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May 6, 2015

Chippewa National Forest
Darla Lenz
Forest Supervisor
200 Ash Avenue NW
Cass Lake, Minnesota 56633

FWS No. 03E19000-2015-F-0016
Formal conference on northern long eared bat

Dear Ms. Lenz:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion and is based on our review of the Chippewa National Forest's (Forest) proposed Batched Vegetation Management Projects Biological Assessment and potential effects to the northern long-eared bat (*Myotis septentrionalis*). The biological assessment and letter, dated October 8, 2014, requesting formal conferencing on the Batched Vegetation Management Projects were received in our office on October 15, 2014. The Service and Forest later agreed to delay conferencing until additional northern long-eared bat information and guidance became available. Subsequently, the Forest provided the Service with a letter, dated March 23, 2015, which was also on behalf of the Chequamegon Nicolet and Superior National Forests, initiating conferencing/consultation for the northern long eared bat (NLEB). 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 BVMP.

This biological opinion is based on the best available scientific and commercial data including meetings, electronic mail and telephone correspondence with Chippewa 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, at 307-421-5839, or via email at *ann_belleman@fws.gov*.

Sincerely,

Peter Fasbender
Field Supervisor

Enclosure

cc: Todd Tisler, Fish and Wildlife Program Manager

# BIOLOGICAL OPINION

Effects to the
Northern Long-eared Bat
From the Batched Vegetation Management Projects 2007–2013
on the Chippewa National Forest

FWS No. 03E19000-2015-F-0016

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 Chippewa National Forest (USFS or Forest), 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 Forest's initial request for formal conferencing, dated October 8, 2014, and Biological Assessment of the 2014 Batched Vegetation Management Projects 2007-2013 (BA or BVMP) were received on October 15, 2014. 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 (80 FR 17974). Section 4(d) of the ESA states that:

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

The Service's interim 4(d) rule for NLEB exempts 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 hibernacula;
   b. Avoid cutting or destroying known, occupied roost trees during the pup season (June 1–July 31); and,
   c. Avoid clearcuts (and similar harvest methods, *e.g.*, seed tree, shelterwood, and coppice) within 0.25 (0.4 km) mile of known, occupied roost trees during the pup season (June 1–July 31).

(2) Removal of hazard trees (no limitations).

(3) Purposeful take that results from:
    a. Removal of bats from and disturbance within human structures and
    b. Capture, handling, and related activities for NLEBs for 1 Year following publication of the interim rule.

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 no known roost trees or hibernacula, but will incorporate the above conservation measures into its proposed action as they are identified by survey efforts.

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

**Consultation History**

The Forest initially requested formal conferencing and submitted the BVMP BA on October 8, 2014. The Service notified the Forest that we would delay conferencing until additional Service guidance on NLEB was available. The Service subsequently provided the Forest with a draft conference opinion for review on March 16, 2015 and the Forest submitted their comments to the Service via electronic mail on March 23. The Forest 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 to conclude formal consultation on the BVMP. The BA, meetings, telephone discussions, and email transmissions with Mr. Todd Tisler, Forest 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 20 vegetation management projects will continue to be 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 Chippewa National Forest background and description can be found in the BA, which is incorporated by reference.

The Forest proposes to implement the BVMP within the Forest boundary, which includes three Ranger Districts (Blackduck, Deer River, and Walker). All projects included in the BA were previously signed under "Finding of No Significant Impact" decisions from 2007 to 2013 and approved for implementation. Proposed BVMP timber harvest and other associated activities are expected to begin in spring 2015 and will continue until completed, within approximately 10 years.

The Forest proposes to carry out timber harvest activities on 39,683 acres and to follow up with post-harvest treatments, including pile burning and planting. Most of the timber harvest (73 percent or approximately 29,108 acres) will occur during spring, summer, and fall seasons; however, at least 27 percent (approximately 10,666 acres) of timber cuts are proposed as required winter harvest only (*note*: the sum of winter and summer harvest acres does not equal total harvest acres due to rounding in GIS). Temporary roads will be constructed or reconstructed to access some harvest units and later decommissioned upon project completion; the number of miles is unknown at this time. Based on additional information requested by the Service and provided by Mr. Tisler, the estimated total distance and acres of habitat removed for BVMP temporary roads would likely be less than 50 miles and 60 acres, respectively.

The proposed action includes the following types of harvest treatments (the BA provides a full description of each treatment on pp. 5-7; see Table 1 below for acres of proposed harvest by treatment type):

1. Clear-cut/Coppice – This is a regeneration method that removes all trees except for areas where reserve trees or patches are retained. This method is considered even-aged management and forest stand ages are reset to zero post-harvest.

2. Shelterwood/Seed Tree – All trees are removed except for those needed for shelter or seed production. This method is considered even-aged management and stand ages are reset to zero post-harvest.

3. Uneven-aged or Multi-aged, Single Tree Selection – Individual trees of all size classes are removed; generally, 10 to 30 percent is harvested more or less uniformly throughout the forest stand. This method does not reset the age of the stand.

4. Uneven-aged or Multi-aged, Group Selection – Trees are removed in groups rather than individually; the stand includes three or more age classes post-harvest; stand age is not reset.

5. Commercial Thinning – This method removes approximately 25 to 35 percent of the trees; stand density is decreased but the stand remains structurally the same; stand age is not reset.

**Table 1. Proposed Number of Timber Harvest Acres by Treatment Type** (adapted from 2014 BA).

| Vegetation Management Project | District | ACRES | | | |
|---|---|---|---|---|---|
| | | Even-aged | Uneven/Two-aged | Commercial Thin | TOTAL |
| Continental Divide | Blackduck | 1168 | 848 | 306 | 2322 |
| Kitchi | Blackduck | 409 | 891 | 953 | 2253 |
| Wagner | Blackduck | 1472 | 322 | 566 | 2360 |
| Lydick | Blackduck | 78 | 8 | 600 | 686 |
| Northwoods | Blackduck | 102 | 0 | 246 | 348 |
| Moon | Walker | 764 | 1085 | 1000 | 2849 |
| Pine | Walker | 0 | 0 | 2272 | 2272 |
| S Leech Lake II | Walker | 413 | 1253 | 717 | 2383 |
| Cuba Hill | Walker | 124 | 455 | 0 | 579 |
| Boy River 2 | Walker | 408 | 485 | 567 | 1460 |
| Talmoon | Deer River | 1520 | 1480 | 455 | 3455 |
| Central | Deer River | 1283 | 461 | 483 | 2227 |
| Big Fork | Deer River | 1244 | 1026 | 865 | 3135 |
| Lower E Winnie | Deer River | 1703 | 176 | 1166 | 3045 |
| Upper E Winnie | Deer River | 388 | 535 | 1246 | 2169 |
| Southeast | Deer River | 17 | 72 | 159 | 248 |
| Marcell NE | Deer River | 1380 | 970 | 1067 | 3417 |
| Upper Bowstring River | Deer River | 0 | 0 | 412 | 412 |
| Birch Lake | Deer River | 178 | 0 | 0 | 178 |
| Blowdown Restoration | Forest-wide | 2505 | 1205 | 205 | 3915 |
| **TOTAL ACRES** | | 15156 | 11272 | 13285 | 39713* |

*This total number of acres differs from the total of 39683 acres in BA Table 3 due to rounding in GIS.

The Forest also proposes post-harvest treatments including: site preparation (mechanical and hand scalping, piling, and pile burning), 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).

The Forest determined that 20 projects are likely to adversely affect the NLEB, as listed in Table 1. Most of these projects involve large scale tree removal and/or post-harvest treatments in forested areas outside the hibernation period, and thus have the potential to adversely affect NLEB roosting and foraging habitat in the short term.

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-VG-19 (maintain/increase ≥300 acre mature forest patches): contributing to maintaining patches >300 acres across the Forest;
- G-VG-1 (maintain 19 patches mature forest patches ≥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): contributing 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;
- G-TM-6 (in northern hardwoods forest types, generally maintain a closed canopy (>70%) of mature forest within 200 ft. of seasonal ponds): mitigations for seasonal ponds are incorporated into silvicultural prescriptions;
- S-WL-3 (all ground-disturbing activities within 200 meters of active bald eagle nests are restricted to October 1 to February 14): inherently provides a level of protection for NLEB; and
- S-WS-8 (winter harvest restricted to frozen ground at a depth of 4 inches or more): minimizes ground disturbance on wet, fertile sites.

In addition, 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; and
- Leave all snags possible standing in harvest area.

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

All individual projects included in the BVMP involve some type of timber harvest and some will also have mechanical post-harvest treatments (site preparation) and/or temporary road construction or decommissioning, all of which may adversely affect NLEB. Effects from those treatments are discussed in the rest of this BO. The remaining are post-harvest treatments that will have no effect (piling, planting, seeding, animal control (deer repellent), planted seedling release, and slash treatments), or are not likely to adversely affect (pile burning, hand scalping (clearing of small plants to make space around seedlings)) the NLEB. Activities with no effect to NLEB will not be discussed further.

The potential effects from pile burning and hand scalping may include temporary disturbance or displacement due to human presence or smoke in the vicinity of roost trees. There are no known NLEB roost trees or maternal roosting colonies on the Forest, but there is abundant habitat and we anticipate one or both will be identified in the future. Because these activities are conducted by hand and will minimally disturb vegetation that is already on the ground or has been piled, no roost trees would be affected. Piles typically are small and are situated away from trees, which will confine fire and smoke to the immediate proximity of the pile. Therefore, the risk of impacts from fire and smoke is expected to be low. In addition, most of the pile burning is

typically completed during winter when NLEB are hibernating and not present in the action area. Based on the abundance of available habitat across the Forest, the probability of a NLEB being disturbed by pile burning or hand scalping by any BVMP is discountable. As a result, 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 activities 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**

All BVMP activities involve tree removal from timber harvest (described above and displayed in Table 1), mechanical post-harvest treatments, and some temporary road construction or decommissioning on 39,713 acres outside the hibernation period, and thus have the potential to adversely affect roosting and/or foraging habitat for the NLEB. 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:

> '(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). 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 BVMP 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 minimize any adverse effects of a proposed action and 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 hibernacula.
>
> 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).

As stated above, no known hibernacula or occupied roost trees occur within 0.25 mile of the CNF. Therefore, this measure would only be implemented if either type of feature are identified in the CNF or within 0.25 mile of its external boundary before any of the proposed actions are completed. Although hibernacula may be unlikely to be found, the discovery of occupied roost trees seems likely if radio telemetry studies are conducted in the vicinity of the CNF.

### Action Area

The action area is defined as all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action. For the purposes of this BO, the action area includes the entire Chippewa National Forest. The Forest boundary encompasses 1.6 million acres (includes Federal, state, county, and other ownerships) – of which over 666,000 acres are forested lands managed specifically by the Forest.

## STATUS OF THE SPECIES

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

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

Upon emergence from the hibernacula in the spring, females seek suitable habitat for maternity colonies (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, 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 inter-annual 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 dbh). NLEB are known to use a wide variety of roost types, using tree species based on presence of cavities or crevices or presence of peeling bark. NLEB have also been occasionally found roosting in structures like barns and sheds (particularly when suitable tree roosts are unavailable).

Young NLEB are typically born in late-May or early June, with females giving birth to a single offspring. Lactation then lasts 3 to 5 weeks, with pups becoming volant (able to fly) between early July and early August (with timing often depending on location within the species' range).

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.

### Migration

Males and non-reproductive females may summer near hibernacula, or migrate to summer habitat some distance from their hibernaculum. NLEB is not considered to be a long distance migrant (typically 40-50 miles). Migration is an energetically demanding behavior for the NLEB, particularly in the spring when their fat reserves and food supplies are low and females are pregnant.

### Winter habitat and ecology

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

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

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

### Spring Staging and Fall Swarming habitat and ecology

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

After hibernation ends in late March or early April (as late as May in some northern areas), most NLEB migrate to summer roosts. Females emerge from hibernation prior to males. Reproductively active females store sperm from autumn copulations through winter. Ovulation takes place after the bats emerge from hibernation in spring. The period after hibernation and just before spring migration is typically referred to as "staging," a time when bats forage and a

limited amount of mating occurs. This period can be as short as a day for an individual, but not all bats emerge on the same day.

In general, NLEB use roosts in the spring and fall similar to those selected during the summer. Suitable spring staging/fall swarming habitat consists of the variety of forested/wooded habitats where they roost, forage, and travel, which is most typically within 5 miles of a hibernaculum. This includes forested patches as well as linear features such as fencerows, riparian forests and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure. Isolated trees are considered suitable habitat when they exhibit the characteristics of a suitable roost tree and are less than 1,000 feet from the next nearest suitable roost tree, woodlot, or wooded fencerow.

**Threats**

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

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

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

In areas where WNS is present, there are additional energetic demands for 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 action. 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).

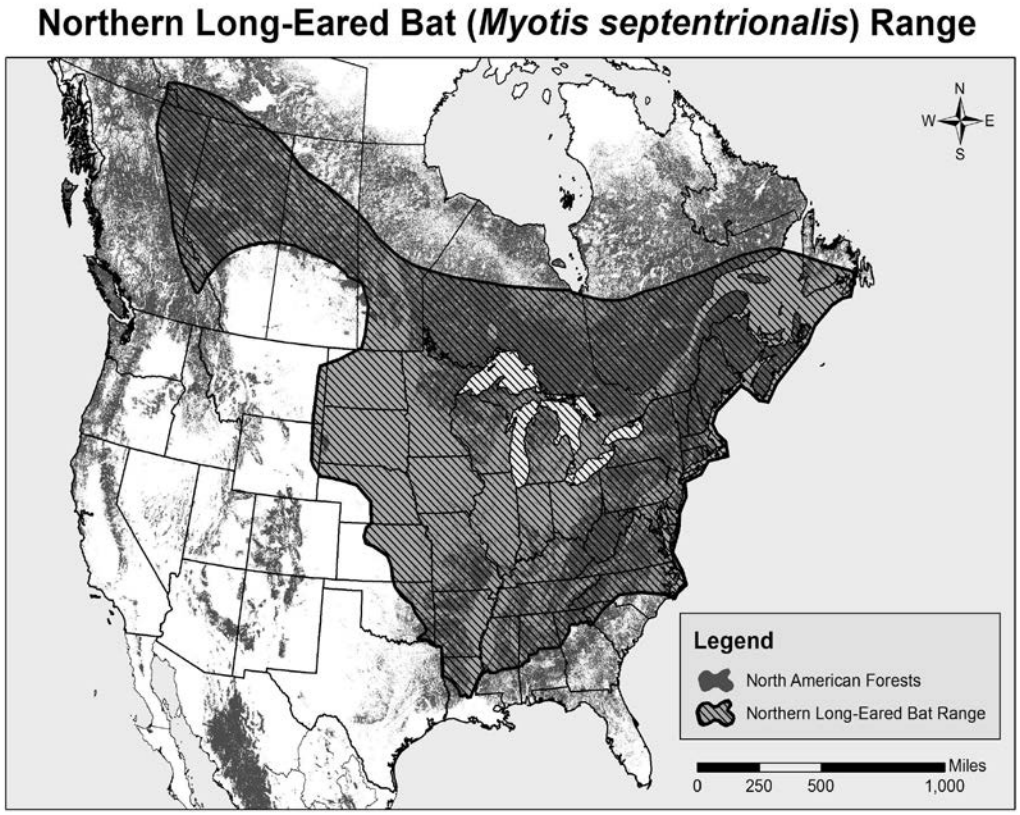


**Figure 1.** Northern long-eared bat range.

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 (Fig. 2; 55 percent of total captures) (Catton 2014). Acoustic and mist-net data were collected by a pipeline project proponent in 2014, which surveyed an approximately 125-feet wide and 300-mile-long (483-km) corridor through the northern third of the state. Positive detections were recorded in Hubbard, Cass, Crow Wing, Aitkin, and Carlton counties, and NLEBs were the most common species captured by mist-net (Fig. 2; Merjent 2014). Mist-net surveys were conducted the previous year (2013) on the Kawishiwi District of the Superior National Forest, 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 NLEB is known from 11 hibernacula in Minnesota; however, the status of most is unknown. The largest known hibernaculum in Minnesota is the Soudan Mine in St. Louis County; an estimated 3,000 northern long-eared bats are thought to hibernate within the mine. WNS has not been detected in Minnesota; however, the fungus that causes WNS was first 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.

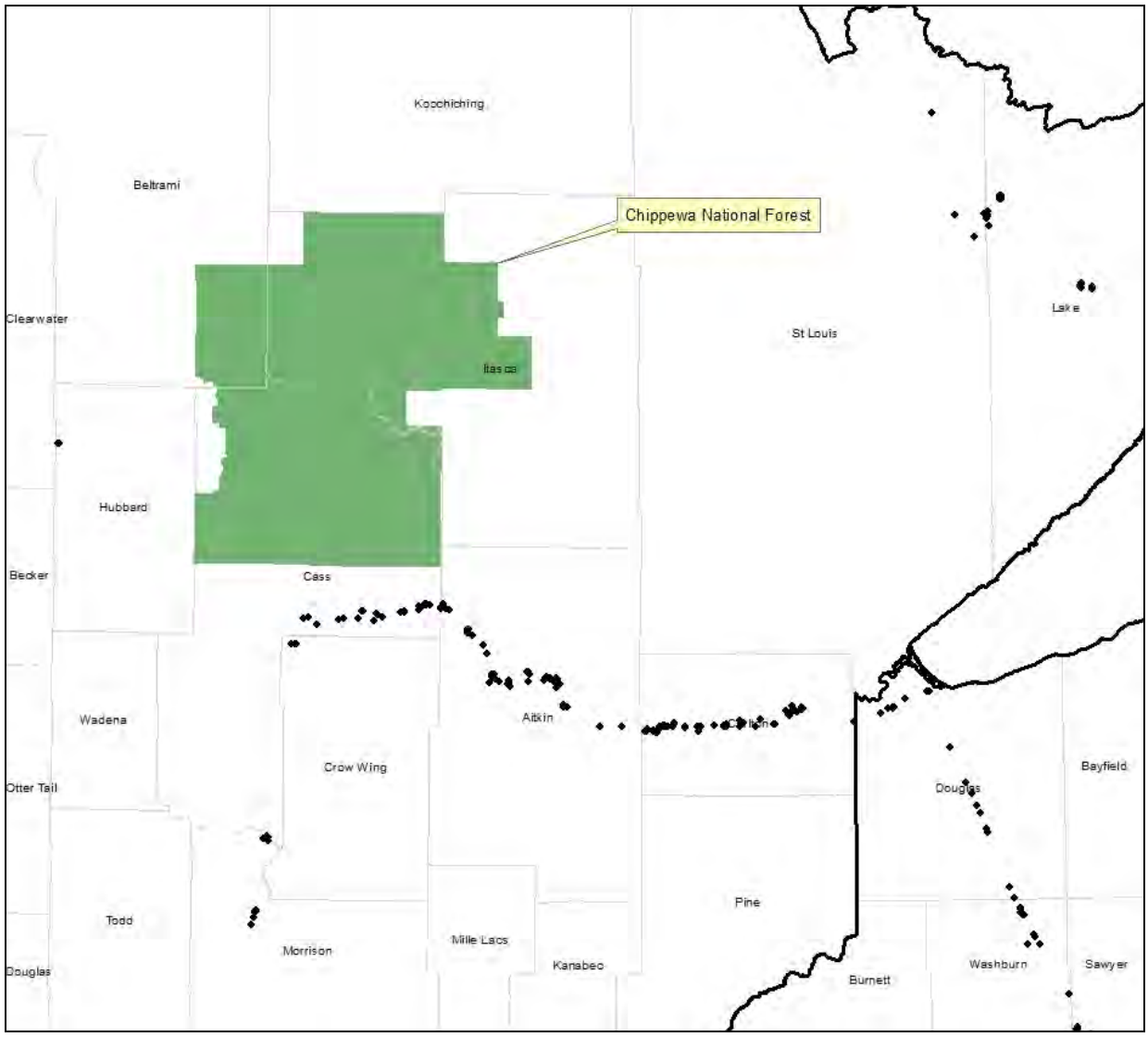


**Figure 2.** Locations of northern long-eared bat (NLEB) mist-net captures and roost tree locations based on surveys conducted in 2013-2014. (Note: These data are not based on an exhaustive inventory of the area shown; the lack of data for any geographic area shall not be construed to mean that no NLEB are present. No mist-net studies were conducted on Chippewa National Forest in 2013-2014.)

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

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

### Status of the Species in the Action Area

NLEB are assumed to be present throughout the Forest based on available potential habitat; however, the population trend in the Forest (action area) is unknown and no project-specific surveys have been conducted. Data have been collected on three permanent acoustic monitoring routes on the Forest since 2011. These data will be used to identify baseline bat activity levels and observe how those levels may change in response to WNS, but completed data analyses are not expected until sometime later in 2015. We assume NLEB presence throughout the Forest; however, because survey data analyses not yet complete, we cannot estimate roost tree density or the proportion of the Forest that is inhabited by NLEB within a useful level of precision.

The Forest is also working with the Minnesota Department of Natural Resources, the Superior National Forest, and the Service to increase our collective knowledge of NLEB distribution and habitat use in northern Minnesota. Currently, there are no known hibernacula in the action area; the closest (Soudan Mine) is approximately 70 miles from the Forest boundary. Therefore, suitable hibernacula sites would not be affected by the BVMP. As stated above, there are also no known roost trees in the CNF, although if NLEB are captured and radio-tracked on or near the Forest, we would expect occupied roost trees to be found within the CNF boundaries. 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 CNF of positive NLEB detections in Minnesota and the prevalence of suitable habitat for the species on the Forest, it is reasonable to assume that the species is widespread in the action area.

**Habitat Conditions in the Action Area**

Overall, the Forest provides an abundance of well-distributed, suitable summer habitat (see BA Appendices for maps that illustrate habitat and distribution of proposed treatments). Approximately 798,000 acres in the action area are considered potential NLEB summer habitat, which is defined as all forested areas greater than or equal to 10 years old with trees greater than 3 inches diameter at breast height. Of this, approximately 546,000 acres are on National Forest System lands and approximately 252,000 acres are on state and county lands. (*Note*: land ownership within the Forest boundary is like a checkerboard; therefore, the BA also provided acres under state and county ownership in their analyses.) Summer habitat that is currently in a suitable condition for NLEB use encompasses approximately 522,000 acres (96 percent) and 236,000 acres (94 percent) under Federal and state/county land ownerships, respectively, (see BA Table 2, p. 4). Currently unsuitable habitat, defined as forested habitats less than 10 years old and non-forested areas, covers approximately 23,884 acres (4 percent) on the Forest and 16,481 acres (6 percent) on state/county lands.

NLEB summer habitat includes both conifer and hardwood tree species (pine, spruce/fir, lowland conifer, upland and lowland hardwood, and aspen/birch) and the BA included forest type acres by condition and ownership (see Table 3, p. 4). In summary, the Forest has a large area of well distributed summer habitat that provides suitable roosting and foraging opportunities for NLEB.

**Conservation Needs of the Species in the Action Area**

The conservation needs of the species in the action area are similar to the needs rangewide. The Chippewa National Forest provides habitat for summering and potentially migrating NLEB. Therefore, within the action area the conservation needs include: 1) providing suitable habitat conditions for NLEB foraging and roosting; 2) reducing the removal of roost trees; 3) searching for previously unidentified areas of maternity and hibernation activity; and 4) conducting research to understand the migration patterns of NLEB that use the area during the summer or 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. It also indicated that the number of acoustic surveys will be increased across the Forest beginning in 2015. The Forest is also working in partnership with the Minnesota Department of Natural Resources, the Superior National Forest, and the Service to further their knowledge of NLEB distribution and habitat use in northern Minnesota. These measures, in addition to the continued implementation of conservation measures required under the Forest Plan, will contribute to conservation needs of the NLEB in general and within the action area.

# EFFECTS OF THE ACTION

This BO evaluates the anticipated effects of 20 projects on the Chippewa National Forest. These projects will affect a total of 39,683 acres of potential NLEB habitat on the Forest, and include timber harvest, post-harvest treatments, and road construction or decommissioning. 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

The nearest known hibernaculum is at least 60 miles from the CNF boundary; therefore, neither direct nor are indirect effects anticipated to wintering NLEB or their hibernacula from the proposed action.

Fall swarming typically occurs within 5 miles of a hibernaculum. Because the nearest known hibernaculum is approximately 70 miles away, neither direct nor are indirect effects anticipated to fall swarming and/or to fall swarming habitat from the proposed action.

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

*Tree Removal Associated with Timber Harvest and Other Activities*

Timber harvest and other associated activities (including mechanical site preparation, road construction or decommissioning and general human presence and noise) are proposed on 39,683

acres. Most of the timber harvest, 73 percent (or approximately 29,108 acres), will occur during spring, summer, and fall seasons, but at least 27 percent (approximately 10,666 acres) of timber cuts are proposed as winter harvest only.

*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.

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.

The BA (Table 7, p. 9) indicated that at least 10,666 acres (27 percent) of total proposed BVMP treatments (39,683 acres) would be winter-harvest only, which would reduce the direct effects of summer harvest. Considering the different types of harvest, varying levels of tree retention, and remaining percentage of canopy cover, remaining roosting trees/sites in areas subject to uneven-age or commercial thinning in summer may continue to be suitable for NLEBs during and soon after harvest. In addition, NLEBs may be affected by the immediate loss of suitable habitat on significantly less than 39,683 acres (the total BVMP treatment area) proposed for treatments because tree removal will not occur simultaneously in all treatment areas, but will be distributed both spatially and temporally across the Forest over a period of approximately 10 years. Tree clearing associated with temporary road construction activities will occur on no more than approximately 60 acres. 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. As mentioned, there are 798,000 acres of potential NLEB habitat in the action area, of which

758,000 acres (95 percent) are currently considered suitable for NLEB use (approximately 40,000 acre (5 percent) are unsuitable).

*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). 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 summary, timber harvests and tree clearing associated with BVMP treatments could have both adverse and beneficial effects on habitat suitability for the NLEB. The approximately 39,683 acres of habitat that will be affected by these activities are scattered throughout the 1.6 million-acre Forest, so there will be large amounts of unaffected, intact forested habitat adjacent to each treatment area. In addition, the potential for effects from timber harvest/other tree removal will be minimized by temporal restrictions (winter harvest only) on at least 27 percent of proposed harvest acres. Winter harvest may still result in adverse effects when tree densities are reduced to a level that decreases their suitability as summer habitat, but it has the advantage of avoiding direct mortality to roosting bats. NLEBs may be affected by the immediate loss of suitable habitat on significantly less than 39,683 acres (the total BVMP treatment area) proposed for treatments because tree removal will not occur simultaneously in all treatment areas, but will be distributed both spatially and temporally across the Forest over a period of approximately 10 years. Tree clearing associated with temporary road construction activities will occur on no more than approximately 60 acres. As a result, we conclude that the overall habitat suitability or availability for NLEB foraging and roosting within the action area should be minimally affected by proposed BVMP 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.

**Cumulative Effects**

Cumulative effects include the effects of future state, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA. Any actions conducted on Chippewa National Forest lands will either be conducted by the USFS, or will require approval by the USFS and thus will require separate section 7 consultation. Therefore, cumulative effects, as defined in the ESA, are not expected to occur on their Forest lands.

Numerous state, county, and private land use activities that may affect the 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. 10) that approximately 5400 acres are planned for timber harvest from 2015-2017 on state land within the Forest. Beltrami, Cass, and Itasca Counties have planned for 962 acres of regeneration harvest or thinning beyond 2016. Harvest on state and county lands may alter available NLEB summer roosting habitat. Based on the same rationale discussed above on Federal lands and that NLEB habitat is abundant and well distributed within the Forest, we anticipate that state and county harvest activities will result in minimal cumulative effects to the species or its habitat.

**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.

The Forest's conservation measures, which include maintaining/increasing various sizes of large forested patches, retaining closed canopy structure in mature forest within 200 feet of seasonal ponds, and leaving all snags possible in harvest areas, will reduce the potential for direct effects to the NLEB. However, the potential for direct effects from timber harvests, road-related activities, and associated human presence 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. Again, to date, WNS has not been detected in Minnesota; however, the fungus that causes WNS was first detected in 2011–2012.

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 (such as active season tree removal of a roost tree) and beneficial effects on habitat suitability for the NLEB. 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) 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. If this should occur, we anticipate harassment of NLEB 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 pile burning. In addition, mortality of pups is possible from timber harvest and inhalation of smoke. 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 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 Chippewa 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 hibernacula;
    b. Avoid cutting or destroying known, occupied roost trees during the pup season (June 1–July 31); and,
    c. Avoid clearcuts (and similar harvest methods, *e.g.*, seed tree, shelterwood, and coppice) within 0.25 (0.4 km) mile of known, occupied roost trees during the pup season (June 1–July 31).

(2) Removal of hazard trees (no limitations).

(3) Purposeful take that results from
    a. Removal of bats from and disturbance within human structures; and,
    b. Capture, handling, and related activities for northern long-eared bats for 1 Year following publication of the interim rule.

There are currently no known roost trees or hibernacula on the Forest. However, we anticipate this will change as the Forest and others continue survey efforts.

The incidental take that is carried out in compliance with the interim 4(d) rule does not require exemption in this Incidental Take Statement. Accordingly, there are no reasonable and prudent measures or terms and conditions that are necessary and appropriate for these actions because all incidental take has already been exempted.

The activities that are covered by the interim 4(d) rule include forest management activities; these activities include various types of timber harvest; road construction and decommissioning; associated noise and general human presence; and, site preparation.

**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) NLEB form small, widely dispersed maternity colonies under loose bark or in the cavities of trees and males and non-reproductive females may roost individually, which makes finding the species or occupied habitats difficult; (3) finding dead or injured specimens during or following project implementation is unlikely; (4) the 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 every individual tree that may contain suitable roosting habitat is 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 39,683 acres of potential NLEB habitat will be disturbed as a result of these ongoing project activities on the Forest, including approximately 60 acres from road decommissioning or construction.

**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**

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

## TERMS AND CONDITIONS

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

## REPORTING REQUIREMENTS

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

2. The USFS shall make all reasonable efforts to educate personnel to report any sick, injured, and/or dead bats (regardless of species) located on the Chippewa National Forest immediately to the Forest Biologist. The USFS point of contact will subsequently report to the Service's Twin Cities Field Office (TCFO) (612-725-3548) and/or the Minnesota Department of Natural Resources (MNDNR; see http://www.dnr.state.mn.us/wns/index.html or call 1-888-345-1730). No one, with the exception of trained staff or researchers contracted to conduct bat monitoring activities, should attempt to handle any live bat, regardless of its condition. If 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.

The Service has identified the following actions that, if undertaken by the USFS, would further the conservation of the NLEB. 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 NLEB on the Chippewa National Forest.
    a. Search for hibernacula within the National Forest;
    b. Conduct inventory surveys;
    c. Conduct radio telemetry to monitor status of NLEB 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 NLEB on the Chippewa National Forest that:
    a. Investigate habitat characteristics of the forest in areas where pre- and post-WNS NLEB occurrences have been documented (acoustically or in the hand) (e.g. forest type, cover, distance to water).
    b. Investigate NLEB 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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