 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 proposed by the SNF and that are covered by the interim 4(d) rule fall under the category of forest management. Because all incidental take that is anticipated will occur as a result of forest management and because the SNF will apply the conservation measures of the interim 4(d) rule, there is no incidental take that is anticipated that is not exempted by the rule.

Amount or Extent of Take

If NLEB are present or utilize an area proposed for timber harvest or other disturbance, incidental take of NLEB could occur. The Service anticipates incidental take of the NLEB 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) the NLEB forms 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 precise distribution 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 forested area is unlikely to produce useful information unless a large number of individual trees that may contain suitable roosting habitat are inspected by a knowledgeable biologist when felled. To minimize or avoid take that is caused by felling trees with roosting bats, a similar tree-by-tree inspection

would have to occur before trees are felled. Inspecting individual trees is not considered by the Service to be a reasonable 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 no more than 65,265 acres of suitable summer NLEB habitat and 190 acres of spring staging/fall swarming habitat will be disturbed as a result of these ongoing project activities on the Forest.

Effect of the Take

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

Reasonable and Prudent Measures/Terms and Conditions

Since all anticipated incidental take will result from forest management activities addressed by the 4(d) rule and because the Forest will apply the conservation measures described above and in the rule, the take is already exempted; therefore, no reasonable and prudent measures or 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 Superior 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 an injured bat is found, if possible, effort should be made by trained staff (with rabies vaccination) to transfer the animal to a wildlife rehabilitator. If needed, TCFO and/or MNDNR will assist in species determination for any dead or moribund bats. Any dead bats believed to be NLEB will be transported on ice to the TCFO or MNDNR. If an NLEB 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 NLEB, 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.

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.

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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 Superior 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 Superior 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 March 23, 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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