United States Department of the Interior

FISH AND WILDLIFE SERVICE
East Lansing Field Office (ES)
2651 Coolidge Road, Suite 101
East Lansing, Michigan 48823-6316

IN REPLY REFER TO:

May 1, 2015

Linda Jackson, Forest Supervisor
Ottawa National Forest
E6248 US2
Ironwood, MI 49938

Re: Formal Section 7 Consultation on the Ottawa National Forest's Ongoing and Planned Actions – Log # 10-R3-ELFO-04

Dear Ms. Jackson:

This letter transmits the U.S. Fish and Wildlife Service's Biological Opinion for the Ottawa National Forest's (ONF) ongoing and planned actions in accordance with Section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). The ONF determined that the proposed actions were "Likely to Adversely Affect" the northern long-eared bat (*Myotis septentrionalis).*

We base the enclosed Opinion on information provided in several documents, including your northern long-eared project matrix and Biological Assessment, the Programmatic Biological Assessment and Opinion for the ONF's Land and Resource Management Plan, and our April 1, 2015, Conference Opinion. Other sources of information include previous telephone conversations, e-mails and meetings. A complete administrative record of this consultation is on file at our East Lansing Field Office.

After reviewing the current status of northern long-eared bat, 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 northern long-eared bat

With respect to ESA compliance, all aspects of the project description are binding. Reasonable and prudent measures and the accompanying Terms and Conditions provided within the enclosed biological opinion are nondiscretionary and are designed to minimize incidental take of listed species.

We appreciate the opportunity to cooperate with the Ottawa National Forest in conserving endangered species. If you have any questions, please contact Chris Mensing, of this office, at (517) 351-8316 or chris_mensing@fws.gov.

Sincerely,

Acting for Scott Hicks
Field Supervisor

cc: Jennifer Szymanski, Onalaska, WI

BIOLOGICAL OPINION

Effects to the Northern Long-Eared Bat from Ongoing and Planned Activities on the Ottawa National Forest, Michigan

Prepared by:
U.S. Fish and Wildlife Service
East Lansing Field Office
East Lansing, Michigan 48823

May 1, 2015

INTRODUCTION

This document transmits the U.S. Fish and Wildlife Service's (Service) Biological Opinion (BO) based on our review of the U.S. Forest Service's (USFS) proposed activities on the Ottawa National Forest (ONF) and their effects on the northern long-eared bat (*Myotis septentrionalis;* NLEB) in accordance with Section 7(a)(2) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*). The USFS' April 8, 2015, request for formal consultation was received on April 8, 2015, for ongoing and planned activities on the ONF. The USFS determined that all activities addressed have had prior coordination/consultation for all other involved federally-listed species. Therefore, this BO only addresses the NLEB.

CONSULTATION/CONFERENCE HISTORY

On March 2, 2006, the Service issued a programmatic Biological Opinion (programmatic BO) for the ONF revised 2006 Land and Resource Management Plan (Forest Plan). In the programmatic BO, we evaluated the effects of ONF Forest Plan activities on bald eagle *(Haliaeetus leucocephalus),* Canada lynx *(Lynx Canadensis*), gray wolf *(Canis lupis),* and Kirtland's warbler *(Dendroica kirtlandii).* We concurred that implementation of the Forest Plan was *not likely to adversely affect* Canada lynx and Kirtland's warbler and *likely to adversely affect* bald eagle and gray wolf.

The programmatic BO established a two-level consultation process for activities completed under the Forest Plan. Evaluation of the Forest Plan at the plan level represented a Level 1 consultation and all subsequent project-specific evaluations for future actions completed under the Forest Plan are Level 2 consultations. Under this approach, the Level 1 programmatic opinion established guidelines and conditions that each individual future project must adhere to and operate within to remain consistent with the scope of the Level 1 opinion; these individual projects are subject to Level 2 consultations. Projects that are *likely to adversely affect* listed species or designated critical habitat are reviewed to determine: 1) whether they were contemplated in the Level 1 programmatic opinion and 2) if they are consistent with the guidelines established in the Level 1 programmatic opinion and whether the reasonable and prudent measures and terms and conditions provided in the incidental take statement are applicable. This ensures that the effect of any incidental take resulting from individual projects is minimized. In response, a Level 2 opinion is prepared and appended to the original programmatic opinion. Future projects that are likely to adversely affect listed species or critical habitat, and do not adhere to the guidelines and conditions evaluated during the programmatic consultation, or any future projects that are considered to be outside the scope of the proposed action or Forest Plan, may require separate formal consultations.

On October 2, 2013, the Service proposed to list the NLEB as endangered (78 FR 61045). Pursuant to Section 7(a)(4) of the Endangered Species Act (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq*.), Federal action agencies are required to confer with the Service if their proposed actions are likely to jeopardize the continued existence of a proposed listed species such as the NLEB (50 CFR 402.10(a)). To prepare for meeting ESA consultation requirements if the species was to be listed, the ONF conducted voluntary conferencing for all ongoing activities and planned projects with a National Environmental Protection Act (NEPA) decision

document that have not been fully implemented. A Conference Opinion was submitted to the ONF on April 1, 2015.

This BO is based on information provided to the Service in preparation of the Conference Opinion. Minor modifications and amendments to the request have been made in the course of completing this biological opinion. The Service and the ONF met informally several times during the preparation of the conference request and subsequent to the species' listing to discuss the conservation of the NLEB, the effect of ONF actions on the species, and to ensure that both agencies agree with the content and direction of the consultation process. A complete administrative record of this consultation is on file at the Service's East Lansing Field Office.

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

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

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

The Service's 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 NLEB for one year following publication of the interim rule.

Thus any take of NLEB occurring in conjunction with these activities that complies with the conservation measures, as necessary, is exempted from section 9 prohibitions by the 4(d) rule,

and does not require incidental take authorization. We distinguish these activities from other actions throughout the accompanying BO.

However, 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 a 4(d) rule) are funded, authorized or carried out by a federal agency. This is because the purpose of section 7 consultation is broader than the mere evaluation of take and issuance of an Incidental Take Statement; such consultations fulfill the requirements of section 7(a)(2) of the ESA, which directs that all Federal actions insure that their actions are not likely to jeopardize the continued existence of any listed species, or result in the destruction or adverse modification of designated critical habitat.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

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 ONF reviewed all their ongoing actions and determined that a total of 119 project activities and 378 special use permits were likely to continue beyond the time when the NLEB would be listed. They then reviewed these projects, including their previous consultation documents, to determine how these projects would affect the NLEB. The ONF 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 (including all conservation measures).

The following project background and area descriptions are summarized from the Conference Opinion and the Forest Plan.

Action Area

In general, the action area for the purposes of this analysis is all lands, under any ownership, within the proclamation boundary of the Forest. During their analysis, the Forest did not identify any direct or indirect effects that moved outside of this area.

The ONF is located in the western Upper Peninsula of Michigan, occupying portions of Baraga, Gogebic, Houghton, Iron, Marquette and Ontonagon counties (Figure 1). The proclamation boundary encompasses approximately 1,552,923 acres, of which approximately 990,961 acres are in Forest Service ownership.

Project Description

The ONF reviewed all their ongoing and planned actions and determined that a total of 497 actions (119 project activities and 378 special use permits) over approximately 94,119 acres were likely to continue beyond the time when the NLEB would be listed (Appendix A, Table 1). Previous Biological Assessments and Tier-2 Consultation documents provided full descriptions of the proposed actions for each of the projects, and are incorporated herein by reference. Due to the number of ongoing and planned projects, for purposes of this consultation, the projects will be combined together and collectively evaluated to determine the projects' effects on NLEB. The ONF, in conjunction with the Hiawatha National Forest, Huron-Manistee National Forests, and Service created 23 separate categories where all existing projects and actions are classified (Table 1).

Figure 1: Map of the Action Area

Table 1: List of actions and affected acres

Activity	Activity Code	Affected Acres/Units
Hardwood timber harvest / non-commercial cutting / timber stand improvement	HWDCUT	44,460 acres
Hardwood low / moderate intensity burning	HWDLMB	20 acres
Hardwood high intensity burning	HWDHIB	none proposed
Conifer timber harvest / non-commercial cutting / timber stand improvement	CONCUT	41,511 acres
Conifer low / moderate intensity burning	CONLMB	470 acres
Conifer high intensity burning	CONHIB	none proposed
Mechanical maintenance in openings, barrens, savannahs, and fuel breaks where trees = > 3” DBH will be felled	OPNMM	790 acres
Burning in openings, barrens, savannahs, and fuel breaks where trees = > 3” DBH will be felled or burned	OPNBRN	221 acres
Mechanical maintenance in openings, barrens, savannahs, and fuel breaks where trees < 3” DBH will be felled	OPN<3	none proposed
Burning in openings, barrens, savannahs, and fuel breaks where trees < 3” DBH will be felled or burned	OPNB<3	none proposed
Site preparation including tree planting, roller chopping, chaining, trenching, scalping, raking, etc.	SPREP	394 acres
Firewood cutting	FIREWD	196 acres
Christmas tree cutting	HOLIDAYTREES	85 trees
Hazard tree removal	HAZTREE	600 trees
Tree pruning	PRUNE	none proposed
Roadside brushing	RDBRUSH	340 acres
Road closures	RDCLOSE	29 acres
Special Use Permits with vegetation management	SUP	3,277 acres
Landline surveys, mineral seismic surveys, cruise volume validation, and other minor activities with tree cutting	MINORTREE	720 acres
Insect and disease destructive studies (e.g. girdling, felling, collecting nurse logs, etc.)	STUDIES	none proposed
Wildlife and fisheries structural habitat improvement / restoration (e.g. girdling, topping, down wood, large wood placement, etc.)	WLFISHSTR	1,291 acres
Building maintenance or demolition	BUILDING	2 structures
Herbicide spraying (backpack, vehicle broadcast, wick application) and bio-control insect releases	HERB	400 acres, 10 release sites

Conservation Measures

Conservation Measures are those actions taken to benefit or promote the recovery of the species. These actions taken by the Forest Service serve to minimize or compensate for project effects on the species under review and have been included in the proposed actions. The ONF has been pro-active in incorporating measures into their actions that contribute to the conservation of forest bats.

For any listed project to be in compliance with the interim 4(d) rule for NLEB, the ONF has committed to the following conservation measures as part of the project description with one exception:

- All but one proposed activity will occur more than 0.25 mile (0.4 km) from known, occupied hibernacula. The Ridge project has a timber harvest planned within 0.25 acres of a known, occupied hibernacula (Figure 2). Total impacted acres within the 0.25 mile buffer are approximately 9.25 acres.

- The USFS will avoid cutting or destroying known, occupied roost trees during the pup season (June 1–July 31).

- 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).

The ONF has six known, or assumed NLEB occupied hibernacula complexes present and no known, occupied NLEB roost trees.

In addition, the ONF will continue implementing the following conservation measures where possible and practicable in an effort to minimize adverse effects to NLEB:

- The ONF will continue to protect known occurrences of wildlife species for which population viability is a concern, which is applicable to NLEB and its known locations.

- The Forest Plan also contains guidelines to maintain snags and mast/den trees which provide wildlife structure and would also serve to maintain NLEB roost trees. Individual project descriptions include these guidelines as design criteria and will be followed unless the prescriptions are not feasible or prudent.

- The ONF will continue to incorporating design criteria and other management restrictions used for protection of Regional Forester Sensitive Species, watershed management, and other resource considerations. Many of these design criteria include actions that may also be beneficial to NLEB.

- The ONF will continue their acoustic mobile survey transects as funding is available.

- The ONF will continue to provide a diverse, productive, healthy, and sustainable forest that is resilient to natural and human-caused disturbances. Non-native invasive species are at low levels and do not alter ecosystem processes. Vegetation composition and

structure provide plant and animal species habitats, including NLEB. This is accomplished by managing different land areas within the ONF; called management areas (MAs). Each MA has a prescription that emphasized conditions or features such as; community types (e.g. early vs. late successional), timber management strategies (e.g. even vs. uneven aged), appearance (e.g. predominately forested vs. forest openings), recreational environment (e.g. semi-primitive non-motorized), wilderness character and experience, special interest areas, river corridors, etc. Through the diverse management of multiple MAs, the ONF provides a diverse array of habitat that is continually renewed through prescribed activities which would provide a long-term benefit to NLEB.

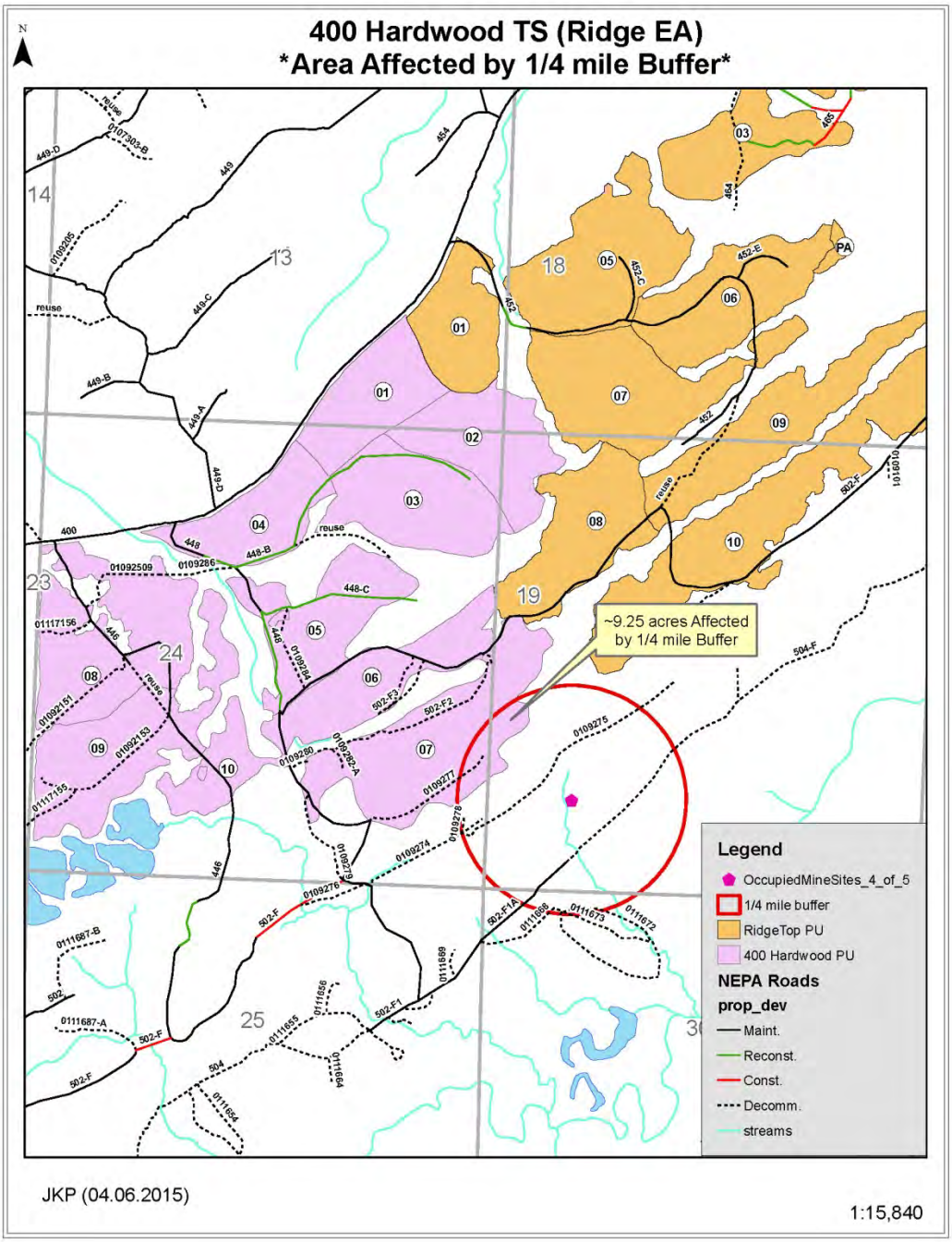

Figure 2: Map of proposed impacts within 0.25 mi of known, occupied hibernacula

STATUS OF THE SPECIES

This section will provide an overview of the biology and conservation needs of the NLEB and that is pertinent to the "Effects of the Action" section (e.g., a description of the annual life cycle, spring emergence habitat, fall swarming habitat, etc.).

Additional information on the NELB's life history, biology, current range-wide population and trends, and threats are thoroughly described in the final rule (80 FR 17974).

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. Throughout the species' range, the NLEB will hibernate between mid-fall through mid-spring each year. The spring migration period likely runs from mid-March to mid-May each year, as females depart shortly after emerging from hibernation and are pregnant when they reach their summer area. Young are typically born in late-May or early June, 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. These dates are variable depending on weather conditions and latitude.

Summer habitat and ecology

Suitable summer habitat 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. NLEBs seem to be focused in upland, mature forests (Caceres and Pybus 1997) with occasional foraging over forest clearings, water and along roads (Van Zyll de Jong 1985). However, most NLEB hunting occurs on forested hillsides and ridges, rather than along riparian areas (Brack and Whitaker 2001; LaVal et al. 1977).

Many species of bats, including the NLEB, consistently avoid foraging in or crossing large open areas, choosing instead to use tree-lined pathways. Further, wing morphology suggests that the species is 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.

For purposes of this consultation, the NLEB's summer occupancy period is defined as the time when bats are reasonably expected to be present at their summer home range. In Michigan, the summer occupancy period is between May 1 and September 1 in the Lower Peninsula (LP) and between May 15 and September 1 in the Upper Peninsula (UP).

Maternity colonies and roosts

Upon emergence from the hibernacula in the spring, females seek suitable habitat for maternity colonies. Coloniality is a requisite behavior for reproductive success. NLEB maternity colonies range widely in size, although 30-60 bats/colony may be most common (USFWS 2013). Maternity colonies contain networks of approximately 10-20 roost trees often centered around one or more primary or central-node roost trees. NLEB show some degree of interannual fidelity to single roost trees and/or maternity areas. Male and non-reproductive female NLEBs may also roost in cooler places, like caves and mines. NLEB roost in cavities, underneath bark, crevices, or hollows of both live and dead trees and/or snags (typically ≥3 inches dbh). The bats 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 and have also been occasionally found roosting in structures like barns and sheds (particularly when suitable tree roosts are unavailable).

Reproduction

Throughout the species' range, young NLEB are typically born in late-May through mid-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. In Michigan the non-volant period occurs between June 15 and August 1.

Migration

Males and non-reproductive females may summer near hibernacula, or migrate to summer habitat some distance from their hibernaculum. NLEB are not considered to be a long distance migrant, typically migrating up to 40-50 miles. However, some NLEB detections have been documented in areas further than 100 miles from any known hibernacula. Migration may be stressful for 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. The species hibernates from October to April depending on local weather conditions (November-December to March in southern areas and as late as mid-May in some northern areas). In Michigan, hibernation typically occurs from October 15 to May 15 in the LP, and from October 1 to May 31 in the UP.

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 (USFWS 2013), with hibernating population sizes ranging from a just few individuals to around 1,000 (USFWS 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, NLEBs "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. 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 bats migrate to summer roosts. Female 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.

Spring staging in Michigan occurs between April 1 and May 15 in the LP, and between April 15 and May 31 in the UP. Fall swarming occurs between August 15 and November 1 in the LP, and between August 15 and October 15 in the UP.

Threats

No other threat is as severe and immediate for 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 2006, WNS has spread rapidly to 29 states and four Canadian Provinces throughout the Northeast, to the Midwest and the Southeast. Population numbers of NLEB have declined by up to 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. Impacts to hibernacula (e.g. human disturbance, changes in the hibernacula's microclimate) and loss or degradation of summer habitat (e.g. highway and commercial development, timber harvest, forest management) are additional stressors that may affect NLEB on two levels. First, individual NLEBs 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.

Species 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). In the United States, the species' range reaches from Maine west to Montana, south to eastern Kansas, eastern Oklahoma, Arkansas, and east to the Florida panhandle (Whitaker and Hamilton 1998, Caceres and Barclay 2000, Wilson and Reeder 2005, Amelon and Burhans 2006). The species' range includes the following 38 States: Alabama, Arkansas, Connecticut, Delaware, the District of Columbia, 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). More than 1,100 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, p. 100). Known hibernacula (sites with one or more winter records) include: Alabama (2), Arkansas (41), Connecticut (8), Delaware (2), Georgia (3), Illinois (21), Indiana (23) Kentucky (119), Maine (3), Maryland (8), , Massachusetts (7), Michigan (103), Minnesota (11), Missouri (more than 269), Nebraska (2), New Hampshire (9), New Jersey (8), New York (58), North Carolina (22), Oklahoma (7), Ohio (7), Pennsylvania (112), South Carolina, (2), South Dakota (7), Tennessee (58), Vermont (14), Virginia (8), West Virginia (104), and Wisconsin (67).

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 widespread surveys and research projects, primarily focused on Indiana bat (*Myotis sodalis*) or an array of other bat species. 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 also reporting 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.

Conservation Needs of the Species

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

Critical Habitat

Critical habitat has not been proposed for the NLEB. Therefore, no proposed critical habitat will be affected.

ENVIRONMENTAL BASELINE

The Environmental Baseline describes the species status and trend information, and 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. Additional detailed information is available in the Forest Plan that is hereby incorporated by reference.

Status of the NLEB in Michigan and the Action Area

In Michigan, NLEB have been captured or physically detected (i.e., observed in winter hibernacula counts) in 38 of 83 total counties and acoustically identified in 4 additional counties (See Figure 3). The species appears to be more abundant in the UP and northern LP than in southern parts of the state (Kurta 1982, Kurta and Smith 2014). For instance, during 1968-1980, NLEB represented 15.3% of 111 bats of 6 species submitted for rabies testing north of 44° north latitude; whereas the species comprised only 0.3% of bats submitted from south of the 44th Parallel (Kurta 1982). Likely, the species' higher density in the north is a result of most known and potential hibernacula being contained in the UP (predominantly abandoned copper and iron mines in Dickinson and Ontonagon Counties; Kurta 1982, Winhold 2007, Kurta 2008a). Although NLEB have been identified at 3 LP hibernacula (Bear Cave in Berrien County, Rockport Quarry in Alpena County, and Tippy Dam in Mason County), it is suspected that a majority of the bats that summer in the southern LP may hibernate in adjacent states (Kurta 1982).

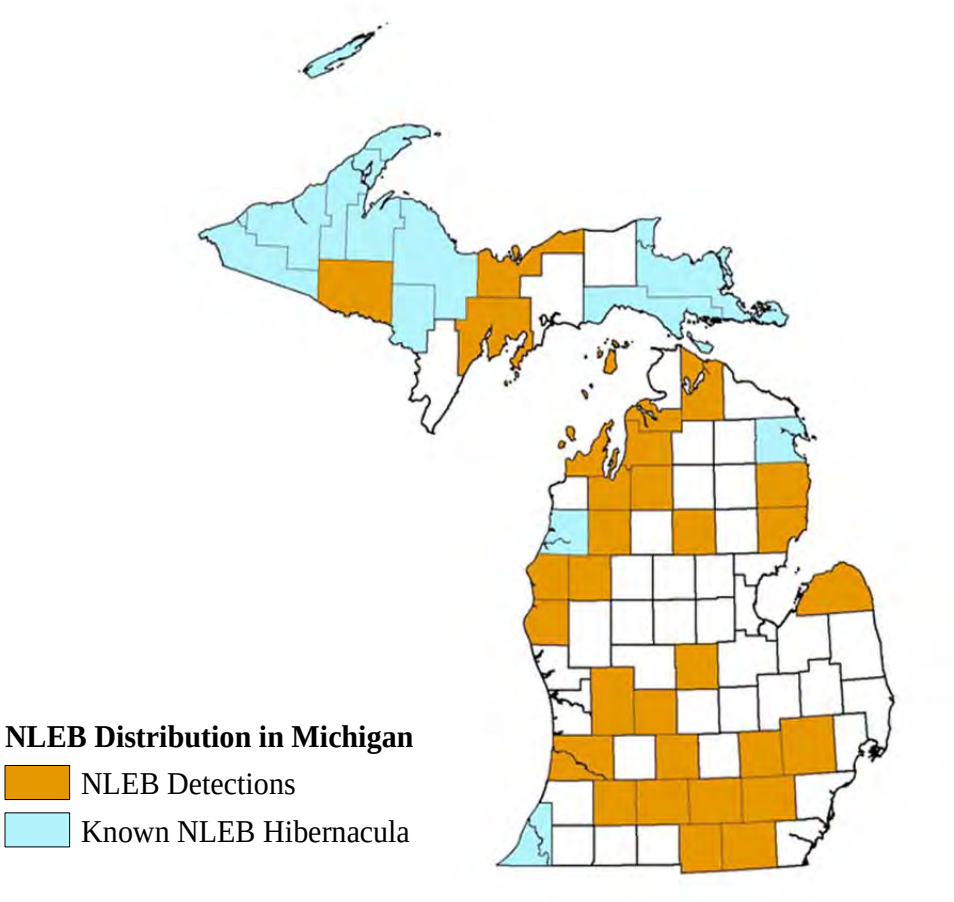

Figure 3: Michigan counties with known NLEB occurrences.

Upper Peninsula

Some of the earliest records of the species in Michigan include sightings from Isle Royale, Mackinac Island (Burt 1946) and Big Summer Island (Long 1978, as cited in Kurta 1982) in the UP. Between 1904 and 1968, the University of Michigan collected a total of 15 NLEB specimens from 7 UP counties (Baraga, Chippewa, Dickinson, Mackinac, Marquette, Keweenaw and Ontonagon; University of Michigan Mammal Research Department Museum Records), and Michigan State University has collected 116 NLEB specimens from 7 UP counties (Chippewa, Delta, Dickinson, Iron, Mackinac, Marquette, and Ontonagon) to date (Michigan State University Mammal Research Department Museum Records).

Although few bat surveys have been conducted in the UP, evidence suggests that NLEB occur there in the highest densities. During the summer of 1979, NLEB represented 81.7% of the total bats captured outside 4 Mackinac County caves in the eastern UP (Kurta 1980). In 2009, Kurta and Smith examined 25 mines in the Ottawa National Forest and concluded that 4 of the sites likely harbor hibernating bats (Kurta and Smith 2009). Finally, during 2010-2014, prior to the arrival of white-nose syndrome (WNS), the team observed bats hibernating in 82 of 119 UP mines, including 91 copper mines, 26 iron mines, 1 dolomite mine, and 1 putative gold mine (Kurta and Smith 2014). Overall, NLEB was the second most commonly observed species, representing almost 10% of the 244,341 total hibernating bats observed.

Hiawatha National Forest

During 2012, NLEB comprised 59% of summer mist net captures in the Ottawa National Forest (Cuthrell et al. 2012, Gehring and Klatt 2013). Additionally, mobile acoustic surveys during 2009-2012 and 2014 yielded several potential NLEB detections, although the results are considered preliminary.

Ottawa National Forest

In 2004-2006, NLEB comprised 19.3-23.6% of captures as well as 6.4-9.6% of acoustic call sequences at vernal pools in or near the Ottawa National Forest in Gogebic County, MI and Vilas County, Wisconsin (Francl 2005, 2008). Additionally, mobile acoustic surveys conducted in the Ottawa National forest yielded NLEB detections during 2011-2012, although the results are considered preliminary.

Northern Lower Peninsula (north of 44°N latitude)

In the northern LP, NLEB appear to occur at somewhat lower densities but are still commonly detected at certain sites. During 1910-1939, the University of Michigan collected 3 NLEB specimens from 2 northern LP counties (Cheboygan and Charlevoix, and Michigan State University has collected a total of 14 specimens from 7 northern LP counties (Alpena, Antrim, Grand Traverse, Iosco, Kalkaska, and Roscommon) to date. In the Manistee National Forest, NLEB represented 6% (22 of 389) of the total bats captured during the summers of 1998 and 1999, and 27 NLEB roost trees were identified in Lake, Manistee and Wexford Counties, including large maternity roosts (Kurta 2000). Additionally, mobile acoustic surveys conducted on the Huron-Manistee National Forests yielded NLEB detections during 2011-2012, although the results are considered preliminary.
NLEB are consistently found hibernating in Tippy Dam, a hydroelectric facility in Mason County, comprising an estimated 2.6% of the approximately 19,000 bats that hibernate there (Kurta et al. 1997). NLEB were 11.9% (203) of bats captured swarming at Tippy Dam during August 1995 and 3% (30) of the bats captured in September of the same year (Kurta et al. 1997). During 12 nights of sampling in the fall of 1998 and 1999, NLEB were 12.26% (1,037) of the total bats captured near the dam (Kurta 2000). In addition to Tippy Dam, NLEB have been observed hibernating in a surge tunnel in Rockport Quarry, an abandoned limestone quarry in Alpena County (Slider and Kurta 2011), although they appear to use the hibernaculum in relatively low numbers (Travis 2014).

Manistee National Forest

In the Manistee National Forest in the northwestern LP, NLEB represented 6% (22 of 389) of the total bats captured during the summers of 1998 and 1999; moreover, 27 NLEB roost trees were identified in in Lake, Manistee and Wexford (Kurta 2000). In addition, mobile acoustic surveys conducted within the Manistee National Forest during 2011-2012 yielded several potential NLEB detections, although the results are considered preliminary. In 2014, NLEB captures totaled 6% of bats (7 of 115) at one study site in Wexford County on the Manistee National Forest. During subsequent radio-tracking, 13 additional roost trees were identified in 2014, including several maternity roosts (George and Kurta 2014).

Huron National Forest

In the Huron National Forest in the northeastern LP, NLEB were 32% (21 of 66) of bats captured mist net captures in Alcona County, approximately 50 km from Rockport Quarry, during July of 2008 (Kurta 2008a).

Southern Lower Peninsula (north of 44°N latitude)

In the southern LP, NLEB are considered relatively uncommon (Winhold 2007). During 1910-1939, a single NLEB specimen was collected from Washtenaw County for the University of Michigan Museum, and Michigan State University has collected an additional 20 specimens from 4 southern LP counties (Berrien, Calhoun, Eaton, and Kent) to date. In Eaton County, NLEB were 1.8% (4 of 223) of bats captured along the Thornapple River during 1978-1979, 3% (4 of 120) of bats captured along the River in 1982 (Brack et al. 1984), and 4.6% (10 of 217) of bats captured there during 1993-1994 (Winhold 2007). Additionally, 32 NLEB roost trees were identified in Eaton County during 1993-1994 (Foster and Kurta 1999), including several large maternity roosts. During the summers of 2004-2006, NLEB represented only 0.6% (6 of 948) of bats captured in mist nets at 75 rural sites in MI's southern four county tiers (Winhold and Kurta 2008b, Winhold 2007). However, in 2007, NLEB were 11% (50 of 457) bats captured in Lenawee County (Kurta 2007), and during 2007-2008, 35 NLEB were tracked to a total of 78 roost trees along Bear Creek, Black Creek, and the River Raisin in Lenawee County (Kurta 2008b). Moreover, NLEB comprised 24.4% of the bats captured at Bear Cave (a tufa cave in Berrien County) on 2 nights in September 1978 and 5 nights in September 1979 (Kurta 1980), and were 55.8% (91 of 163) of bats captured outside the hibernaculum in August of 2005 (Kurta et al. 2007, Winhold 2007).

In addition to Bear Cave, one more potential hibernaculum has been identified in the southern LP (Silas Doty Cave in Hillsdale County), although inspections in the fall of 2004 and spring of 2006 revealed a high degree of human disturbance and did not contain bats (Winhold 2007).

WNS was first confirmed in Michigan in the winter of 2013-2014. As of March 25, 2015, mortality has been documented at hibernacula in at least 5 counties (Alpena, Dickinson, Keweenaw, Mackinac, and Ontonagon); however, mortality has not been specifically confirmed for NLEB. Additionally, evidence of WNS was discovered in Tippy Dam in the winter of 2014-2015 and a case of WNS in a big brown bat (Eptesicus fuscus) was recently confirmed in Clare County.

Habitat Conditions in the Action Area

The ONF is characterized by landscapes shaped by glaciers, which have provided a variety of landforms from hilly glacial moraine to outwash sand plains. Rock outcrops, hills and ranges from past geologic events have contributed to the ecological and scenic features of the ONF. The ONF is composed of predominantly northern hardwood tree species with associated plants and animals. Mixed stands of early successional (aspen/birch), and lowland and upland conifer trees are also common. Much of the forest cover is less than 100 years old and is rapidly maturing.

At the time of the writing of the ONF Forest Plan (2006) forest composition was broken down into the following categories including acreage and percent of forested land; northern hardwoods

457,000 acres (50%), aspen-paper birch 199,000 acres (22%), short-lived conifers 159,000 acres (18%) and long-lived conifers 90,000 acres (10%).

Hibernacula

Six abandoned mines used by up to 3,000 bats occur on the ONF (Kurta and Smith 2013). Known occupied winter hibernacula occur at the Ohio Traprock #59 Adit, Ohio Traprock #60 Adit, Windsor Mine, Norwich Main Shaft B, Derby Mine, and the Silver Mountain Mine. All entry points have been gated with bat-friendly closures.

Norwich Mine Complex

This complex is located on a large, geologic outcrop that extends run in an East-West orientation. The outcrop has extensive amounts of steep, cliff cleaved by drainages and old rock falls. The height of the outcrop is distinct compared to surrounding area. This mine complex consists of the Ohio Taprock #59 Adit, Taprock #60 Adit, Windsor Mine Shafts, and the Norwich Main Shaft B. The Norwich mine complex is located north of the West Branch of the Ontonagon River in the Norwich Outcrop Special Interest Area and the Recreational Segment of the West Branch Ontonagon River, in Ontonagon County, Michigan.

Based on ONF cover type mapping and botany surveys habitats in the area include mixed northern hardwoods on the lower slopes, and northern red oak woods on the drier top; aspen and aspen-fir-spruce mixed stands scattered in the area; open rock faces, cliffs, talus slopes; part of the West Branch Ontonagon River; and deciduous forested wetlands, coniferous forested wetlands and shrub wetlands (e.g. alder thicket) associated with the West Branch; and roads/roadsides/trail/upland openings within forest. In addition to the West Branch, Whiskey Hollow Creek and several of its tributaries occur in the project area. There are no named lakes in the area; there is an oxbow pond south of the W. Branch.

Ohio Taprock #59

This is a short (45 foot long) adit and an adjoining shaft (depth unknown) that is filled with water.

Ohio Taprock #60

This mine has a straight passage 171 feet long, and a narrow lateral drift about 65 feet long.

Windsor Mine

Windsor Mine is complex and consists of four shafts. These shafts historically were numbered from 1 in the east to 4 in the west. Before 2010, Shaft #4 typically was water filled, almost to the surface, and it was permanently covered by the Forest Service in summer 2010. The other three shafts, which were interconnected underground, were given bat-friendly gates at the same time, although the gate at shaft #2 was the only one that included a lockable entrance panel that allowed passage of humans. As of 2014, Shaft #2 was about 280-feet deep and ended in water. Shaft #3 terminated in collapse after only 80 feet, whereas Shaft #1 was over 200-feet deep and ended in a rock pile (Kurta and Smith 2014).

The Windsor Mine continues to have the largest known population of hibernating bats on the ONF and the 21st largest within the state, as of December 2014 (Kurta and Smith 2014).

Derby Shaft and Adit

This mine contains as a single adit that is about 80-feet long, and has a relatively straight design. The site is located at the bottom of a deep and steep creek drainage, surrounded by heavily wooded hills. The mine is located less than 100 yards from a perennial, small sized stream. Based on ONF cover type mapping and field visits, habitats in the area include mixed northern hardwoods on the lower slopes, mainly sugar maple and red oak. Some old remnant yellow birch is present, but limited and appears to be declining out of the stands. Hemlocks are not uncommon, and several occur around the mine entrance. Understory species are lacking, mainly due to the age of the stands and heavy canopy cover associated with them.

In 2014, a survey revealed 210 little brown bats, 14 northern bats, and 19 big brown bats, for a total of 242 bats. No eastern pipistrelles were seen (Kurta and Smith 2014).

Silver Mountain Mine

The Silver Mountain consists of an adit in Houghton County at the base of an isolated basalt volcanic vent plug. The mine itself is located immediately adjacent to a wooden stairway leading to the top (1,312 feet) of the geographic feature. The addit is 147 feet long, with a submerged shaft (unknown depth) at the end of it. Vegetation is predominately mature sugar maple with inclusions of mature hemlock, yellowbirch, paperbirch and aspen. Red oaks and white pine occur on the drier soils on top of the volcanic plug. The vent plug above the mine is nearly vertical, with sheer rock cliffs, fractures, boulders, and rocky outcrops common.

In the winter of 2014, this adit contained 1,580 bats, including 1,500 little brown bats, 72 northern bats, and 8 big brown bats; no eastern pipistrelles were in the mine. The Silver Mountain Mine contains the 24th largest population of hibernating bats in Michigan, as of December 2014, and in terms of number of bats per linear foot of passage, this population is one of the largest (Kurta and Smith 2014).

Conservation Needs of the Species in the Action Area

The conservation needs of the species in the action area are similar to the needs range-wide. The ONF provides habitat for swarming, migrating, and summering NLEB. WNS has not been detected on the ONF; however the fungus has been detected in six counties in Michigan and suspected in another and mortality has been detected in six counties. It is likely the bat's population on the ONF will experience significant declines over the next several years directly attributable to WNS. Therefore, within the action area the conservation needs include: 1) reducing WNS-related mortality and injury; 2) conducting research to discover ways to prevent bats from being infected with WNS or treat bats who are infected; 3) providing suitable habitat conditions for NLEB; 4) maintaining suitable habitat conditions in identified maternity areas and reducing the removal of occupied roost trees; 5) searching for previously unidentified areas of maternity and hibernation activity; and 6) conducting research to understand the migration patterns of NLEB that use the area during the summer or winter.

Ongoing Stressors in the Action Area

The Service believes the following State, local, and private actions are currently occurring within the Action Areas and are likely to be adversely affecting some percentage of NLEB to variable degrees, and are likely to continue into the reasonably foreseeable future.

- Loss and degradation of roosting and foraging habitat – Most of the forest habitat within the Action Area is on Forest Service lands and is being maintained and available for use by NLEB. However, on lands outside of the Forest Service's ownership, an unknown amount of forest habitat is being lost and/or degraded by private and public, commercial and residential developments, which are converting, fragmenting, or otherwise degrading forest habitat available for roosting and foraging, especially near incorporated areas centers and along primary and heavily traveled secondary roadways and their main intersections.

- Commercial and private timber harvesting – Some private timbering likely occurs on private lands within the Action Area while bats are roosting in trees. Therefore, some unknown number are likely exposed to this stressor and may be directly killed, harmed, or displaced as trees are felled in the summer.

- Cutting of Snags - While most primary and many alternate roost trees are dead snags that are ephemeral/short-lived, some small proportion are likely to be cut down before they would naturally fall in order to reduce safety risks (i.e., hazard tree removal), to provide firewood, or to improve aesthetics.

- Degraded water quality – Point and non-point source pollution and contaminants from agricultural, commercial, and residential areas are likely present in waterways within the Action Area and may at times reduce aquatic insect biomass that form a portion of the NLEB prey base and/or have direct or other indirect adverse effects on the bats themselves (e.g., females may have reduced reproduction in heavily contaminated areas).

EFFECTS OF THE ACTION

This BO evaluates the effects of 119 ongoing and planned project activities and 378 special use permits on the ONF. These projects will affect a total of 94,119 acres potential NLEB habitat on the ONF. Potential effects to the NLEB include direct effects 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.

We deconstructed the ongoing activities into its various project elements and determined the direct and indirect environmental consequences that NLEB would be exposed to. We conducted various exposure analyses for each proposed activity that may directly or indirectly affect the bats and determined the likely responses of the bats to each potential stressor.

While analyzing direct and indirect effects of the proposed action on NLEB, we considered the following factors:

- proximity of the action to known occupied or likely suitable habitat,

- distribution of the disturbances and impacts,

- timing of the effects in relation to sensitive periods in the species' lifecycle,

- nature of the effects - how the effects of the action may be manifested in elements of a species' lifecycle, population size or variability, or distribution, and how individual animals may be affected,

- duration of effects - short-term, long-term, permanent,

- disturbance frequency - number of events per unit of time, and

- disturbance severity - what is the relative impact in comparison to unimpacted individuals.

In addition, our analysis of effects for northern long-eared bat entails integrating those individual effects to discern the consequences to the populations to which those individuals belong, and determining the consequences of any population-level effects to the species rangewide. If, at any point, we demonstrate that the effects are unlikely, we conclude that the agency has insured that their action is not likely to jeopardize the continued existence of the species and our analysis is completed.

Hardwoods - Timber Harvest / Non-commercial cutting / TSI

Description of Action

The actions that will be analyzed in this section include all commercial timber harvest, non-commercial tree felling, and timber stand improvement activities (TSI) that will occur in hardwood forest types. . This action also includes the construction of temporary roads and landings for the removal of timber products. These actions are described in more detail in Appendix A. These actions are described in more detail in Appendix A. Approximately 44,458 acres of hardwood forests are planned to be harvested or felled on the Ottawa National Forest.

Commercial timber harvest in the hardwood forest type includes all tree felling activities conducted on National Forest System lands by a purchaser, where trees are felled and removed. A number of silvicultural techniques may be used including clearcutting, thinning, shelterwood and seed tree harvest. These techniques are used most often to regenerate or manage a stand that will remain forested over the long term. Sometimes hardwood timber harvest is used to create openings, barrens and fuelbreaks, roads, or other permanent openings.

Non-commercial felling is occasionally used to accomplish the same vegetation management objectives described above without commercial harvest. Trees are felled non-commercially to meet specific forestry, wildlife habitat, or other resource management objectives.

Timber Stand Improvement (TSI) activities typically include forest management practices that improve the vigor, stocking, composition, productivity, and quality of forest stands. The improvement usually results from removing poor quality trees and allowing crop trees to fully

use the growing space. Snags and wildlife (e.g. relict) trees are generally retained unless they pose a safety hazard or prevent access.

To minimize effects to NLEB, the ONF has developed the following design criteria to be incorporated into projects as feasible and prudent:

- Conduct felling outside of the summer occupancy period.

- Reserve snags and den trees according to Forest Plan guidelines; focus on retaining trees with features beneficial to the NLEB.

Environmental Baseline

Timber harvest, non-commercial cutting, and timber stand improvement activities in hardwood forests are ongoing activities on National Forest System lands to: 1) promote forest health, restoration, and use; 2) provide habitat for wildlife, plants, and fish; 3) provide recreational opportunities; 4) reduce risk to users and enhance public safety; 5) meet other resource management objectives in the ONF's Forest Plan.

A majority of NLEB roosts reported were in deciduous (i.e. hardwood) forest types (e.g., Mumford and Cope 1964, Sasse Thesis 1995, Foster and Kurta 1999, Lacki and Schwierjohann 2001, Schultes Thesis 2002, Broders and Forbes 2004, Jackson Thesis 2004, Carter and Feldhamer 2005, Ford et al. 2006, Bales Thesis 2007, Winhold Thesis 2007, Garroway and Broders 2008, Kurta 2008, Dickinson et al. 2009, Johnson et al. 2009, Lacki et al. 2009, Krynak Thesis 2010, Timpone et al. 2010, Silvis et al. 2012, Sinander 2012, Bohrman and Fecske 2013, Brown 2013, Lereculeur Thesis 2013, Badin Thesis 2014). Broders and Forbes (2004) reported that female NLEB roosts in New Brunswick were 24 times more likely to be in shade-tolerant, deciduous trees than conifers. These data suggest that hardwood trees most often provide the structural and microclimate conditions preferred by maternity colonies and groups of females, which have more specific roosting needs than solitary males (Perry and Thill 2007), although softwood snags may occasionally offer more suitable roosting habitat for both sexes than hardwoods (e.g., Perry and Thill 2008, Cryan et al. 2001).

Additionally, it has been suggested that NLEB does not often forage in intensively managed stands (Patriquin and Barclay 2003, Ford et al. 2005, Sheets et al. 2013). However, Owen et al. (2002) and Menzel et al. (2002) concluded that intensively managed hardwood forests in the central Appalachians provide adequate roosting habitat for NLEB. Badin (Thesis, 2014) found that NLEB roosted at greater abundances in undisturbed forest (n = 65) than harvested forests, with a few roosts in patch-cuts (n = 4), and none in larger clear-cuts. When using disturbed areas, NLEB were found to use plots with more trees (i.e. vegetative clutter) than random locations (Cryan et al. 2001, Owen et al. 2002, and O'Keefe 2009).

Direct and Indirect Effects

Although the probability is relatively small (based on total forest size), some of the trees harvested or felled may be roosting habitat for the NLEB. While the probability of this is difficult to quantify, it may vary depending on the extent of trees removed (i.e. size of harvest area and treatment type, as well as age, size, and condition of tree). Trees may be felled in the

spring, summer, and fall when NLEBs may be present. Harvesting or felling trees during this period may directly affect NLEBs because of the possibility of a tree containing roosting bats. Bats may leave a roost tree prior to it being felled due to the noise, vibration and disturbance from saws or other equipment. However, some bats might remain in a tree and could be injured or killed if the tree strikes the ground. If bats are present in trees adjacent to the tree being felled, these bats may be disturbed by the activity, however, the bats are not likely to be injured or killed, unless the felled tree damages the roost site on the retained tree. The design criteria for retention of snags and den trees offer additional protection because many potential roost trees would be protected from cutting.

Potential adverse effects are reduced during the spring staging and fall swarming periods. During spring staging, most bats would be expected to be staging near their hibernaculum; during swarming, most NLEBs would be expected to be swarming near their hibernaculum.

If a roost tree is felled any time of year, it could cause a local loss of roosting habitat. The roost tree would no longer be available to NLEBs and cause the bats that were occupying it to find an alternate roost tree. However, depending on the prescribed treatment for the specific treatment area, the bats may find suitable habitat in adjacent trees or neighboring stands. The size of the treatment areas may impact the social structure of bats in maternity colonies by losing preferred roost trees and the loss of roost trees may also potentially affect home ranges of bats using the treated areas. Silvis et al. (2014) used simulations to demonstrate that >20% roost removal was required to fragment social networks for maternity colonies in Kentucky. While harvests are generally concentrated to localized landscape types or ecological regions, the timber harvests are generally conducted in smaller blocks of payment units (anywhere from 5-100 acres in size) over the course of several years (duration of the timber contract). This incremental timber removal may help minimize loss of habitat by dispersing it over time and space.

Uneven-aged Management

In the short term, uneven-aged management treatments could have a moderate indirect effect on NLEBs because of changes in forest structure. These stands would lose the poor condition trees that may offer cavities for roosting bats and canopy cover that may serve as maternal roost sites. However, the amount of trees removed would be relatively low compared to even age management treatments and the stand would retain most of its prior structure. The removal of trees may open up the understory and provide greater foraging areas, presenting a beneficial effect. The limited removal of trees should be low enough not to affect prey (insects) abundance or prey habitat. Retained snags and cavity trees would provide some roosting habitat, however these trees will likely fall over within 10 years.

Some areas of hardwood timber harvest used to create openings, barrens, fuelbreaks, roads or other permanent openings would not be reforested. These actions could result in a minor loss of roosting and foraging habitat over the long term. The impact depends on the size and density of the trees removed, and size and shape of the permanent openings created. Areas where the trees are large (> 3” dbh) and not densely stocked could be roosting and foraging habitat for NLEBs; hardwood timber harvest in these areas may result in habitat loss. Harvest that creates large or wide openings could result in a loss of foraging habitat for NLEBs, while harvest that creates small or narrow openings could provide foraging habitat.

In the long term, the remaining trees would continue to age and provide additional roosting habitat in the future (10-20 years depending on stand characteristics). The hardwood stands that are thinned would promote larger trees and an increase in stand diversity. Owen et al. (2003) suggest that partial timber harvests (thinning) in the Allegheny Mountains that left a relatively closed canopy could be beneficial to NLEB, and Lacki and Schwierjohann (2001) reported NLEB in higher abundances in stands with higher diversity of tree species. This diversity should be more conducive to NLEB by providing additional foraging opportunities and prey habitat and prey abundance. The long term effects should be beneficial to the NLEB and its prey base.

Even-aged Management

Even-aged management in hardwoods is most often conducted on aspen vegetation types, usually in older aged stands which are often at higher risks of succeeding out of the landscape and being replaced by other species. Without efficient even-aged regeneration, aspen and aspen dominated stands currently face a long-term decline across the Forest. However, aspen stands can be structurally diverse and provide cavities and other characteristics which NLEB and other bats can use for optimal roost selection (Parson et al. 2002).

No direct negative effects to NLEB maternity roosting communities would occur from even-aged timber harvests when conducted outside the summer occupancy period. A brief window of direct risk may exist in the fall, for adult and volant-staged NLEB pups prior to bats entering winter hibernacula. However, risks are considered minimal. Avoidance capabilities of NLEB would be strong during this time because once NLEB are capable of flight, their ability to flush and evade injury and mortality from certain forest management actions is enhanced. Flight strength and skills would continue to develop after the summer period, especially pups actively flying and preparing for fall migrations and subsequent hibernation. Even-aged hardwood management represents only a small portion of active timber sales at any given time. Aspen is more frequently cut in the winter or early spring when resource damages (e.g., sensitive soils, road issues) can be avoided, which coincides with when NLEB are restricted to hibernacula.

In the short term, even-aged management treatments could have a significant indirect effect on NLEBs because of a loss in forest structure. Snags and cavity trees would be retained, but overall canopy loss may make the stand unsuitable for NLEB roosting. Some home ranges could be affected with the cutting of an entire stand of trees, depending on the size of the stand treated and location of the home range. This would most likely disrupt the social structure of any colonies inhabiting the stand, but colonies utilizing the edge of the cut stand may be able to make use of the adjoining stand. The overall removal of trees may affect local moisture and evaporation levels enough to affect prey (insects) abundance or prey habitat. However, NLEBs using neighboring stands for roosting may use the newly cut stands for foraging purposes if prey base is unchanged. Some short-term benefits may occur as a result of new edges for foraging. Hogber et al. (2009) noted NELB tended to use edges of patches of residual trees left in clearcuts, and avoided open areas near the center of them. However, these impacts are not expected because stands suitable for even-aged treatment are not likely to be primary roosting habitat, and because even-aged cuts are small and not done over large contiguous areas of the Forest.

Some areas of hardwood timber harvest used to create openings, barrens, fuelbreaks, roads or other permanent openings would not be reforested. These actions could result in a minor loss of roosting and foraging habitat over the long term. The impact depends on the size and density of the trees removed, and size and shape of the permanent openings created. Areas where the trees are large (> 3" dbh) and not densely stocked could be roosting and foraging habitat for NLEBs; hardwood timber harvest in these areas may result in habitat loss. Harvest that creates large or wide openings could result in a loss of foraging habitat for NLEBs, while harvest that creates small or narrow openings could provide foraging habitat.
In the long term, the regenerated stand may return to near pre-disturbance conditions in canopy closure and structural features in 40-60 years depending on forest type. This would be a long-term benefit to NLEB and help provide for a sustained supply of future live trees as well as snags. Snags and cavity trees would become more abundant and foraging opportunities would become available as the stand matures. Non-aspen hardwood forest types regenerating from a previous clearcut would continue to age and transition to uneven-aged management improving their suitability for NLEB. Aspen forest types would be retreated with even-aged management techniques to enhance diversity in age classes (across the forest) and promote retention of the species through regeneration. Any change in prey base may not fully rebound until a canopy is restored (20-40 years depending on forest type) and foraging opportunities in interior portions of stands may not mature to the point where NLEB can effectively navigate. However, this may be off-set by NELB using stand edges or younger age classes of regenerating trees. The long term effects should be mild to the NLEB and its prey base as the stands replace themselves. Overall, northern hardwood forests (i.e. non-aspen) are rarely treated with even-aged management techniques. Aspen type forests are the most common forest type treated with even-aged techniques and NLEB use of aspen forests is still not well understood, but may vary depending on proportional availability.

Non-commercial Cutting

The unplanned non-commercial removal of trees would likely have very limited indirect effects on NLEBs due to the low number of trees removed. Trees that serve as roosts and maternity colony sites may be removed from the landscape; however the limited tree removal likely would not disrupt social assemblages or home ranges. Additionally, prey bases should not be disturbed by this limited tree removal. Any effects should be short-term in nature and would most likely be mitigated by other surrounding habitat. The removal of a few trees could also be beneficial by creating an opening in the canopy that could serve as a foraging location.

Timber Stand Improvement

The removal of small diameter trees to improve the regeneration, health and vigor of future hardwood stands would likely have a very limited negative indirect effect on NLEBs due to the low suitability of the trees removed, and in some cases would be beneficial to NLEB. Site prep activities would most likely have no effect on NLEB due to the fact that the treated stand age is so young that it would not be suitable to NLEB and that the trees removed are generally young trees less than 3" dbh. Other TSI activities in developed stands may remove live trees larger than 3" dbh, but these trees are generally located in the sub-canopy and their removal would be beneficial to NLEB by removing clutter and allowing greater foraging opportunities. TSI activities most likely would not affect prey abundance or habitat.

Determination

Timber harvest, non-commercial cutting, and timber stand improvement activities in hardwood forests are likely to adversely affect the NLEB because of potential adverse impacts to individuals due to injury and death from felling trees, and harassment due to social structure changes and roost tree removals. Actions that are able to incorporate both design criteria are not likely to adversely affect the NLEB because tree would be felled outside the summer occupancy period.

Actions Likely to Adversely Affect the NLEB (HWDCUT-LAA) (No design criteria)
Approximately 44,460 acres are planned for treatment on the Ottawa National Forest.

Hardwoods– Low to Moderate Intensity Prescribed Burning

Description of Action

The action that will be analyzed in this section includes all low to moderate intensity prescribed burning that will occur in hardwood forest types. These actions are described in more detail in the Appendix A. Approximately 20 acres of hardwood forests are planned for low to moderate intensity prescribed burning on the Ottawa National.

Low to moderate intensity prescribed burning includes all prescribed burning activities conducted on National Forest System lands, where the flame lengths are generally 2 to 4 feet, and no greater than 6 feet. Low to moderate intensity prescribed burns are typically intended to consume ground level litter and vegetation, and usually have little to no impact on overstory trees.

A summary of NLEB roost trees (USFWS unpublished) shows a range of roost heights from 16 to 52 feet, well above the height of flames of a low to moderate intensity prescribed burn.

To minimize effects to NLEB, the ONF has developed the following design criteria to be incorporated into projects as feasible and prudent:

- Conduct burning outside of the non-volant period

Environmental Baseline

Prescribed fire activities in hardwood forest types are used to improve forest health and restoration, reduce fuel loading, invasive species management, and site preparation activities. Hardwood forests are important habitats that NLEB use for foraging, roosting, pup rearing and social interactions. Lacki et al. (2009) reported that although NLEB in Kentucky roosted preferentially in hardwoods, they foraged in or near pine-dominated stands more often than hardwood-dominated stands and in burned habitats more than unburned habitats. They argued that the lower subcanopy clutter observed in both pine stands and burned habitats were preferred for foraging. In a large majority of NLEB telemetry studies, roost tree species reported were hardwoods. Of 1443 total roost trees described in 30 studies across the species' range (Sasse 1995, Foster and Kurta 1999, Cryan et al. 2001, Lacki and Schwierjohann 2001, Schultes 2002, Scott 2007, Swier 2003, Broders and Forbes 2004, Jackson 2004, Carter and Feldhamer 2005,

Ford et al. 2006, Bales 2007, Henderson 2007, Perry and Thill 2007, Winhold 2007, Garroway and Broders 2008, Dickinson et al. 2009, Johnson et al. 2009, Lacki et al. 2009, Krynak 2010, Timpone et al. 2010, Olson 2011, Silvis et al. 2012, Sinander 2012, Park and Broders 2012, Bohrman and Fecske 2013, Brown 2013, Lereculeur 2013, Badin 2014, George and Kurta 2014), 1185 (84.6%) were reported as deciduous, and 882/1005 (87.8%) of total female NLEB roosts were deciduous. Broders and Forbes (2004) reported that female NLEB roosts in New Brunswick were 24 times more likely to be shade-tolerant, deciduous trees than conifers. In Newfoundland, even though approximately 83% of forests are dominated by coniferous species, female NLEB were tracked to nearly the same number of deciduous as coniferous roosts (Park and Broders 2012). However, these pooled data were skewed toward the preferences of reproductive female bats (which were targeted by most of the telemetry studies), and it appears that solitary male NLEB may use coniferous roosts to a greater extent (Broders and Forbes 2004, Jung et al. 2004, Henderson et al. 2008, Lausen 2009).

Direct and Indirect Effects

Trees potentially containing NLEB may be burned or felled as part of the preparation (fire line creation and maintenance) or burning process resulting in a direct effect on the bats. Areas may be treated at any time in the spring, summer, and fall when NLEBs may be present. When conducted in the summer occupancy period, particularly the non-volant period, some pups might not be capable of flight or have enough experience to safely relocate from fire related dangers.

Fire line creation or maintenance may include felling and cutting of standing woody materials greater than 3 inches. Burning during this period may also directly affect NLEBs primarily due to smoke, heat and possible flame length. Some bats may remain in the trees and may potentially be injured or killed. Additionally bats may leave a roost tree prior to the area being burned due to the noise, vibration and disturbance from chainsaws or other equipment. If bats are present in stands adjacent to an area being burned, those bats may be disturbed by the activity though the risk would be varied by factors such as wind direction and speed. Bats may also avoid the burned area for a short period after the burn, causing them to relocate to other suitable areas. Temporary relocation is not considered harmful because suitable habitat is not a limiting factor.

To meet the low to moderate intensity objectives within a prescribed burn prescription, burn plans only allow burning when weather and vegetation conditions are favorable. Conservation measures from the NLEB Interim Conference and Planning Guidance (D-5) states “direct effects to NLEB are minimized when prescribed burns are of low/moderate intensity during the summer maternity season” (USFWS 2014).

If a roost tree is rendered unusable by burning, it could cause a local loss of roosting habitat. The roost tree would no longer be available to NLEBs and cause the bats that were occupying it to find an alternate roost tree. Depending on the location and quantity of roost trees rendered unusable, the social structure of the NLEBs may also change. Additionally, if the burn area is large enough it could cause a temporary change in home range. Using simulations, researchers found that NLEB colony social structure is robust to fragmentation from small, random loss of roosts, suggesting >20% roost trees could be removed before network breakdowns occurred (Silvis et al. 2014). Loss of roost trees is unlikely though given the low intensity of the fire. The intended action is to remove low level vegetation, not large structures like roost trees.

In the long term, burning in hardwood stands with low to moderate intensity fire may benefit the NLEB by making the stands less dense and improving stand structure for foraging (Humes et al. 1999, Menzel et al. 2002, Erikson and West 2003, Owen et al. 2003). Stand structure may be more conducive to NLEB foraging because of an expected increase in vegetative diversity that may improve insect diversity and abundance (Lacki et al. 2009). Burning may thin portions of hardwood stands, promoting larger trees, reducing stem density, and increasing solar exposure for potential roost trees. Some trees may be killed or damaged by fire; the exfoliating bark, crevices, cavity, or cracks in the damaged or dead trees could provide new roosting habitat. Lacki et al. (2009) reported a higher number of NLEB roosts in burned habitats in Kentucky (74.3%) after fires than in unburned habitats (25.7%). Similarly, Johnson et al. (2009) found that NLEB were more likely to establish maternity colonies in stands with a higher percentage of fire-killed stems than random trees, corresponding with their observation that suitable roosts were disproportionately higher in fire-treated areas.

Determination

Low to moderate intensity prescribed burning projects in hardwood forest without design criteria are likely to adversely affect the NLEB because of potential adverse impacts to individuals, especially non-volant bats, due to injury and death from smoke, heat, flame length, and felling roost trees, and harassment due to social structure changes and roost tree impacts. Actions that are able to incorporate the design criteria are not likely to adversely affect the NLEB because activities would occur outside the non-volant period.

Actions Likely To Adversely Affect the NLEB (HWDLMB-LAA) (No design criteria)
Approximately 20 acres are planned for treatment on the Ottawa National Forest.

Conifer - Timber Harvest / Non-commercial felling / TSI

Description of Action

The actions that will be analyzed in this section include all commercial timber harvest, non-commercial tree felling, and timber stand improvement activities (TSI) that will occur in coniferous forest types. This action also includes the construction of temporary roads and landings for the removal of timber products. These actions are described in more detail in Appendix A. Approximately 41,511 acres of coniferous forests are planned to be harvested or felled on the Ottawa National Forest.

Commercial timber harvest in the coniferous forest type includes all tree felling activities conducted on National Forest System lands by a contractor, where trees are felled and removed. A number of silvicultural techniques may be used including clearcutting, thinning, shelterwood and seed tree harvest. These techniques are used most often to regenerate or manage a stand that will remain forested over the long term. Sometimes coniferous timber harvest is used to create openings, barrens and fuelbreaks, roads, or other permanent openings.

Non-commercial felling is occasionally used to accomplish the same vegetation management objectives described above without commercial harvest. Trees are felled non-commercially to meet specific forestry, wildlife habitat, or other resource management objectives.

Timber Stand Improvement (TSI) activities typically include forest management practices that improve the vigor, stocking, composition, productivity, and quality of forest stands. The improvement usually results from removing poor quality trees and allowing crop trees to fully use the growing space.

To minimize effects to NLEB, the ONF has developed the following design criteria to be incorporated into projects as feasible and prudent:

- Conduct felling outside of the non-volant period.

- Reserve snags and den trees according to Forest Plan guidelines; focus on retaining trees with features beneficial to the NLEB.

Environmental Baseline

Timber harvest, non-commercial cutting, and timber stand improvement activities in coniferous forest are ongoing activities on National Forest System lands with the objective of supplying timber products, enhancing wildlife habitat, reducing fire risk and meeting other objectives in Ottawa National Forest' Land and Resource Management Plan (USDA Forest Service, 2006).

In a study of red pine plantations on the Manistee National Forest in Michigan, found that "red pine plantations, even after thinning, most likely are too structurally complex and have low insect abundance, making them a largely unsuitable habitat for bats." However, Lacki et al. 2009 reported that although NLEBs in Kentucky roosted preferentially in hardwoods, they foraged in or near pine-dominated stands more often than hardwood-dominated stands. Tibbels and Kurta (2003) believe that the lower vegetative clutter observed in pine stands improved foraging. Additionally, they suggested that coniferous habitats are likely to provide poor habitat for many species of bats. In their study, they found that the majority of bat activity was in openings within red pine plantations. Given the availability of deciduous trees in the Action Area that more commonly provide the structural features used by roosting NLEB, in particular maternity colonies, the likelihood of this species roosting in coniferous stands in the Action Area is relatively low.

A majority of NLEB roosts reported are deciduous (e.g., Mumford and Cope 1964, Sasse Thesis 1995, Foster and Kurta 1999, Lacki and Schwierjohann 2001, Schultes Thesis 2002, Broders and Forbes 2004, Jackson Thesis 2004, Carter and Feldhamer 2005, Ford et al. 2006, Bales Thesis 2007, Winhold Thesis 2007, Garroway and Broders 2008, Kurta 2008, Dickinson et al. 2009, Johnson et al. 2009, Lacki et al. 2009, Krynak Thesis 2010, Timpone et al. 2010, Silvis et al. 2012, Sinander 2012, Bohrman and Fecske 2013, Brown 2013, Lereculeur Thesis 2013, Badin Thesis 2014). Broders and Forbes (2004) reported that female NLEB roosts in New Brunswick were 24 times more likely to be shade-tolerant, deciduous trees than conifers. In Newfoundland, even though approximately 83% of forests are dominated by coniferous species, female NLEB were tracked to nearly the same number of deciduous as coniferous roosts (Park and Broders 2012). In contrast, several studies reporting male NLEB roosts documented a preference for conifers (Broders and Forbes 2004, Perry and Thill 2007, Jung et al. 2004). These data suggest that hardwood trees most often provide the structural and microclimate conditions preferred by maternity colonies and groups of females, which have more specific roosting needs than solitary

males (Perry and Thill 2007), although softwood snags may occasionally offer more suitable roosting habitat for both sexes than hardwoods (e.g., Perry and Thill 2008, Cryan et al. 2001).

Of the few NLEB telemetry studies in which conifers represented a large proportion of roosts, most were reported as snags (Cryan et al. 2001, Jung at al. 2004, Perry and Thill 2007, Park and Broders 2012, Yates et al. 2012) with bark remaining.

Direct and Indirect Effects

Even though the probability is very small, northern long-eared bats could occur in coniferous stands outside the hibernation period. Therefore, a remote possibility exists that felling trees in coniferous stands by timber harvest, non-commercial cutting and timber stand improvement may have a direct effect on individual NLEBs. If NLEBs are present, felling trees may affect individual northern long-eared bats because of the possibility of a tree containing roosting bats. Although bats may leave the roost tree prior to it being felled due to the noise, vibration and disturbance from chainsaws or other equipment, some bats may remain in the tree and may be injured or killed when the tree strikes the ground or is mechanically processed. If bats are present in trees adjacent to the tree being felled, these bats may be disturbed by the activity, or they may be injured or killed if the roost tree is struck by the tree being felled. The design criteria for retention of snags and den trees offer additional protection because many potential roost trees would be protected from cutting.

Potential adverse effects are reduced during the spring staging and fall swarming periods. During spring staging, most bats would be expected to be staging near their hibernaculum or migrating to their summer range and during swarming, most NLEBs would be expected to be migrating to or swarming near their hibernaculum.

Felling a roost tree any time of year may have an indirect effect on NLEB due to the local loss of roosting habitat. If a roost tree is felled any time of year, it would no longer be available and cause the bats that were occupying it to find an alternate roost tree. Depending on the location of the tree, the social structure of the NLEBs may also change, however those effects are likely to be insignificant due to the small number of hazard trees removed in relation to the total number of roost trees that would remain available in the immediate project area. Silvis et. al. (2014) found that colony social structure is robust to fragmentation caused by random loss of small numbers of roosts.

In the short term, coniferous stands that are clearcut or have other types of regeneration treatments could have a minor indirect effect on NLEBs because of changes in forest structure. These stands would transition from poorly suited NLEB habitat to unsuitable habitat. In the long term, the coniferous stands that are clearcut would be regenerated and would mature in approximately 60 years. These stands would transition back from unsuitable habitat to poorly suited NLEB habitat and could offer some foraging or roosting habitat for the NLEB. Although retained snags would not last 60 years, retained live den trees could provide habitat over the long term.

Some areas of hardwood timber harvest used to create openings, barrens, fuelbreaks, roads or other permanent openings would not be reforested. These actions could result in a minor loss of roosting and foraging habitat over the long term. The impact depends on the size and density of

the trees removed, and size and shape of the permanent openings created. Areas where the trees are large (> 3" dbh) and not densely stocked could be roosting and foraging habitat for NLEBs; hardwood timber harvest in these areas may result in habitat loss. Harvest that creates large or wide openings could result in a loss of foraging habitat for NLEBs, while harvest that creates small or narrow openings could provide foraging habitat.

In the short term, thinning coniferous stands could improve NLEB habitat by making the stands less dense, improving forest structure for foraging. Retained snags and den trees could provide roosting habitat. In the long term, thinning coniferous stand would promote larger trees and an increase in vegetative diversity. This could have beneficial effects on northern long-eared bat habitat because the stand structure would be more conducive to NLEB foraging and the increase in vegetative diversity may improve insect diversity and abundance. Retained snag would not likely provide habitat in the long term because they would likely fall within 10 years of harvest. Live den trees could provide habitat in the long term.

Determination

Timber harvest, non-commercial cutting, and timber stand improvement activities in coniferous forest with no design criteria are likely to adversely affect the northern long-eared bat due to killing or injuring bats roosting in trees while being felled. Actions that are able to incorporate the design criteria are not likely to adversely affect the NLEB because activities would occur outside the non-volant period.

Actions Likely To Adversely Affect the NLEB (CONCUT-LAA) (No design criteria)
Approximately 41,511 acres are planned for treatment on the Ottawa National Forest.

Conifer – Low/Moderate Intensity Prescribed Burning

Description of Action

The action that will be analyzed in this section include all low to moderate intensity prescribed burning that will occur in coniferous forest types. These actions are described in more detail in Appendix A. Approximately 470 acres of coniferous forests are planned for low to moderate intensity prescribed burning on the Ottawa National Forest.

Low to moderate intensity prescribed burning includes all prescribed burning activities conducted on National Forest System lands, where the flame lengths are generally 2 to 4 feet, and no greater than 6 feet. Low to moderate intensity prescribed burns are typically intended to consume ground level litter and vegetation, and usually have little to no impact on overstory trees. These burns often occur in red pine plantations with the objective of reducing fuel loading and improving habitat for wildlife.

To minimize effects to NLEB, the ONF has developed the following design criteria to be incorporated into projects as feasible and prudent:

- Conduct burning outside of the non-volant period.

Environmental Baseline

Low to moderate intensity burning projects in coniferous forest occurs on National Forest System (NFS) lands with the objective of reducing fire risks, enhancing wildlife habitat, and meeting other objectives in Ottawa National Forest' Land and Resource Management Plan (USDA Forest Service, 2006).

In a study of red pine plantations on the Manistee National Forest in Michigan, Tibbels and Kurta (2003) found that "red pine plantations, even after thinning, most likely are too structurally complex and have low insect abundance, making them a largely unsuitable habitat for bats." Additionally, they suggested that coniferous habitats are likely to provide poor habitat for many species of bats. In their study, they found that the majority of bat activity was in openings within red pine plantations. Given the availability of deciduous trees in the Action Area that more commonly provide the structural features used by roosting NLEB, in particular maternity colonies, the likelihood of this species roosting in coniferous stands in the Action Area is relatively low.

The literature suggests that coniferous trees (especially live, healthy ones) are rarely used as roosts by female NLEBs, with solitary male NLEB using them a greater extent (Broders and Forbes 2004, Jung et al. 2004, Henderson et al. 2008, Lausen 2009). Lacki et al. 2009 reported that although NLEB in Kentucky roosted preferentially in hardwoods, they foraged in or near pine-dominated stands more often than hardwood-dominated stands and in burned habitats more than unburned habitats. They argued that the lower sub-canopy clutter observed in both pine stands and burned habitats were preferred for foraging.

A summary of NLEB roost trees (USFWS unpublished) shows a range of roost heights from 5 to 16 meters, well above the height of flames of a low to moderate intensity prescribed burn.

NLEB use of immature and mature jack pine is likely limited due to the high stem density and lack of flight corridors. Sheets et al. 2013 noted, forest stands that are "solid walls" of vegetation provide little usable habitat for the northern myotis. This is especially true for stands that have been planted for Kirtland's warbler breeding habitat (Philip Huber, prof. opinion).

Direct and Indirect Effects

Even though the probability is very small due to coniferous forest being poor habitat for northern long-eared bats, NLEBs could potentially occur in coniferous stands outside the hibernation period. A remote possibility exists that low to moderate intensity prescribed burning in coniferous stands during this period may have a direct effect on individual NLEBs.

If NLEBs are present, burning may affect individual northern long-eared bats because of the possibility of a tree within the burn area containing roosting bats. During the non-volant period, pups may not be able to leave a roost tree if heat and smoke from a burn are not tolerable. These individuals may be injured or killed. The risk to NLEBs is reduced substantially by design criterion that does not permit burning when pups are non-volant. Low to moderate intensity burning would only occur when all NLEBs are able to leave their roost trees if heat and smoke from a burn are not tolerable. According to Dickinson, et al. 2009, radio-tracked bats (NLEB) were observed leaving their respective roosts well before harm from heat or smoke affected

them. Most NLEBs utilized the prescribed burn as a foraging opportunity; gleaning insects forced up and out of the burn area from the heat and smoke plume. Furthermore, most bats in the study were found to utilize live oaks for roosting, versus dead snags that could catch fire and burn during the prescribed burn process.

To meet the low to moderate intensity objectives within a prescribed burn prescription, burn plans only allow burning when weather and vegetation conditions are favorable. Conservation measures from the NLEB Interim Conference and Planning Guidance (D-5) states "direct effects to NLEB are minimized when prescribed burns are of low/moderate intensity during the summer maternity season" (USFWS 2014).

If a roost tree is rendered unusable by burning, it could cause a local loss of roosting habitat. The roost tree would no longer be available to NLEBs and cause the bats that were occupying it to find an alternate roost tree. Depending on the location of the tree and quantity of trees rendered unusable, the social structure of the NLEBs may also change. However those effects are likely to be insignificant due to the small number of trees affected in relation to the total number of roost trees that would remain available in the immediate project area. Silvis et. al. (2014) found that colony social structure is robust to fragmentation caused by random loss of small numbers of roosts.

In the long term, burning in coniferous stands with low to moderate intensity fire may benefit the northern long-eared bat by making the stands less dense and improving stand structure for foraging. Burning may thin portions of coniferous stands, promoting larger trees, reducing stem density, and increasing solar exposure for potential roost trees. Stand structure may be more conducive to NLEB foraging because of an expected increase in vegetative diversity that may improve insect diversity and abundance. Some trees may be killed or damaged by fire; the exfoliating bark, crevices, cavity, or cracks in the damaged or dead trees could provide new roosting habitat. Of the few NLEB telemetry studies in which conifers represented a large proportion of roosts, most were reported as snags (Cryan et al. 2001, Jung at al. 2004, Perry and Thill 2007, Park and Broders 2012, Yates et al. 2012). Therefore, increasing the number of dead or dying trees in a coniferous stand is likely to enhance habitat for NLEBs.

Determination

Low to moderate intensity prescribed burning projects in coniferous forest without design criteria are likely to adversely affect the northern long-eared bat because of the possibility roosting bats may be injured or killed during prescribed burn activities. Actions that are able to incorporate the design criteria are not likely to adversely affect the NLEB because 1) coniferous stands are poor habitat for NLEBs, and NLEBs are not likely to be present, 2) burning would not be conducted when the pups are non-volant, and 3) if NLEBs were present, they are likely to leave their roosts well before harm from heat or smoke affected them.

Actions Likely to Adversely Affect the NLEB (CONLMB-NLAA) (No design criteria)
Approximately 470 acres are planned for treatment on the Ottawa National Forest.

Openings (I.E. Barrens, Savannahs) and Fuel Breaks Where Trees Greater Than or Equal to 3" Dbh and In Areas with Trees Less Than 3"Dbh Will Be Mowed, Felled or Burned

Description of Action

The actions analyzed in this section include implementing prescribed fire operations and using mechanical and hand tools to burn, mow and fell vegetation in openings. Openings will be maintained to provide a diverse array of vegetative cover types from grass-herbaceous to shrub-brush land to barrens. A variety of methods could be used to stimulate native vegetation growth, release nutrients to the soil, and maintain areas in the desired conditions. The openings are divided into those with trees greater than or equal to 3" diameter breast high (dbh) and those with trees less than 3" dbh. The actions are described in Appendix A. An estimated 1,011 acres of openings are planned for maintenance activities on the Ottawa National Forest.

Pine barren, savanna, openings and upland openland are interchangeable terms used to describe complexes characterized by herbaceous and shrub cover, with scattered live and dead trees. Maintenance is directed towards fuels management and restoration of habitat. Since the areas are non-forested, very little large material or coarse woody debris is present. Large wood that is present will be left on site to decompose into the soil.

Management techniques will include activities such as:

- Prescribed fire
- Mechanical maintenance (brush hog, roller-chop, disc, etc.)
- Hand tool use, such as axe, brush-saw and chainsaw or axe
- Site preparation and planting of native grasses, forbs and seedlings

A small tractor or other vehicle with rubber tires might be used to pull mechanical implements, such as a brush mower, seed drill, or seed harvester. Periodically, a larger machine might be used to operate a rotating drum cutter, or plow. Project areas will be accessed from the existing transportation system in the area. Therefore, no new road construction or reconstruction will occur.

To minimize effects to NLEB, the ONF has developed the following design criteria to be incorporated into projects as feasible and prudent:

- Conduct mechanical maintenance outside the non-volant period, reserving snags and den trees according to Forest Plan guidelines where possible. Retain trees with features beneficial to the NLEB.
- Conduct burns outside of the non-volant period. Retain burning snags by extinguishing the fire, rather than by felling.

Environmental Baseline

Maintenance occurs on Michigan National Forests with the objective of maintaining openings that will provide wildlife habitat and function as fuel breaks. Since fire frequency and extent have been reduced over time, active management is needed to restore fire-ecosystem components and maintain species viability. Openings provide important breeding and foraging habitat for many animal species, including the Kirtland's warbler, Karner blue butterfly, sharp-tailed grouse, sandhill crane, upland sandpiper, eastern bluebird, black-backed woodpecker, eastern wild turkey, and others. Openings could constitute suitable habitat for NLEB. Individual trees, equal to and greater than 3" dbh, may be considered habitat when they exhibit characteristics of roost trees and are within 1000 feet of forested or wooded habitat (FWS 2014, Interim NLEB Guidance). Bats have been documented to follow linear features on the landscape, such as an edge between forest and openings. The features of this interface may increase commuting and foraging opportunities, and afford greater protection from predators than crossing an open area (Erickson and West 2003).

Direct and Indirect Effects

In openings and fuel breaks, consisting of shrubs and trees less than 3" dbh and herbaceous cover, there would be minimal direct and indirect effects, since these areas are not considered to be roosting, maternity or winter habitat. However, they could function as foraging habitat, especially areas adjacent to forest boundaries. Mechanical maintenance, such as use of a mower or brush hog would have transient effects from noise and movements that may disturb bats roosting in nearby wooded edge or briefly affect insect availability. However, these effects are expected to be minimal and very short-term in duration to the point of not being measurable. Likewise for prescribed burning in areas devoid of snags and live trees greater than or equal to 3" dbh. Smoke, radiant heat and convective heat might briefly disturb bats in adjacent wooded habitat and temporarily decrease insect abundance and alter foraging opportunities. However, the effects would be limited in area and duration.

In openings where trees greater than or equal to 3" dbh are present, conducting mechanical maintenance and burning outside of the non-volant period would limit impacts, since all bats would likely vacate roosting areas before individuals might be injured or killed from smoke, heat or mechanized operations. By reserving snags and den trees according to Forest Plan guidelines, and protecting trees with features beneficial to the NLEB, habitat would be retained in the area for future roosting and maternity use. Retaining snags that catch fire, by extinguishing the flames, rather than felling, would preserve the location for roosting and maternity purposes. These actions would reduce the duration of impacts to the short time period of the burn. Any risk of injury or mortality to individual NLEBs is expected to be very low and discountable. Not implementing design criteria where trees and snags greater than or equal to 3" are present would increase both the risk of injury and mortality to individuals, especially non-volant bats in the immediate project area. Bats without flight capabilities could be injured or killed if maternity trees were burned, inundated with smoke or struck with heavy equipment. Roosting bats could also be affected if suitable trees are rendered unusable by burning or felled by mechanical equipment. The roost trees would no longer be available to NLEBs. Consequently, individual bats would be displaced and forced to find alternate roost trees. However, the magnitude of risks for all of the effects would be small in scale in any given year relative to the total habitat available for NLEB as foraging, roosting and maternity habitat.

Overall, adverse impacts caused by implementing mechanical treatments and prescribed burning would be small in scale and temporary. The beneficial impacts from maintaining openings across the forest system lands could be long-term. It is expected that maintaining openings will augment insect numbers and insect diversity which could lead to increases in NLEB fitness and greater productivity.

Determination

Implementing mechanical maintenance and burning where trees or snags greater than or equal to 3" dbh are present, incorporating no temporal design criteria, is likely to adversely affect the NLEB because of potential adverse impacts to individuals due to injury and death from felling trees, and heat and fire from burning vegetation. Implementing mechanical maintenance and burning where trees greater than or equal to 3" are present is not likely to adversely affect the NLEB if working outside of the non-volant period, extinguishing rather than felling snags, reserving snags and den trees according to Forest Plan guidelines, and retaining trees with features beneficial to the species. This is because the risk of injury or mortality to individual NLEBs is expected to be very low and discountable.

Implementing mechanical maintenance and burning where trees and snags less than 3" dbh are present, using no temporal design criteria, is not likely to adversely affect the NLEB. This is because NLEBs are not likely to be present in the described areas.

Actions Likely to Adversely Affect the NLEB (OPNMM-LAA) (No design criteria)
Approximately 786 acres are planned for treatment on the Ottawa National Forest.

Actions Not Likely to Adversely Affect the NLEB (OPNMM-NLAA, OPNBRN-NLAA)
Approximately 225 acres are planned for treatment on the Ottawa National Forest.

Site Preparation (including mechanical tree planting, roller chopping, chaining, trenching, scalping, raking, and other activities)

Description of Action

The actions that will be analyzed in this section include all site preparation activities including, but not limited to mechanical tree planting, roller chopping, chaining, trenching, scalping and raking. These actions are described in more detail in Appendix A. An estimated 394 acres of site preparation activities are planned to be implemented on the Ottawa National Forest.

Site preparation is the act of preparing an area for artificial or natural regeneration of trees. Site preparation can also be used to reduce competition from undesirable vegetation to increase the survival and growth rate of the desired trees, treat slash and logging debris if the site has been harvested, and to prepare or modify the soil.

A variety of site preparation methods are employed on the Ottawa National Forest. Mechanical tree planting is typically accomplished with a bulldozer pulling a planting machine. Roller chopping is usually accomplished with a bulldozer or skidder pulling a roller chopper, a large drum with blades to chop up slash and other remaining vegetation. Chaining is typically accomplished by pulling large anchor chains behind a piece of equipment to scarify the ground,

and is often accomplished with roller chopping. Trenching creates furrows in the ground to expose mineral soil for the planting of trees. Trenching is usually accomplished with a skidder or bulldozer pulling a trencher. Scalping creates patches of bare ground, exposing mineral soil for tree planting. Scalping is usually accomplished with a skidder or bulldozer pulling a Bracke scarifier or a mounder. Raking usually is the piling of brush with a rake mounted on the front of a bulldozer. Sometimes a rake is used to scarify the soil, or remove roots and stumps.

Environmental Baseline

Site preparation activities are ongoing actions on National Forest System lands, typically with the objective of regenerating harvested sites by planting trees, or preparing harvested sites for natural regeneration or planting. Most of these actions (~90%) occur after coniferous stands have been harvested, but may occasionally occur in hardwood stands. Most often, these stands have been clearcut, but have live reserve trees or areas, and standing dead snags.

Since the northern long-eared bat is a forest dwelling bat, the likelihood of individuals being present in these treatment areas is extremely low because the areas are typically large openings (>16 ha; 40 ac), with scattered live and dead trees. In addition, work specifications typically state that live reserve trees/areas and standing dead trees are to be avoided. However, the possibility exists that a few trees within a site preparation area may be knocked down by site preparation equipment. These trees are almost always dead conifer snags. No live hardwood trees would likely be impacted by these activities because the equipment would be damaged if these trees were struck.

In addition, Tibbels and Kurta (2003) suggested that coniferous habitats are likely to provide poor habitat for many species of bats, and therefore the likelihood of individuals being present in these treatment areas in coniferous forest types is further reduced.

A majority of NLEB roosts reported are deciduous (e.g., Mumford and Cope 1964, Sasse Thesis 1995, Foster and Kurta 1999, Lacki and Schwierjohann 2001, Schultes Thesis 2002, Broders and Forbes 2004, Jackson Thesis 2004, Carter and Feldhamer 2005, Ford et al. 2006, Bales Thesis 2007, Winhold Thesis 2007, Garroway and Broders 2008, Kurta 2008, Dickinson et al. 2009, Johnson et al. 2009, Lacki et al. 2009, Krynak Thesis 2010, Timpone et al. 2010, Silvis et al. 2012, Sinander 2012, Bohrman and Fecske 2013, Brown 2013, Lereculeur Thesis 2013, Badin Thesis 2014). Broders and Forbes (2004) reported that female NLEB roosts in New Brunswick were 24 times more likely to be shade-tolerant, deciduous trees than conifers. In Newfoundland, even though approximately 83% of forests are dominated by coniferous species, female NLEB were tracked to nearly the same number of deciduous as coniferous roosts (Park and Broders 2012). In contrast, several studies reporting male NLEB roosts documented a preference for conifers (Broders and Forbes 2004, Perry and Thill 2007, Jung et al. 2004). These data suggest that hardwood trees most often provide the structural and microclimate conditions preferred by maternity colonies and groups of females, which have more specific roosting needs than solitary males (Perry and Thill 2007), although softwood snags may occasionally offer more suitable roosting habitat for both sexes than hardwoods (e.g., Perry and Thill 2008, Cryan et al. 2001).

Direct and Indirect Effects

Northern long-eared bats could potentially occur in site preparation areas during the spring staging, summer occupancy, and fall swarming periods. However, the probability of northern long-eared bats being impacted by site preparation activities is extremely small. NLEBs would not likely be roosting in areas where site preparation activities occur because:

- Site preparation areas are usually open and not forested and do not typically provide NLEB roosting habitat,

- Live hardwood trees within the openings that could be potential roosts for NLEBs are not likely to impacted by the activities because the equipment would be damaged if these trees were struck, and,

- Work specifications usually state that dead coniferous trees that could serve as NLEB roost trees are to be avoided.

Nevertheless, a small probability exists that NLEBs could occur in live or dead trees with holes, cracks or loose bark within or near areas of high canopy closure. Therefore, a remote possibility exists that site preparation activities during these periods could have a direct effect on individual NLEBs. If NLEBs are present in a site preparation area, a remote possibility exists that a tree containing roosting bats may be knocked down by equipment. Although bats may leave the roost tree prior to it being knocked down due to the noise, vibration and disturbance from chainsaws or other equipment, some bats may remain in the tree and may be injured or killed when the tree strikes the ground or is mechanically processed. If bats are present in trees adjacent to the tree being felled, these bats may be disturbed by the activity, or they may be injured or killed if the roost tree is struck by the tree being felled. However, the avoidance of snags and other live trees offers a substantial degree of protection for NLEBs because almost all potential roost trees would be protected.

If a roost tree is knocked down any time of year, it may have an indirect effect on NLEB due to the local loss of roosting habitat. If a roost tree is felled any time of year, it would no longer be available and cause the bats that were occupying it to find an alternate roost tree. Depending on the location of the tree, the social structure of the NLEBs may also change, however those effects are likely to be insignificant due to the small number of hazard trees removed in relation to the total number of roost trees that would remain available in the immediate project area. Silvis et. al. (2014) found that colony social structure is robust to fragmentation caused by random loss of small numbers of roosts.

In the short term, stands that have had site preparation activities could have a minor indirect effect on NLEBs because of changes in forest structure. If a stand is habitat for NLEBs, some site preparation activities may improve foraging conditions. However, it is likely that these stands would transition from suited NLEB habitat to unsuitable habitat because of the growth of young trees over time. In the long term, stands with site preparation treatments would likely regenerate and mature in 60 to 100 years. These stands would transition back from unsuitable habitat to poorly suited NLEB habitat and could offer some foraging or roosting habitat for the NLEB. Although retained snag would not last 60 years, retained live trees could provide roosting habitat over the long term. However, retaining snags would gradually create tree fall

gaps and woody debris, enhancing vertical complexity and offering increased solar radiation to certain standing trees. These are features thought to be important for forest-dwelling bats (Badin Thesis 2004, Kalcounis et al. 1999, López-González et al. 2014).

Determination

Site preparations activities are not likely to adversely affect the northern long-eared bat. The effects would be insignificant and discountable. Based on best judgment, a person would not: (1) be able to meaningfully measure, detect, or evaluate insignificant effects; or (2) expect discountable effects to occur. The effects would be insignificant and discountable because: 1) site preparation areas are usually open and not forested and do not typically provide NLEB roosting habitat, 2) live hardwood trees within the openings that could be potential roosts for NLEBs are not likely to impacted by the activities because the equipment would be damaged if these trees were struck, and 3) work specifications usually state that dead coniferous trees that could serve as NLEB roost trees are to be avoided.

Actions Not Likely to Adversely Affect the NLEB (SPREP-NLAA)
Approximately 394 acres are planned for treatment on the Ottawa National Forest.

Firewood Cutting

Description of Action

Firewood cutting is an ongoing activity on the ONF that typically results in the cutting of individual standing or down dead trees scattered across a very large landscape. The ONF intends to issue permits with the objective of supplying firewood to the public. The actions are described in more detail in Appendix A.

To minimize effects to NLEB, the ONF has developed the following design criteria to be incorporated into the firewood program as feasible and prudent:

- With each permit, the ONF would provide the permit holder with a handout to provide information on the NLEB and asks them to voluntarily take measures to help conserve the bat. Such measures would include asking the permit holder to refrain from felling standing dead trees during the non-volant period if possible.

- The handout would ask the permit holder to voluntarily create a noise/vibration disturbance, providing bats a modest amount of time to rise and exit the roost that before cutting standing dead trees. The permit holder would be asked to voluntarily report back on any bat activity observed.

- Forest Protection Officers or other Forest Service employees that encounter firewood cutters in the field will attempt to collect information on when, where, how much, and what kind of timber was gathered. This data may provide information for future discussions and help determine the impact of firewood cutting on NLEBs.

Environmental Baseline

Permits

Firewood permits are issued starting January 1 each year. Permit holders are allowed to cut five standard cords (4 CCF [CCF=100 cubic feet]) per permit within areas open to firewood cutting. Permits are valid from January 1 to December 31 of each year or when the early maximum of 4 CCF (100 ft^3) is achieved, whichever comes first.

Regulations

On the Ottawa National Forest, firewood cutting regulations are as follows:

- Cutting and gathering is prohibited in designated wilderness, Forest Service administrative sites, developed recreation sites and research natural areas.
- No firewood shall be gathered from active timber sale areas without prior specific written permission from the timber sale purchaser.
- The use of tractors, rubber-tired skidders and similar vehicles is not allowed. On timber sales where the purchaser gives permission in writing these vehicles are allowed.
- No cutting or gathering of dead and/or down wood is permitted within 200 feet of any lake, pond, stream or river
- Live trees may NOT be cut.
- All dead and down trees may be gathered.
- Standing dead trees may be cut only if they are within 100 feet of open Forest Service roads, if they are less than 15" diameter at breast height.
- Trees marked with paint, tags or signs may not be cut.

Area Open to Firewood Cutting

Appendix A indicates approximately 393 permits may be issued each year. This quantity of permits, at the maximum quantity allowed, would equate to approximately 98 acres / year (393 permits * 0.25 acres/permit). A total of 196 acres of firewood cutting is expected to occur during the 2015 and 2016 firewood seasons.

Direct and Indirect Effects

During the Spring Staging, Summer Occupancy, and Swarming Periods, northern long-eared bats could occur in areas that are open for firewood cutting.

Permit holders could potentially fell standing dead trees that are roosts, injuring or killing roosting NLEBs. If a permit holder fells a tree that is a roost, the roosting bats may leave the tree prior to it being felled due to the noise, vibration and disturbance from chainsaws or other equipment. However, some bats may remain in the tree and may be injured or killed when the tree strikes the ground or is processed further. The potential for individuals to be injured or killed is even greater during the non-volant period (June 15 to August 1) because the non-volant pups would be unable to leave the roost tree. NLEBs present in trees adjacent to the tree being felled may be disturbed by the activity; however, these bats would not likely be injured or killed, unless an adjacent tree is struck by the tree being felled.

The probability of NLEBs being directly impacted by firewood cutting is reduced by the following factors:

- Standing dead trees may be cut only if they are within 100 feet of a legal public road. Standing dead trees beyond 100 feet are protected from felling. These trees could constitute alternate roosts should a roost tree be felled by a permit holder.

- Beyond 100 feet of a road only dead and down wood may be gathered and processed. The dead and down wood is not suitable habitat for the NLEB.

- Standing dead trees targeted by firewood gatherers are less likely to be roost trees than dead trees outside of open firewood areas. This is because standing dead trees within the 100-foot zone are usually cut quickly after they die. Thus, they could be less likely to develop structural components (sloughing bark, cavities, etc.) that would attract NLEBs.

- Relative to the total acres available within the 100-foot zone along roads calculated at approximately 64,302, the actual acreage affected by an annual permit program of 421 permits would be small.

- The use of equipment (e.g., tractors, ATV/OHV, or any vehicle) to move firewood out to a road is prohibited outside of active timber sales. This will reduce disturbance in the area and decrease the chances for non-target live and non-target standing dead trees, both potential roosting habitat, to be struck.

- Permit holders would be asked to voluntarily refrain from actions that could cause harm to NLEBs.

From a habitat perspective, firewood cutting in hardwoods likely reduces the number of potential roost trees for NLEBs. However, the effects are judged to be minimal for the reasons stated above.

Determination

Issuing firewood permits and permitting the cutting of firewood is likely to adversely affect the northern long-eared bat due to the potential for injury or death of individuals. Individual NLEBs may be injured or killed by the felling standing dead trees that are roosts.

Actions Likely To Adversely Affect the NLEB (FIREWD-LAA)
Approximately 196 acres (98 acres per year) of firewood cutting are anticipated to be cut on the Ottawa National Forest.

This opinion is for the 2015 and 2016 firewood permit periods (April 1 to March 31 each year). If new information about the effects of firewood cutting becomes available that indicates the NLEB or its habitat may be affected in a manner or extent not previously considered, the ONF will reinitiate consultation.

Holiday Tree Harvest

Description of Action

The actions analyzed in this section include implementing a holiday tree harvest program. A permit is required to participate and a fee is charged. By permit conditions, live trees must be less than 25 feet tall and topping of large trees is not permitted. Pine species are not allowed to be harvested. No harvest is permitted in Wilderness areas. The actions are described in Appendix A. An estimated 85 holiday trees are harvested in November and December on the Ottawa National Forest.

Environmental Baseline

Harvesting holiday or Christmas trees is an ongoing activity on National Forest System lands. The activity is intended to engage with the public in an outdoor recreation setting to provide an opportunity to harvest a tree at a nominal cost. The activity is usually very limited in area and extent. For example, on the Ottawa National Forest 308 permits were issued between 2010 and 2014. The period for issuing permits is November and December. Therefore, the trees are being felled outside of the spring, summer and fall occupancy period for NLEB. By permit conditions, trees must be less than 25 feet tall. Topping of large trees is not permitted. NLEB roosts have been reported as average more than 20 feet in height with diameters, on average, greater than 12 inches dbh (Lacki et al. 2009). Thus, removing holiday trees is unlikely to impact suitable roosting habitat for NLEB. Across the species' range, NLEBs also show a general preference for dead/dying trees over live, healthy trees (e.g., Lacki et al. 2009), as well as a preference for hardwoods over conifers (e.g., Henderson and Broders 2008).

Direct and Indirect Effects

Tree harvest would occur outside of the summer occupancy period of May 15 – September 1. It would also occur outside of the fall swarming period, which ends on October 15. Therefore, no NLEB injury or mortality is expected to occur from the activity. The trees that are felled could be larger than 3 inches in diameter. Therefore, they could be suitable for NLEB roosting. However, the trees are unlikely to be sufficient height (greater than 20 feet) and diameter (greater

than 12 inches) observed as utilized roosting structure. Spruce and fir are also unlikely roost trees for NLEB. Thus, removal of the trees would have a negligible impact on future NLEB habitat.

Determination

Implementing a holiday tree harvest program is not likely to adversely affect the NLEB. This is because the activity will occur when the bats are not present in habitat. Trees that will be removed are very few in number, and are not recognized as the species or the height and diameter used as roosting habitat by NLEB.

Actions Not Likely To Adversely Affect the NLEB (HOLIDAYTREES-NLAA)
Approximately 85 trees are likely to be removed on the Ottawa National Forest.

Felling Hazard Trees

Description of Action

Felling hazard trees is an ongoing activity within recreation sites and other areas on National Forest System lands to reduce risk to users and enhance public safety. Trees that pose a serious risk to forest users are felled to reduce the risk to users, particularly in high use areas like campgrounds, picnic areas, parking lots and boat launches. Both live and dead trees are felled. The trees typically have a structural defect that increases the probability that they may fall on a forest user, causing injury or death. Forest Service sawyers or contractors will fall the trees to eliminate the hazard. An estimated 600 trees are felled, annually, on the ONF. The actions are described in more detail in Appendix A.

To minimize effects to NLEB, the ONF has developed the following design criteria to be incorporated into projects as feasible and prudent:

- Fell trees outside the non-volant period when possible. For additional protection, fell trees outside of the summer occupancy period when possible

Environmental Baseline

Hazard tree felling is usually limited to a small area like a trail, campground, picnic area or boat launch. Trees that are removed vary in diameter, ranging from several inches to 20 inches or more. They can consist of hardwood or conifers trees. Some of the trees might be used as roosting habitat for NLEBs. However, many of the trees will not be suitable habitat due to small size and lack of defoliating bark, crevices, cavities and other features attractive to NLEB.

Direct and Indirect Effects

Felling hazard trees may have an adverse effect on NLEB. Hazard trees typically have defects that may provide roosting habitat for the species. When possible, the ONF will attempt to fell hazard trees outside of the summer occupancy period to reduce the likelihood of impacts to the NLEB. If a hazard tree is a roost tree for NLEB, felling it outside the summer occupancy period would not result indirect effects on the bats because they would not likely be present. If it is not

possible to fell hazard trees outside of the summer occupancy period, the ONF will attempt to fell hazard trees outside of the non-volant period.

Occasionally, some trees may need to be felled during the non-volant or summer occupancy periods because the trees pose an imminent danger to the public. Felling hazard trees during this period may directly affect NLEBs because of the possibility of a hazard tree to contain roosting bats, especially if the tree is felled during the non-volant period. Although bats may leave the roost tree prior to it being felled due to the noise, vibration and disturbance from chainsaws or other equipment, some bats may remain in the tree and may be injured or killed when the tree strikes the ground. This risk is greatest for pups during the non-volant period. If bats are present in trees adjacent to the tree being felled, these bats may be disturbed by the activity, or they may be injured or killed if the roost tree is struck by the tree being felled.
Felling a roost tree may have an indirect effect on the NLEB due to the local loss of roosting habitat. If a roost tree is felled any time of year, it would no longer be available and cause the bats that were occupying it to find an alternate roost tree. Depending on the location of the tree, the social structure of the NLEBs may also change, however those effects are likely to be insignificant due to the small number of hazard trees removed in relation to the total number of roost trees that would remain available in the immediate project area. Silvis et. al. (2014) found that colony social structure is robust to fragmentation caused by random loss of small numbers of roosts.

Felling hazard trees causes a very small change in forest structure, and is therefore likely to have discountable effects on foraging habitat and prey abundance. The action may reduce the supply of locally available roost trees available in the short term. In the long term, the remaining trees will age and some of these trees will likely provide habitat for the NLEB.

Determination

Felling hazard trees is likely to adversely affect the NLEB because they may be injured or killed if they are roosting in hazard trees while it is being felled or if their roost tree is struck by the tree being felled.

Actions Likely To Adversely Affect the NLEB (HAZTREE-LAA)
Approximately 600 trees are anticipated to be removed on the Ottawa National Forest.

Roadside Brushing

Description of Action

Delimbing, brushing, or felling of trees, snags, and shrubs on National Forest System lands is conducted annually to set-back encroaching woody vegetation. The removal of vegetation aids in the daylighting of roads, improves visibility for vehicle operators, increases public safety by reducing hazard trees and limbs, reduces vehicle damage by overgrown vegetation, and allows for easier road maintenance.

Equipment used typically consists of tractor powered mowers, with hydraulically controlled decks. The decks can be adjusted so that mowing can be above the ground, or tilted perpendicular then raised up and down to shear limbs or stems. Some site-specific cutting may

also be done with chainsaws, shears, or line-fed mowers. Brushing/mowing occurs in road right-of-ways (up to 15 feet off the road), and may occur annually at some locations, or periodically (every few years) at others, depending on maintenance needs, funding, and/or scheduling. The vast majority of vegetation treated is in the form of shrubs and trees less than 3 inches in diameter. This repeated treatment inherently limits the amount of trees reaching the suitable habitat size of 3 inches. Tree removal and brushing activities will occur on an estimated 96 miles. Using a standard ROW width of 33 feet and 10 foot wide buffers as identified in Appendix A, approximately 340 acres of tree removal and brushing activities are expected to occur.

To minimize effects to NLEB, the ONF has developed the following design criteria to be incorporated into projects as feasible and prudent:

- Fell trees outside the non-volant period when possible. For additional protection, fell trees outside of the summer occupancy period when possible.

- Retain trees with features beneficial to NLEB.

Environmental Baseline

Locations may occur along any roadway and in any forest type. Although large highways or interstates may deter roosting bats, pose barriers to movements and restrict home ranges, there is a lack of evidence that minor roads and trails are avoided by NLEB. On the ONF, most forest roads are not considered large enough and/or contain enough traffic use to be considered a deterrent to the NLEB roosting. Numerous studies have reported high NLEB activity on or near minor roads (Krusic and Neefus 1996, Lacki and Schwierjohann 2001, Owen et al. 2003, Broders et al. 2006, Brooks 2009) suggesting they may be important foraging and commuting corridors. Roosting near forested roads may thus enhance accessibility to foraging areas. Perry et al. (2008) and O'Keefe (2009) found that NLEB roosts were closer to unpaved, forested roads than random.

Direct and Indirect Effects

Most vegetation cut during brushing would be small diameter shrubs and young trees unsuitable for roosting, and there would be no direct loss of habitat associated with these kinds of woody materials. At some treatment sites, larger diameter (=> 3" DBH) trees, shrubs, or snags would be cut or de-limbed. These could be structurally suitable (e.g. loose or furrowed bark, broken limbs, snags) as roosting habitat.

Most of the roadside brushing would occur during the summer occupancy period due to a limited operating window because of favorable weather and generally dry conditions. If roost trees were to be encountered, some direct effects could occur. Use of equipment or activities by personnel may cause NLEB to displace away from noise and vibrations. Bats may leave a roost tree prior to it being felled or contacted because of noise, vibration and disturbance from saws or other equipment. However, some bats could remain in a tree and be injured or killed if the tree strikes the ground. If bats are present in trees adjacent to the tree felled, these bats may be disturbed by the activity, however, the bats are not likely to be injured or killed, unless the felled tree damages the roost site on the retained tree. Displacement would not be expected to result in mortality, but

could elevate short-term stresses. However, these stresses should be short in duration as the equipment and treatment progress down the roadway away from the area just treated. These risks may be slightly higher during spring emergence when fat reserves can be low or during summer occupancy when pups may be exposed. Trees felled during the non-volant period would have a higher potential for adverse effects than other periods because non-volant pups could be present and unable to avoid disturbances or physical harm. Any NLEB that becomes expelled from a roost site would face some unplanned exposure to climate, predators, or extra caloric expenditures. On the ONF, suitable roosting is assumed to be abundant, therefore minimizing the amount of time and effort needed to relocate in most instances.

Felling a roost tree could cause a local loss of roosting habitat. If a roost tree is felled any time of year, it would no longer be available and cause the bats that were occupying it to find an alternate roost tree. Depending on the location of the maternity roosting colony, the social structure of the NLEBs may be affected. Silvis et al. (2014) used simulations to demonstrate that >20% roost removal was required to fragment social networks for maternity colonies in Kentucky. However, roadside brushing generally does not extend beyond 15 feet from the edge of roads, so the chance of removing >20% of roost trees is unlikely.

Foraging bat behavior would not be directly affected by roadside brushing because this type of cutting and mowing would occur when bats would be inactive. Indirectly, foraging spaces may be maintained which provides some foraging benefits. Potential changes to prey abundance and availability may or may not change per treatment site, depending on many variables such as; insect type or species present, drainage, and weather variables. These roadside vegetation areas are also routinely treated. As the vegetation grows and fills in along the roadside it is cut back and the cycle is repeated. So it is not often that trees grow to maturity along these road shoulders. These vegetation treatment actions are not expected to have any measurable indirect effect to NLEB

Overall, direct negative effects to NLEB by activities associated with roadside brushing are considered low. There are no long-term effects anticipated from these activities. However, there is a possibility of injury or mortality to NLEB if roost trees are removed during the non-volant period.

Determination

Roadside brushing along all maintenance level roads, within the period summer occupancy period without design criteria is an activity that could result in adverse effects to the NLEB. Effects to NLEB could include adverse impacts to individuals in the form of injury and death, or harassment and /or displacement due to social structure changes and roost tree removals.

Actions Likely to Adversely Affect the NLEB (RDBRUSH-LAA)
Approximately 340 acres of roadside brushing is planned for treatment on the Ottawa National Forest.

Road Closures and Decommissioning

Description of Action

Several means or processes exist to make roads unusable including, restricting access and decommissioning/obliteration. Access restriction may allow for future use of roads, but targets exclusion of vehicles through gating, berms, felling or pushing over trees, or bouldering. Road decommissioning and obliteration on National Forest System lands is the process of converting roads with little or no future intended use back to a natural habitat state. This may be accomplished by passive means (allowing natural regrowth) or more active measures of felling trees, reseeding, soil scarification of road bed, or planting of herbaceous and woody materials. The majority of roads that are closed or decommissioned are temporary/OML level 1 roads used in the timber harvest process and those actions are usually considered part of the overall harvesting effects.

The ONF accomplishes the overwhelming majority of the road closures and decommissioning as part of the timber harvesting procedure. Additional road closures and decommissioning outside of timber harvests are accomplished by ONF engineering, construction and maintenance staff. The actions analyzed in this section include road closures and decommissioning that will occur outside of timber harvest activities. An estimated 10 miles of roads are planned to be closed/decommissioned in 2015. Average road width is considered 24 feet, resulting in approximately 29 acres of habitat potentially affected.

The actions analyzed in this section include all road closures and decommissioning listed in Appendix A.

To minimize effects to NLEB, the ONF has developed the following design criteria to be incorporated into projects as feasible and prudent:

- Fell trees outside the non-volant period, when possible. For additional protection, fell trees outside of the summer occupancy Period, when possible.

Environmental Baseline

Road closure and decommissioning is an ongoing process across the ONF. Roads are closed to help protect resources from unnecessary use or harm. Decommissioning roads helps in the stabilization and restoration of unneeded roads to a more natural state (36 CFR 212.1). Most of the roads across the Forest are low vehicle volume transport and/or haul roads with relatively narrow widths. The lack of traffic and general wooded state surrounding the roadways means NLEB may use trees and snags in ROWs or in adjoining areas for roost sites. If trees are felled to close or decommission a road, they are usually smaller diameter and within 12 feet of the road edge. Therefore, the maximum area affected would be approximately 1,318 acres. However, the actual area affected would likely be much less because most of the closures do not involve tree felling.

The responses of bats to roads appear to be largely dependent on road size and traffic levels (Sparks 2010, Bennett et al. 2013). Wide, busy roads may be a deterrent of bats, while minor roads, such as the type that exist on the ONF are not. As a reference, Pauli et al. (2014) defined

a “major road” as one with traffic rates exceeding 2 cars/minute based on Bennett et al. (2013), who used simulation modeling to determine that roads acted as filters to Indiana bat movements when the rate of traffic was 10 vehicles/5 minutes and barriers to bat movements when the rate was 200 vehicles/5 min. Bats, including NLEBs, are expected to use ONF roadways for foraging activities, and potentially roost in trees along roadsides or in adjoining habitat away from paved and unpaved roadways. Numerous studies have reported high NLEB activity on or near minor roads (e.g., Krusic and Neefus 1996, Lacki and Schwierjohann 2001, Owen et al. 2003, Broders et al. 2006, Brooks 2009).

Direct and Indirect Effect

Access restriction of roads may require the felling or pushing of trees near the start of a road, or along its entire length. These trees may be potential roost trees. Harvesting or felling trees during the summer occupancy period may directly affect northern long-eared bats because of the possibility of a tree containing roosting bats. Bats may leave a roost tree prior to it being felled or contacted because noise, vibration and disturbance from saws or other equipment. However, some bats could remain in a tree and be injured or killed if the tree strikes the ground. If bats are present in trees adjacent to the tree felled, these bats may be disturbed by the activity, however, the bats are not likely to be injured or killed, unless the felled tree damages the roost site on the retained tree. Trees felled during the non-volant period would have a higher potential for adverse effects than other periods because non-volant pups could be present and unable to avoid disturbances or physical harm. Direct effects could include displacement from active sites where roads are in the process of being closed. Displacement from a roost tree would not be expected to result in mortality, but could elevate short-term stresses. These risks may be slightly higher during spring emergence when fat reserves can be low. Any NLEB flushed from a roost site would potentially face some additional exposure to climate, predators, or expenditure of energy. On the ONF, suitable roosting is considered abundant and widespread. Therefore the amount of time and effort needed for NLEB to relocate should be minimal. Restricting access of vehicles may provide some benefits to NLEB, by reducing disturbances from motorized vehicles.

Road decommissioning or obliteration generally involves the permanent conversion of a road back to a natural state. Direct effects are similar to those of access restriction; however the intended conversion of an open area (roadway) to a forested environment results in a loss of open space and diminished edge-effect. Depending on the proportional availability of openings (foraging habitat) and woodlands (roosting habitat) at the landscape level this may be seen as either a beneficial or negative indirect effect. For instance, losing foraging habitat and gaining roosting habitat when there is already a limited supply of foraging habitat and an abundance of roost habitat may be compounding negative indirect effects. However, a loss of foraging habitat in an already abundant supply and gains in roosting habitat where it’s already lacking is most likely beneficial. Over the long-term, tree canopy would close-in, reducing canopy gaps and road edges. Interior stand qualities, including more roost suitable trees would develop and become available. This process would result in short-term loss of foraging habitat, but a long-term gain in habitat more suitable overall for the NLEB which can efficiently use interior type habitats more than some other species. The effects are likely beneficial at the individual scale; however at the population level, the benefits are likely insignificant because of the small amount of area in proportion to the overall Forest area.

Determination

Road closures and decommissioning conducted within the summer occupancy period and without design criteria is an activity that could result in adverse effects to the NLEB. Effects to NLEB could include adverse impacts to individuals in the form of injury and death, and/or harassment due to social structure changes and roost tree removals.

Actions Likely to Adversely Affect the NLEB (RDCLOSE-LAA)
Approximately 10 miles of roads / 29 acres are planned for closure/decommissioning on the Ottawa National Forest.

Special use permits with vegetation management

Description of Action

The actions analyzed in this section include implementing special use permits that typically results in the cutting of individual standing dead trees scattered across a very large landscape. Special use permits are legal agreements the Forest Service enters with private individuals, groups, businesses, government agencies and others. They can cover long-term scenarios, such as a road easement of several decades, or one-time events, such as a recreation event program. Permits and easements allowing vegetation removal may authorize the holder to remove trees equal to or greater than 3" DBH. Some of the permits and easements with approved vegetation removal are in place to maintain safe conditions. These may be expected to have infrequent tree removal. Others, such as utility corridor easements and road permits, would be expected to have tree removal occurring at greater frequency, since there is a need, or requirement, to maintain safety, services, and access. In some cases trees that are dead or dying would be identified for removal due to safety concerns and the need to maintain utility service, traffic or access. In other cases, live trees might be identified for removal. Trees that are cut can be left on site or removed. On the ONF, an estimated 3,277 acres of vegetation removal are allowed through current Special Use Permits.

Environmental Baseline

In accordance with conditions included in approved special use permits on Michigan National Forests, removal or felling of trees may occur. Hardwood species and conifer trees equal to and greater than 3" DBH can be removed. Some easements and permits allow vegetation removal to occur without additional approval, in that, the removal of trees is pre-approved in order to maintain services, access, safety, etc. Other easements and permits may allow for vegetation to be removed, as long as the permit holders request approval and the requests are granted. Both live and dead trees may be removed. However, since live trees have commercial value, there is likely to be an approval process identified for that activity. It is not likely that there are any time constraints in the existing permits that would preclude cutting vegetation during the non-volant and summer occupancy. Since existing special use permits are legal documents, there is no identified process for requesting permit holders to avoid felling trees during the non-volant and summer occupancy periods. However, a voluntary conservation approach may be possible for permit holders where approval is required before trees can be removed, if it is consistent with other permit conditions.

Direct and Indirect Effects

Trees could be felled at any time of the year. Although the probability is small, some of the trees that could be felled might be roosting habitat for NLEB. There may be a higher risk of removal of suitable and occupied structure, since snags would be removed due to potential for safety, service and access needs. Bats may leave the roost tree prior to it being felled due to the noise, vibration and disturbance from chainsaws, vehicles, other equipment, and personnel. However, individual bats might remain in the tree and be injured or killed when the tree strikes the ground. If bats are present in trees adjacent to the tree being felled, they may be disturbed by the activity. However, the individuals are unlikely to be injured or killed while in proximity to the activity.

Roosting bats could also be affected if suitable trees are removed by permit holders. The roost trees would no longer be available to NLEBs. Consequently, bats would be displaced and forced to find alternate roost trees. However, the magnitude of risks for all of the effects would be small in scale in any given year relative to the total habitat available for NLEB as foraging, roosting and maternity habitat. Overall, adverse impacts caused by implementing tree removal in approved special use permit would be small in scale and temporary in duration.

Determination

Felling trees as allowed or conditioned in a special use permit is likely to adversely affect the northern long-eared bat due to potential for injury or death of individual NLEBs roosting in a tree being felled. Special use permits are legal documents. Time constraints in existing permits, which would preclude cutting vegetation during the non-volant and summer occupancy, are not likely to exist. No identified process exists for requesting permit holders to avoid felling trees during the non-volant and summer occupancy periods in order to decrease the likelihood of injury or mortality, however this may be possible for permits and easements requiring approval prior to implementing tree removal.

Actions Likely to Adversely Affect the NLEB (SUP-LAA)
Approximately 3,277 acres are planned for treatment on the Ottawa National Forest.

Landline surveys, mineral seismic surveys and other minor activities with tree cutting

Description of Action

Landline and mineral seismic surveys require cleared land to traverse and set up surveying/monitoring equipment (e.g., drill rigs, air guns, drop weights). Trees would be felled with chainsaws or possibly commercial felling equipment depending on how much access is required. The ground may require minor grading or clearing to set up equipment which may require motorized equipment. Once set up, surveying/monitoring equipment may run for extended periods day and night, for up to a couple weeks. An estimated 720 acres are planned for landline and mineral seismic surveys on the Ottawa National Forest. Included within those acres are the test sites where surveying/sampling equipment will be operated.
The actions are described in more detail in Appendix A.

To minimize effects to NLEB, the ONF has developed the following design criteria to be incorporated into projects as feasible and prudent:

- Reserve snags and roost trees, if possible

Environmental Baseline

Removal or felling of trees to allow for surface-disturbing exploration within approved areas on National Forest System lands where there is a potential to discover minerals of compelling domestic significance. Selected locations may occur in hardwood or coniferous forest types, openings, and other possible locations outside of recreational sites.

Direct and Indirect Effects

Of the trees that are felled, some of the trees felled may be roosting habitat for the NLEB. While the probability of this is difficult to quantify, it may vary depending on the extent of trees removed (i.e., age, size, and condition of tree). Trees may be felled in the spring, summer, and fall when NLEB may be present. Harvesting or felling trees during this period may directly affect NLEB because of the possibility of a tree containing roosting bats. Bats may leave a roost tree prior to it being felled due to the noise, vibration and disturbance from saws or other equipment. However, some bats might remain in a tree and could be injured or killed if the tree strikes the ground. If bats are present in trees adjacent to the tree being felled, these bats may be disturbed by the activity, however, the bats are not likely to be injured or killed, unless the felled tree damages the roost site on the retained tree. The design criteria for retention of snags and den trees offer additional protection because potential roost trees may be protected from cutting.

In addition to the clearing of trees, surveys may cause disturbances to the bats while the surveys are being conducted. The activity could disturb the bats during roosting or activity periods, depending on the type of survey being conducted. All equipment producing noise are capable of disturbing bats from their roosts, which may require them to relocate to another suitable area until the activity is completed. Repetitive or long term disturbances of this type may disrupt the social structure of bats, but given the small size of these treatment areas and duration of surveys, it is unlikely.

If a roost tree is felled any time of year, it could cause a local loss of roosting habitat. The roost tree would no longer be available to NLEBs and cause the bats that were occupying it to find an alternate roost tree. However, depending on the size of the cleared area, the bats may find suitable habitat in adjacent trees or neighboring stands. The size of the treatment areas may impact the social structure of bats in maternity colonies by losing preferred roost trees and the loss of a roost trees may also potentially affect home ranges of bats using the treated areas. Silvis et al. (2014) used simulations to demonstrate that >20% roost removal was required to fragment social networks for maternity colonies in Kentucky. Therefore, the fragmenting of social networks is unlikely given the small size of most cleared areas (<5 acres); however, larger areas may need to be cleared which may disrupt foraging and roosting activities leading to fragmented social networks.

Determination

Landline surveys, mineral seismic surveys, road and trail construction and reconstruction, campsite development, bridge replacement, surveying, monitoring, drilling, and other minor activities with tree cutting in forested stands with no design criteria are likely to adversely affect the NLEB because of potential adverse impacts to individuals due to injury and death from felling trees, roost tree removal, noise harassment, and other effects from activities listed above.

Actions Likely to Adversely Affect the NLEB (MINORTREE-LAA)
Approximately 720 acres are planned for treatment on the Ottawa National Forest.

Wildlife and Fisheries Structural Habitat Improvement and Restoration

Description of Action

These actions include all structural habitat improvement for wildlife and fish, including the felling, topping, or girdling of trees to improve habitat for wildlife and/or fish, and waterhole construction. For a complete list of actions, see Appendix A.

The actions that will be analyzed in this section include the treatment of standing timber by mechanical means or hand treatment occurring in multiple forest types and using various tree species.

Mechanical treatment generally involves the use of hand power tools (e.g. chainsaw) to fell or girdle live trees. Felled trees would be cut to directionally lay on the forest floor or into a stream bed. Trees are generally not bucked nor are tops removed. Girdled trees will have rings (generally 2 or more) cut through the cambium to sever nutrient flow and extinguish the life of the tree. Girdled trees may remaining standing for 5-10 years, depending on the species, condition of the tree when girdled, tree density within the stand, and weather events. Trees treated with hand equipment (i.e. handsaw) are generally smaller in size (<5" dbh) and felled, rather than girdled. This category also includes a small number of hardwood trees removed to create habitat in lakes, through tree drops or construction of log cribs. However, for the later, trees are normally purchased, rather than procured on-site. The category includes removal of a small number of trees associated with stream habitat improvement, such as log bank cover, and tree groups placed in the channel. Approximately 1,291 acres of structural habitat improvement in conifer, hardwood and mixed forests could be impacted by the planned activities on the ONF. To minimize effects to NLEB, the ONF has developed the following design criteria to be incorporated into projects as feasible and prudent:

- Fell trees outside the non-volant period when possible. For additional protection, fell trees outside of the summer occupancy period when possible.

Environmental Baseline

To aid in the enhancement of wildlife and fisheries habitat, dead woody material is often added to the landscape to supplement existing conditions. This is often achieved through the felling, topping or girdling of live trees with chainsaws or handsaws. Treatment location is often

dictated by existing conditions, but generally treatments occur in the interior of forest stands and along riparian corridors.

Direct and Indirect Effects

Although the probability is very small, some of the felled, topped or girdled trees may be roosting habitat for the NLEB. Trees may be felled, topped or girdled in the spring, summer, and fall when NLEBs may be present. Felling trees during the Non-volant Period and Summer Occupancy Period may directly affect NLEBs because of the possibility of felling or disturbing a tree containing roosting bats. Although bats may leave the roost tree prior to it being felled due to the noise, vibration and disturbance from chainsaws, other equipment or people, some bats may remain in a tree and be injured or killed when the tree strikes the ground. If bats are present in trees adjacent to or near a tree being felled or girdled, those bats may be disturbed by the activity. Such disturbances would not result in injury or death, but may cause some displacement or avoidance while treatments occur. If a felled tree were to collide with a retained tree containing bats, there is the chance that bats could be injured or killed. The process of girdling could result in the same short-term disturbance responses as felling a tree because of the saws and people using them. Girdled trees typically stand for several years after treatment, and would not pose any meaningful risk in the form of injury or mortality to bats.

Felling or topping a roost tree could cause a short-term, local loss of roosting habitat. This could cause the bats occupying it to find an alternate roost tree, thus create shifts to the occupancy range. Depending on the location a roost, some adjustments to individual home ranges or a maternal range could occur, but would likely be minor. Any changes would be minor, short-term, and not exceed thresholds which alter maternal networks, because structural improvement projects tend to be small relative to the amount of untreated area and/or trees.

While the disturbance and felling of trees may present immediate hazards to local bats, indirectly the creation of snags via girdling or topping would have long-term beneficial effects. The death of the tree generally would occur within the next growing season, but loosening of bark and other features beneficial to the bat may take a few years. Additionally, the scattered removal of select trees within a forest stand may create small openings providing foraging habitat. This may also allow more solar radiation to reach certain standing trees, potentially improving microclimate conditions suitable for roosting. However, it's possible that already-suitable conditions could also be disrupted in this way. NLEB generally select roosts with higher canopy cover than Indiana bats (Foster and Kurta 1999, Carter and Feldhamer 2005, Lacki et al. 2009, Timpone et al. 2010.) As quoted from Badin (Thesis 2014): "NLEB selected roost trees with lower canopy cover and thus more solar exposure than random trees in the undisturbed forest, similar to Foster and Kurta (1999) and O'Keefe (2009), although many other studies have not identified higher solar exposure as important for this species (Sasse and Pekins 1996, Menzel et al. 2002, Carter and Feldhamer 2005, Perry and Thill 2007)." In fact, Carter and Feldhamer (2005) found that NLEB roosted in areas with higher canopy closure than in random plots.

Determination

Wildlife and Fisheries Structural Habitat Improvement and Restoration activities with no design criteria are likely to adversely affect the NLEB because of potential adverse impacts to individuals due to injury and death from felling and topping trees, and roost tree removals.

Actions that are able to incorporate design criteria are not likely to adversely affect the NLEB because trees would be felled, topped or girdled outside the summer occupancy period.

Actions Likely to Adversely Affect the NLEB (WLFISHSTR-LAA)
Approximately 1,291 acres are planned for treatment on the Ottawa National Forest.

Building Maintenance or Demolition

Description of Action

Maintenance of buildings owned by the Forest Service is an ongoing activity. Building maintenance may include activities like replacing shingles on a roof, painting, structure repair, weather sealing or installing insulation.

Demolition of buildings owned by the Forest Service is uncommon, but does occasionally occur. For example, the Forest Service may acquire a property with a building. The building would be demolished to restore the site to natural conditions.

Two structures are planned to be demolished or moved from the Ottawa National Forest.

To minimize effects to NLEB, the ONF has developed the following design criteria to be incorporated into projects as feasible and prudent:

- Perform maintenance or demolition outside the non-volant period when possible. For additional protection, perform maintenance or demolition outside of the summer occupancy period when possible.

Environmental Baseline

Most buildings are well sealed and are not likely to provide summer roosting habitat. However, some older structures and those with an open design may provide roosting habitat for NLEB.

Direct and Indirect Effects

Maintaining or demolishing a building with the above design criteria could have a direct effect on northern long-eared bats. These activities could occur when NLEBs are present in structures during the Summer Occupancy Period. Although uncommon, demolition during this period poses the greatest risk because destroying a structure could injure or kill individual roosting bats. Maintenance activities like sealing, reroofing, and shutter replacement could have impacts, but these activities are likely to be more disturbing than life threatening. If the maintenance activity is longer in duration, it could be considered harassment because of the possibility of disrupting normal behavioral patterns.

If a building was used by NLEBs and is then rendered unusable by maintenance or demolition, it could cause a local loss of roosting habitat in the short term. The roost site would no longer be available and cause the bats that were occupying it to find an alternate roost site. Depending on the location of the site, the social structure of the NLEBs may also change, however those effects are likely to be insignificant due to the small number of roosts removed (typically only one) in

relation to the total number of roosts that would remain available in the immediate project area. Silvis et. al. (2014) found that colony social structure is robust to fragmentation caused by random loss of small numbers of roosts.
In the long term, a site where a building was demolished would likely be allowed to succeed to a natural forest. Depending on the site, building demolition could provide foraging habitat in 1-20 years, and potential roosting sites in 50 or more years.

Determination

Building maintenance or demolition is not likely to adversely affect the northern long-eared bat because building demolition will be conducted when bats are not present in the building and habitat alterations would be very small and social structure is not likely to be altered. Any effects to NLEB would be insignificant.

Actions Not Likely To Adversely Affect the NLEB (BUILDING-NLAA)
Two structures would be affected on the Ottawa National Forest.

Herbicide treatments (e.g. backpack, vehicle broadcast, wick application, injection) and Bio-control insect releases

Description of Action

The actions analyzed in this section include application of herbicide and releases of biological control insects to manage infestations of non-native invasive plants (NNIP). The actions are described in Appendix A. Approximately 400 acres of herbicide treatments and 10 bio-control insect releases are planned on the Ottawa National Forest.

Herbicides could be applied using numerous methods. Examples include dabbing the chemical on the cut stump, brushing it on the basal bark of woody shrubs, injecting a liquid or capsules into the plant trunk or stem, and wand (or glove) application directly to foliage. For foliar spray applications, a backpack or hand-held apparatus that can direct controlled spray of chemical on target plants with minimal drift will be used. Truck, tractor, off-highway vehicle-mounted (or similar vehicle) or hose spray devices may be used to cover large areas. Herbicides will not be applied using airplanes or helicopters. Generally there would be one chemical application per site per year. It is anticipated multiple years of herbicide treatment might be required to gain adequate control or eradication at many sites. The timing of treatments will vary by NNIP species and to avoid negative impacts on non-target species. All herbicides will be applied according to label directions by applicators that hold a current Commercial Pesticide Applicator certification from the Michigan Department of Agriculture. The chemicals to be used are listed in Table 2.

Table 2: Herbicides to be used for controlling non-native invasive plants (NNIP)

Common Chemical Name	Some Examples of Trade Names	Application Method & Chemical Selectivity	Example Targeted NNIP Species *
Triclopyr	Garlon3A, Brush-B-Gone Habitat, Vine-X	Stump and/or basal bark treatment, foliar spot spray; broadleaf-selective	Buckthorn, barberry, honeysuckle, wild parsnip, crown vetch
Glyphosate	Roundup Pro, Roundup, Accord	Stump treatment, foliar spray; non-selective	Honeysuckle, buckthorn, barberry, garlic mustard, wild parsnip, St. Johnswort, crown vetch
Glyphosate aquatic formulation	Rodeo	Foliar treatment, weeds near open water; non-selective	Purple loosestrife, swamp thistle, reed canary grass, common reed grass, and any species near open water
Dicamba	Banvel, Clarity, Vanquish	Foliar treatment, typically applied as mix with other herbicides; broadleaf selective	Knapweed, leafy spurge, thistle, tansy
Imazapic	Plateau, Plateau Eco-Pak, Cadre	Foliar treatment; non-selective	Leafy spurge
Clopyralid	Transline, Stinger, Confront	Foliar spray; broadleaf-selective	Canada thistle, swamp thistle, spotted knapweed, common burdock, crown vetch
2,4-D	Weedar 64	foliar spray; selective for broad-leaved plants	Bull thistle, Canada thistle, common burdock
Imazapyr	EZ-Ject herbicide shells	injection into woody NNIP	Privet, Lombardy poplar
Sethoxydim	Poast, Poast-Plus	foliar spray; broad-spectrum	NNIP grasses

* Note: The label for each herbicide provides a list of plants that can be treated.

Biological control of NNIP involves releasing insects that feed on or parasitize specific plant species. The insects are typically native to Europe, Asia, or other parts of the world where the target plant occurs naturally, but have been approved for release in the United States by the United States Department of Agriculture. Biological control methods generally suppress host NNIP populations, but may not contain or eradicate them. Biological control of plants is a common practice on state, tribal, county, and private land in Michigan, Minnesota, and Wisconsin (Landis et al. 2004, Van Driesche et al. 2002). Insects used as biological control agents are generally released as adults (not as eggs or larvae) between June and August. Some releases are performed by simply emptying a container of insects at an NNIP site. Other releases

are accomplished by placing an insect-bearing plant in the middle of an infestation of NNIP. If a release is successful, the insects will continue to thrive at the infestation, as long as the host plant remains. The biological control agents (all insects) that could be used are listed in Table 3.
Table 3: Biological control agents (insects) and target plants

Biological Control Insect	Scientific Name	Target Plant
Banded gall fly	*Urophora affinis*	Spotted knapweed
UV knapweed seed head fly	*Urophora quadrifasciata*	Spotted knapweed
Knapweed root weevil	*Cyphocleonus achates*	Spotted knapweed
Lesser knapweed flower weevil	*Larinus minutus*	Spotted knapweed
Copper leafy spurge flea beetle	*Aphthona flava*	Leafy spurge
Brown-legged leafy spurge flea beetle	*Aphthona lacertosa*	Leafy spurge
Black dot leafy spurge flea beetle	*Aphthona nigriscutis*	Leafy spurge
Black-margined loosestrife beetle	*Galerucella calmariensis*	Purple loosestrife
Golden loosestrife beetle	*Galerucella pusilla*	Purple loosestrife
Loosestrife root weevil	*Hylobius transversovittatus*	Purple loosestrife
Milfoil weevil	*Euhrychiopsis lecontei*	Eurasian water milfoil

Environmental Baseline

Herbicide spraying is an ongoing activity on National Forest System lands. Non-native invasive plants are not known to be adversely affecting NLEB on the Michigan National Forests. However, NNIP can be aggressive invaders of disturbed habitats and native plant communities. When left untreated, some NNIP may become the dominant component of the vegetative community, thus reducing native plant survivorship, dispersal and diversity and impacting wildlife habitat, visual resources and future management of infested sites. Aggressive, non-native shrubs in the forest can also reduce growth rates of native overstory trees (Hartman and McCarthy 2007). Infestations are generally treated once annually by licensed applicators, using approved chemicals and following label mixing and application directions. Applications are conducted during daylight hours. The majority of treatments are in upland herbaceous areas not considered NLEB habitat. However, some treatments may be in, or near, areas NLEB use for foraging, roosting, pup rearing and social interactions. Approximately 1,364 acres and 1,268 acres of herbicide and bio-control treatments have occurred in 2013 and 2014, respectively, on the ONF.

Herbicide Toxicity Information for NLEB

Tables 4 and 5 provide herbicide information relevant to NLEB. Thus, they preface the effects analysis.

Table 4 presents mammalian toxicity data for the herbicides used on the Michigan Forests. There is no data specific to NLEB. Rather, the data reflect the potential for toxicity to terrestrial mammalian wildlife exposed to areas treated with the herbicides. The data consist of LD50, LC50, and NOEL values. A LD50 (Lethal Dose50) represents the dose (amount supplied orally) to a test animal species in a controlled laboratory experiment that causes 50 percent mortality.

An LC50 (Lethal Concentration50) represents the concentration causing 50 percent mortality when a test animal species is externally exposed to the chemical in a controlled laboratory experiment. A NOEL (No Observed Effects Level) represents the highest dose or concentration (expressed as mg per kg body weight per day) observed not to cause noticeable effects in a test animal in a controlled laboratory experiment. For all three parameters, a higher value indicates a safer (less toxic) chemical.

Data are presented for two categories of toxicity: acute and chronic. Acute toxicity results from exposure to the chemical for a short time, for example when an animal enters an area immediately after herbicide application when the foliage is still wet. Chronic toxicity results from continuous exposure to the chemical over an extended time, for example should an animal inhabit an area that is repeatedly sprayed with a herbicide at regular intervals over multiple years. Because the proposed program would consist mostly of single applications, or at most, an initial application and one to three subsequent over approximately five years, the acute toxicity data is most relevant. For each herbicide separate rows of data are provided for the technical product (unformulated active ingredient) and for several common formulations. How a product is formulated can significantly affect its toxicity. Because it is the formulations and not the technical product that are used in the field, formulation data are more relevant, if available. While data based on exposure of mammalian test organisms are a useful predictor of toxicity to mammalian wildlife, they are less useful as a predictor of toxicity to birds, fish, and other wildlife whose physiology substantially differs from that of mammals.

Table 5 includes information related to minimum, average and maximum application rates, when available, for the chemicals used on the Michigan Forests. The table presents summarized ecological risk assessments, considering potential toxicity of herbicides to ecological receptors, such as the data presented in Table 4, but also the likelihood of exposure of receptors to the herbicides. Thus, they provide a more realistic assessment of risk to ecological receptors from herbicide use than do toxicity data alone.

Herbicides on the market today are generally regarded as safe to both humans and to wildlife if used in accordance with the manufacturer label. For purposes of comparison against data in Table 4, the oral LD50 for rats exposed in their diet to table salt (sodium chloride) is reported at 3,000 mg/kg body weight (BW) (Mallinckrodt Baker Inc. 2004).

Table 4: Mammalian toxicity data for herbicides used for invasive plant (NNIP)

Herbicide	Acute Toxicity						Chronic Toxicity		
(Technical product unless specific formulation noted)	Oral LD_{50} (rat)	Dermal LD_{50} (rabbit)	4-Hour Inhalation LC_{50} (rat)	Skin Irritation (rabbit)	Skin Sensitization (guinea pig)	Eye Irritation (rabbit)	24-Month Dietary NOEL (mouse)	24-Month Dietary NOEL (rat)	12-Month Dietary NOEL (dog)
	mg/kg BW		mg/L				mg/kg BW/day		
Glyphosate									
Glyphosate acid	5600	>5000	NA	None	No	Slight	4500	400	500
Glyphosate isopropylamine salt	>5000	>5000	NA	None	No	Slight	Chronic toxicity data available only for technical glyphosate acid		
Glyphosate trime-thylsulfonium salt	748	>2000	>5.18 (unspec.)	Mild	Mild	Mild			
ROUNDUP	>5000	>5000	3.2	None	No	Moderate			
RODEO	>5000	>5000	1.3	None	No	None			
Imazapic									
Imazipic acid	>5000	>5000	NA	None	No	Slight	Long-term dietary administration produced no adverse effects in mice and rats.		
Imazipic ammonium salt	>5000	>5000	2.4	None	No	None	Chronic toxicity data available only for technical imazipic acid		
PLATEAU	>5000	>5000	2.4	None	No	None			
CADRE	>5000	>5000 (rat)	2.4	None	No	None			
Triclopyr									
Triclopyr acid	713	>2000	NA	None	Positive	Mild	5.3 (22mo)	3	NA
GARLON 3A	2574	>5000	>2.6 (unspec.)	NA	NA	Severe	Chronic toxicity data available only for technical triclopyr acid		
GARLON 4	1581	>2000	>5.2 (unspec.)	Moderate	Positive	Slight			
Clopyralid									
Clopyralid acid	>5000	>2000	>1.3 (unspec.)	V. Slight	No	Severe	500 (18mo) (mouse)	50 (rat)	100 (dog)

Herbicide	Acute Toxicity						Chronic Toxicity		
(Technical product unless specific formulation noted)	Oral LD_{50} (rat)	Dermal LD_{50} (rabbit)	4-Hour Inhalation LC_{50} (rat)	Skin Irritation (rabbit)	Skin Sensitization (guinea pig)	Eye Irritation (rabbit)	24-Month Dietary NOEL (mouse)	24-Month Dietary NOEL (rat)	12-Month Dietary NOEL (dog)
	mg/kg BW		mg/L				mg/kg BW/day		
STINGER	>5000	NA	NA	NA	NA	NA	Chronic toxicity data available only for technical clopyralid acid		
Dicamba									
Dicamba acid	1707	>2000	9.6	Slight	Possible	Extreme	115 (18mo)	125	60
BANVEL	2629	>2000	>5.4	Moderate	No	Extreme	Chronic toxicity data available only for technical dicamba acid		
BANVEL 720	2500	NA	NA	NA	NA	NA			
BANVEL SGF	6764	>20000	>20.23	Slight	N/A	Minimal			
WEEDMASTER Dicamba+2,4-D	>5000	>20000	>20.3	Minimal	N/A	Minimal			
Imazapyr									
Isopropyl or isopropylamine salt	>5000	>2000	>1.3 – >4.62	Mildly irritating	No	Mildly to irritating	>100	>100	>100
ARSENAL™	>5000	>2000	>4.62	Mildly irritating	No	Non-irritant	Long-term studies in rats and mice produced no carcinogenic effect.		NA
CHOPPER™	>5000	>5000	1.58	Irritating	Slightly sensitizing	Moderately irritating			
HABITAT™	>10000	>2000	4.62	Mildly	No	Non-irritating	NA	NA	NA
Sethoxydim									
Sethoxydim	2676	>5000 (rat)	6.1	None	No	None	18	NA	8.86
POAST™	4.1	>5000 (rat)	>4.6	Moderate	No	Moderate	Chronic toxicity data available only for technical sethoxidim		
POAST PLUS™	>2200	>2000 (rat)	>7.6	Slight	No	Slight	Chronic toxicity data available only for technical sethoxidim		

Herbicide	Acute Toxicity						Chronic Toxicity		
(Technical product unless specific formulation noted)	Oral LD_{50} (rat)	Dermal LD_{50} (rabbit)	4-Hour Inhalation LC_{50} (rat)	Skin Irritation (rabbit)	Skin Sensitization (guinea pig)	Eye Irritation (rabbit)	24-Month Dietary NOEL (mouse)	24-Month Dietary NOEL (rat)	12-Month Dietary NOEL (dog)
	mg/kg BW		mg/L				mg/kg BW/day		
2,4-D									
2,4-D acid	639	>2000	1.79	None	No	Severe	5	5	1
2,4-D Dimethylamine salt	>1000	909	3.5	None	No	Severe	Chronic toxicity data available only for technical 2,4-D acid		
2,4-D Isooctyl ester	1045	>5000	5.7	None	Yes	Moderate			

Source: Herbicide Handbook (WSSA 2002, 2006), Greenbook (2006); Cornell University (1986); NA = Not Available

Table 5: Risk assessment information for herbicides used for invasive plant (NNIP) control on the ONF

Risk Assessment Application Rate	Terrestrial Mammals	Birds	Insects	Fish & Other Aquatic Receptors
Glyphosate (Source: SERA 2003a; Tu et al. 2001, USDA Forest Service 2003b)				
2 lb a.e./acre (average rate) 7 lb a.e./acre (maximum rate)	Effects resulting from average application rate are minimal. Some risk exists for large mammals consuming foliage for an extended period of time in areas treated with maximum application rate.	Effects resulting from average application rate are minimal. Some risk exists for small birds consuming insects for an extended period of time from areas treated with maximum application rate.	Effects resulting from average application rate are minimal. Some risk from maximum application rate to bees exposed to direct spray.	Effects resulting from average application rate are minimal. Some risks exists to fish near areas treated with maximum application rate using some of the more toxic formulations not labeled for use in aquatic settings.
Imazipic (Source: SERA 2004c, Tu et al. 2004, USDA Forest Service 2004c)				
0.100 lb a.e. /acre (average rate) 0.1875 lb/acre (maximum rate)	No substantial risk to small mammals at maximum rates. Some risk exists for large mammals, if consumed over long period (i.e. 2 years).	No substantial risk at maximum rates.	No substantial risk at maximum rates. Non-toxic to bees	No substantial risk at maximum rates. However, limited toxicological data available. Potential for risk to aquatic plants from maximum rates is border-line.
Imazapyr (as Arsenal, Chopper, Stalker) (Source: USDA Forest Service 2004d)				

Risk Assessment Application Rate	Terrestrial Mammals	Birds	Insects	Fish & Other Aquatic Receptors
0.45 lb a.i. /acre	Available toxicity studies are relatively complete, including studies in three mammalian species (dogs, rats, and mice) and several reproduction studies in two mammalian species (rats and rabbits) indicate that imazapyr is not likely to be associated with adverse effects at relatively high-dose levels.	While toxicity studies on birds are less extensive than those on mammals, no adverse effects have been noted in birds.	Limited toxicological data is available. However, the toxicity of imazapyr to insects may be similar to the toxicity of this compound to mammals, that is, relatively non-toxic.	Limited toxicological data is available. There exists some research that suggests imazapyr is moderately toxic to other fish species.
Sethoxydim (Source: USDA Forest Service 2001b)				
0.09375 lb/acre (minimum rate) 0.375 lb/acre (maximum rate)	No substantial risk at maximum rates.	No substantial risk at maximum rates.	Studies on beetle larvae suggest that rates exceeding maximum rates are relatively non-toxic.	No substantial risk at maximum rates. However, limited toxicological data available. Potential for risk to aquatic plants from maximum rates is borderline.
Triclopyr (Source: SERA 2003b, Tu et al. 2003, USDA Forest Service 2003c)				

Risk Assessment Application Rate	Terrestrial Mammals	Birds	Insects	Fish & Other Aquatic Receptors
1 lb a.e./acre (average rate) 10 lb a.e./acre (maximum rate)	No substantial risk at average rate. Some risk for mammals exposed via direct spray or consuming sprayed vegetation when applied at maximum rate.	No substantial risk at average rate. Some risk for large bird exposed via direct spray or consuming sprayed vegetation when applied at maximum rate.	No substantial risk to terrestrial vertebrates and invertebrates from salt and ester formulations. Risk to aquatic invertebrates when if exposed to the butoxyethyl ester (BEE) formulation.	No substantial risk when triethylamine (TEA) salt formulations are applied at average rate. Some risk to aquatic species when butoxyethyl ester (BEE) formulations are applied at average rate. Substantial risk when BEE formulations applied at maximum rate.
Clopyralid (Source: SERA 2004b, Tu et al. 2001, USDA Forest Service 2004a)				
0.1 lb a.e./acre (typical rate) 1.0 lb a.e./acre (maximum rate)	Reported to be relatively non-toxic, with little potential for adverse effects.	Reported to be relatively non-toxic, with little potential for adverse effects.	Reported to be relatively non-toxic to bees, with little potential for adverse effects. Low toxicity to soil invertebrates and microbes	Reported to be relatively non-toxic, with little potential for adverse effects.
Dicamba (as Vanquish, diglycolamine salt of dicamba) (Source: SERA 2004a, Cornell 1993, USDA Forest Service 2004b)				

Risk Assessment Application Rate	Terrestrial Mammals	Birds	Insects	Fish & Other Aquatic Receptors
2 lb a.i./acre (foliar application) 1.5 lb a.i./acre (cut surface application)	No plausible and substantial hazard under normal conditions of Forest Service use.	No plausible and substantial hazard under normal conditions of Forest Service use.	Reported to be non-toxic to bees.	No plausible and substantial hazard under normal conditions of Forest Service use.
2,4-D (Source: USDA Forest Service 2006a)				
1.0 lb a.i./acre (average rate) 2.0 lb a.i./acre (maximum rate)	Except for accidental exposures, applications at average or maximum rates are not likely to cause adverse effects. Small mammals exposed to direct spray could display subclinical toxic effects. If foliage treated with 2,4-D is the sole diet of a mammal, subclinical toxic effects are possible.	Except for accidental exposures, applications at average or maximum rates are not likely to cause adverse effects. Acute toxicity studies suggest that birds are somewhat less sensitive than mammals. Studies suggest that 2,4-D sprayed directly onto avian eggs at rates up to 10 lb/Ac. (substantially higher than label rate) have no effect.	Bees exposed to direct sprays could experience substantial mortality.	Direct application of 2,4-D to water at rates used by the Forest Service could cause mortality of aquatic receptors (including MIS brook trout or mottled sculpin).. Formulations approved for aquatic use would be used for Eurasian water-milfoil control.

Direct and Indirect Effects

Chemical Treatment

The mammalian toxicological data presented in Table 4 suggests that the toxicity of the herbicides used to treat infestations would be low. Bats, and specifically NLEB, are insectivorous, capturing prey by hawking and gleaning behaviors (Ratcliffe and Dawson 2003). Gleaning behaviors could expose bats to chemicals or to insect treated with chemicals. Some research indicates demonstrated that glyphosate is toxic to aquatic invertebrates at doses lower than those expected to be present in the environment and toxicity to aquatic invertebrates might have been underestimated in the past (Cuhra et al. 2013). Since NLEB may use aquatic insects as a food source the information suggests that glyphosate may pose more of an indirect threat than previously assumed. Gleaning also increases NLEB's risk of pesticide exposure because they are thought to consume a particularly high proportion of spiders, in which chemical concentrations can accumulate to higher levels than in lower-trophic-level invertebrates (Dodd et al. 2012). However, these risks are considered very small on Michigan National Forests since the low intensity of herbicide spraying, generally one application per site per year, points to a very low probability of NLEB exposure through food resources. Also, upland herbaceous plants are the frequent targets for spraying, not wetland plants and habitats or canopy trees and shrubs. While herbaceous areas can be foraging locations, NLEB foraging is most likely to occur in upland and lowland woodlots and tree-lined corridors, where they catch insects in flight using echolocation and by gleaning insects from vegetation and water surfaces (FWS, 2014, NLEB Interim Guidance). Thus any risk from foraging exposure to chemicals is very low. Bats could theoretically experience dermal toxicity by brushing against recently treated NNIP foliage or through direct spray. However, as evidenced by the dermal LD50 data in Table 4, the dermal exposure pathway is of low hazard. Furthermore, NLEB would not be roosting in herbaceous areas where most treatments occur and would not be actively foraging until the crews depart for the day, giving the sprayed foliage a chance to dry. Because herbicides would be applied directly to target foliage in a manner that prevents drift or runoff (i.e. label directions), the risk of herbicides contaminating drinking waters sources for bats would be low. NLEB could potentially be affected if herbicide treatment results in a reduction in numbers of insects. However, in the low probability this were to occur, the effect is expected to be temporary, as insect populations would likely recover within a short period of time after treatment of an area. While there is no specific risk information for bats in Table 5, overall ecological risk of the studied herbicides at rates commonly used by the Forest Service pose little or no risk to terrestrial mammals. Control of invasive species would have the effect of preserving native plant diversity and abundance, which could be beneficial for retaining native insect populations consumed by NLEB.

Biological Control

There is no available evidence that the insects with potential for use as biological control agents are harmful to bats or other mammals. None are biting or stinging insects. All have a record of safe use in the Midwestern United States. Releasing biological control agents does not require the use of motorized equipment other than a vehicle for basic transportation. In most cases release would likely take place close to existing roads decreasing risk of a minor physical disturbance in remote habitat. The agent would be expected to spread on its own to remote areas. Insects used as biological control agents for invasive plants, such as leafy spurge, purple

loosestrife, spotted knapweed, are neither competitors, nor identified prey of NLEB. Thus, their abundance or absence would have no effect on NLEB.

Both NNIP Control Methods

Northern long-eared bats do not utilize any of the NNIP weed species or the plant species that they displace. None of the NNIP herbicide or bio-control treatments would fragment habitat for NLEB. No permanent human intrusions would result from the NNIP control program. The low level of vegetation change in suitable bat habitat would have no detectable impact on the NLEB.

Determination

Implementing herbicide treatment and bio-control insect releases is not likely to adversely affect the NLEB. By using approved herbicides and following manufacturer's product label with application by Michigan certified personnel, the effects to NLEB would be insignificant and discountable because: 1) NLEBs are not likely to be present in these areas, and 2) if present, not likely to be exposed to the herbicide treatments either directly or indirectly through eating prey that has come in contact with the herbicide, and 3) if present in areas treated with bio-control insects would be unaffected by the activity.

Actions Not Likely To Adversely Affect the NLEB (HERB-NLAA)
Approximately 400 acres and 10 release sites are planned for treatment on the Ottawa National Forest.

Effects to Hibernating Bats and Hibernacula

No effects are anticipated to wintering NLEB or their hibernacula from the proposed action.

Effects Related to White-nose Syndrome

This BO assumes that WNS will affect all NLEB present within the action area over the proposed life of the project. 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. Affected bats may also be more likely to stay closer to their hibernation site for a longer time period following spring emergence. There are six known NLEB hibernacula complexes within the action area, and the potential exists that bats affected by WNS may be more likely to use the action area for at least temporary foraging and roosting rather than migrating longer distances to established summer home ranges.

While none of the ONF's proposed actions will alter the amount or extent of mortality or harm to NLEB resulting directly from WNS, the proposed action does have the potential to increase or decrease the chances that WNS-affected bats present in the action area will survive and recover. For example, WNS-affected bats roosting in the area immediately after emerging from hibernation may have damaged wings and therefore could be less able to quickly fly away from fire and smoke during a prescribed burn. As a result, there may be an increased chance of WNS-affected bats being killed or harmed as a result of the project, particularly if burns are conducted early in the spring (April –May). However, research into how WNS affects bat physiology and behavior is ongoing, and current information is not sufficient to quantify or predict the full range

and scope of potential effects, or compare the relative likelihood and significance of the potential adverse and beneficial effects described above.

Cumulative Effects

Cumulative effects include the effects of future state, tribal, local or private actions that are reasonably certain to occur within the action area. 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 act.

When considered with future State, county, tribal and private actions that are reasonably certain to occur in the future, the forest management and other actions listed Appendix A would have a minor adverse cumulative effect on the NLEB. Non-federal tree cutting activities would have the greatest potential to have a cumulative effect on the NLEB because of potential for bats to be injured or killed during summer occupancy, loss of roost trees, or loss of forested habitat. Other public, tribal and commercial lands within the analysis area may or may not be managed similar to ONF lands. Tree cutting activities on non-commercial private lands is estimated to be substantially lower than federal lands because many private landowners lack interest in forest management, small parcels may not be economical to manage, or activities remove very few trees annually (ex. ROW maintenance). Therefore, when considering tree cutting activities on all ownership annually, it is estimated that no more than two percent of the analysis area would receive a treatment, providing substantial forest habitat and roost trees over the long term. In addition, some timber harvest activities on the ONF would occur outside of the summer occupancy period, further reducing the risk NLEBs could be injured or killed while in a roost. Tree cutting activities on non-Federal lands may retain snags and den trees that could be roost trees for NLEBs. Snag creation activities may improve roosting habitat. Thinning of hardwood and conifer stands would likely improve NLEB foraging habitat. Furthermore, considerable areas on the ONF exist where disturbance would be infrequent or absent (Appendix B: ONF NLEB Infrequent Vegetation Management Map). These areas also provide substantial forested habitat and roost trees for NLEBs over the long term.

Most prescribed burn activities occur on federal lands within the analysis area and is low intensity. High intensity burning is uncommon, and generally occurs in dense coniferous forest that is not likely habitat for NLEBs. Total prescribed burning activities average less than 0.1 percent of the ONF land base annually. Prescribed burning on other lands within the analysis area is estimated to be minor when compared to burning on NFS lands, and is almost always low intensity. Low intensity burning poses lower risk to roosting NLEBs because roosts generally occur much higher than flame heights. At the landscape level, prescribed burning is likely a source of new roost trees for NLEBs because some trees within a burn area are likely to be killed by fire. Therefore, prescribed burning activities would have a minor adverse cumulative effect on the northern long-eared bat.

Site preparation activities would have an extremely small adverse cumulative effect on the NLEB. State, county, tribal and private site preparation activities within the analysis area is estimated to be small when compared to Forest Service actions on an annual basis. As stated in the direct/indirect effects, the likelihood of NLEBs being impacted on by site preparation activities on the ONF would be remote and similar effects would be expected on State, county, tribal and private activities.

Building maintenance and demolition occurs on non-federal lands annually, but to a greater degree on lands in private ownership simply because more structures are present. Maintenance and demolition activities would have a potential to disturb, injure or kill NLEBs in buildings and could cause a loss of roosting habitat. However, when considering these potential impacts to NLEBs across the landscape, buildings are much less commonly used for roosts than trees with cracks, crevices or holes. Therefore, although these effects would be cumulative to activities on the ONF, the loss of roosting habitat would be extremely small on an annual basis, and therefore would have a minor adverse cumulative effect on the northern long-eared bat.

State, county, tribal and private herbicide use and biocontrol would likely have a cumulative effect when considered with Forest Service use of herbicides and biocontrol. Herbicide use by non-federal entities within the analysis area likely equals or exceeds use by the Forest Service, primarily to control woody vegetation under powerlines and along roadways, and to control non-native invasive species. Considering the size of the analysis area, the limited amount of herbicide used annually by the Forest Service and the non-federal entities, and the limited exposure of NLEBs, herbicide use and biocontrol would have minor adverse cumulative effects on NLEBs.

Many activities would implement design criteria that would help protect NLEBs. Therefore, when considered with future State, county, tribal and private actions that that have occurred in the past, those occurring in the present, and those that are reasonably certain to occur in the future, the forest management and other actions listed in Appendix A would have a minor adverse cumulative effect on the NLEB. This is based on the low level of vegetation management on the ONF (~1% of land base, annually), the presence of considerable areas where disturbance would be infrequent or absent (~500,000 acres), and the implementation of design criteria to protect NLEBs.

Summary of Effects

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 conservation measures included through the Forest Plan and associated programmatic BO and individual project decisions will serve to reduce the potential for direct effects to the NLEB. However, direct effects to NLEB including mortality, injury, harm, or harassment as a result of the removal, burning, or modification of occupied or established roost trees remain. The potential for direct effects to NLEB are greatest when activities are conducted during the species' non-volant period.

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. Prescribed fire may also result in both adverse and beneficial effects on roosting habitat through loss and creation of existing roosts, and long-term changes in forest composition towards a greater abundance of suitable roosts in the future. Prescribed fire may also have a short-term adverse and long-term beneficial effect on prey abundance, and thus foraging habitat suitability in the action area. The overall effect of the prescribed fire portion of the proposed action on habitat suitability may be neutral to potentially beneficial. Given the scope of the projects in relation to the overall action area, these projects will not substantially alter the overall availability or suitability of NLEB roosting or foraging habitat.

Throughout the course of conducting the above actions, the NLEB may also experience disturbance from other project-related activities such as, increased noise during the day, artificial lighting and increased noise at night, increased presence of people, etc. These effects are typically short-term and temporary in nature, and limited in size compared to the amount of available habitat and NLEB home range size. We expect that the response of NLEB to these disturbances to be minor (e.g. startle, alarm, possible temporary abandonment of roost site, etc.) and do not anticipate that the level of disturbance would have a significant effect on individuals or the local NLEB population.

In any given year, approximately only 1% of ONF lands receive any type of treatment, and approximately 2/3 of all timber harvests are likely occur outside the summer occupancy period (Lee Humburg, pers.comm.).

While the ONF's proposed action will not alter the amount or extent of mortality or harm to NLEB resulting directly from WNS, the proposed action does have the potential to both increase and decrease the chances that WNS-affected bats present in the action area will survive and recover.

Based on the analysis above, the proposed action should not significantly reduce the ability of the action area to meet the conservation needs of the species. The proposed action will not affect any hibernating NLEB and the project area will continue to provide suitable roosting and foraging habitat during the spring staging, summer occupancy, and fall swarming periods. While there is potential for direct take of the species, given the small-scale of the proposed action in relation to the action area, and the current distribution and abundance of the NLEB on the ONF, the NLEB should be able to continue to survive and reproduce on the ONF.

There is no proposed critical habitat for the NLEB, and thus, none will be adversely affected.

CONCLUSION

WNS is the primary threat to species continued existence. All of the other (non-WNS) threats, including forestry management, combined did not lead to imperilment of the species. However, in those areas of the country impacted by WNS, the conservation measures in the interim 4(d) rule for NLEB, and adopted as a part of these proposed actions, focus on protecting individual bats in known roosts and hibernacula to minimize needless and preventable deaths of bats during the species' most sensitive life stages. Although not fully protective of every bat, these conservation measures help protect some roosting and hibernating individuals.

According to the interim 4(d) rule, the Service projected that forest management activities will affect approximately 2 percent of all forests in States within the range of the northern long-eared bat to (Boggess et al. 2014). Further, only a portion of this forested habitat will actually be harvested during the NLEB active season (April–October), and a smaller portion yet would be harvested during the pup season. Given these estimated impacts to suitable habitat (i.e., forest within the range of the species), the Service estimated that a number of NLEB will be directly affected by forest management activities during the active season. Implementation of the interim 4(d) rule conservation measures should further reduce the take of those individual bats where there are known roost trees. When occupied roosts are cut during the active season (outside of the pup season) or if undocumented NLEB roosts are cut while occupied, some portion of these individuals will flee the roost and survive. The conservation measures will further protect

known NLEB hibernacula, including a portion of the surrounding habitat. Thus, the Service, in the interim 4(d) rule, anticipated only a small percentage (estimated less than 1 percent) of NLEB will be directly impacted by forestry management activities.

In addition, according to the interim 4(d) rule, the Service anticipated that hazard tree removal, right-of-way maintenance, and minimal tree removal will only have a minimal impact on NLEB habitat and individuals. This activity will collectively impact only small percentages of NLEB habitat and individuals in the season during which they occur.

Twelve activities are not exempted from take through the interim 4(d) rule. The total amount of potential NLEB habitat affected by those 10 activities is approximately 90.25 acres. These activities include system road construction, gravel pit construction/expansion, and one timber harvest within the 0.25 mile hibernacula buffer.

Similar to the actions included in the interim 4(d) rule, the ONF's conservation measures would look to limit the amount of habitat affected during the active season and pup season. When compared to the area of potential habitat affected by exempted activities, and the amount of total available habitat throughout the action area that is not affected by project activities, only a very small percentage of NLEB habitat and individuals would be affected by activities not included in the interim 4(d) rule.

Impacts to NLEB through direct injury/mortality, loss of roost trees, and maternity colony structure changes are unlikely to result in net reductions in the number of maternity colonies as well as associated wintering population fitness. In fact, we find that many of the proposed actions of the USFS are likely to result in benefits to the species over the long term due to the maintenance of a mosaic of forest types. Thus, no component of the proposed action is expected to reduce the reproduction, numbers, or distribution of the NLEB rangewide. 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 found that the proposed project is unlikely to have population-level impacts, and thus, is also unlikely to decrease the reproduction, numbers, or distribution of the NLEB.

Based on the analysis above, despite the anticipated loss of individuals and population impacts, given the analysis in the interim 4(d) rule, the proposed action should not decrease the reproduction, numbers, or distribution of the NLEB. Therefore, we do not anticipate an appreciable reduction in the likelihood of both survival and recovery of the species as a whole.

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.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat

modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering (50 CFR § 17.3). Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering (50 CFR § 17.3). Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

On April 2, 2015, the Service published an interim species-specific rule pursuant to section 4(d) of the ESA for northern long-eared bat (80 FR 17974). The Service's interim 4(d) rule for northern long-eared bat exempts the take of northern long-eared bat from the section 9 prohibitions of the ESA, when such take occurs as follows (see the interim rule for more information):

(1) Take that is incidental to forestry management activities, maintenance/limited expansion of existing rights-of way, prairie management, projects resulting in minimal (<1 acre) tree removal, provided these activities:

   a. Occur more than 0.25 mile (0.4 km) from a known, occupied hibernacula;

   b. Avoid cutting or destroying known, occupied roost trees during the pup season (June 1–July 31); and

   c. Avoid clearcuts (and similar harvest methods, *e.g.*, seed tree, shelterwood, and coppice) within 0.25 (0.4 km) mile of known, occupied roost trees during the pup season (June 1–July 31).

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

(3) Purposeful take that results from

   a. Removal of Bats From and Disturbance Within Human Structures and

   b. Capture, handling, and related activities for northern long-eared bats for 1 Year following publication of the interim rule.

The incidental take that is carried out in compliance with the interim 4(d) rule does not require exemption in this Incidental Take Statement. Accordingly, there are no reasonable and prudent measures or terms and conditions that are necessary and appropriate for these actions because all incidental take has already been exempted. The activities that are covered by the interim 4(d) are identified in Appendix A. The remainder of this analysis addresses the incidental take resulting from those elements of the proposed action that are not covered by the 4(d) rule.

AMOUNT OR EXTENT OF TAKE

If NLEB are present or utilize an area proposed for timber harvest, habitat clearing, prescribed fire, 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 extent and density of the species within its summer habitat in the action area is unknown; and (5) in many cases incidental take will be non-lethal and undetectable.

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

As detailed in Table 6 below, the Service anticipates that no more than 92,608 acres and 600 additional trees of potential NLEB habitat will be taken as a result of ongoing and planned project activities on the ONF. Of the total, 92,510 acres and 600 additional trees are exempted through the interim 4(d) rule, and the resulting 100 acres are addressed through the ITS. Project activities would primarily occur over the next 1-5 years; however some activities may extend over the next ten years.

Table 6: Acreage affected by ongoing management activities on the ONF that may result in take of NLEB

Action type	Units of Adverse Effects	Units exempted through interim 4(d) rule	Units of Incidental Take	Units of Measure
HWDCUT	44,460	44,360	100	Acres
CONCUT	41,511	41,511		Acres
OPNMM	786	786		Acres
FIREWD	196	196		Acres
HAZTREE	600	600		Trees
RDBRUSH	340	340		Acres
RDCLOSE	29	29		Acres
SUP	3,277	3,277		Acres
MINORTREE	720	720		Acres
WLFISHSTR	1,291	1,291		Acres
Total	92,608 Acres 600 Trees	92,510 Acres 600 Trees	100 Acres	

If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation. In this case, the ONF must also

immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures provided.

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

The following reasonable and prudent measures (RPMs) are necessary and appropriate to minimize incidental take of NLEB:

1. Protect hibernacula from disturbance.

2. Avoid the removal of known NLEB maternity roost trees.

3. Report on the progress of project activities on the Forest and the impact on the species as required pursuant to 50 CFR 402.14 (i) (3).

TERMS AND CONDITIONS

Exemption from the prohibitions of section 9 of the ESA requires the Forest Service to comply with the following terms and conditions, which implement the RPMs described above and outline required reporting and monitoring requirements. These RPMs with their implementing terms and conditions are non-discretionary.

The following term and condition implements the first RPM:

1.1 No woody vegetation removal or soil disturbance will occur within 100 feet of known or assumed NLEB hibernacula entrances and associated sinkholes, fissures, or other karst features.

The following term and condition implements the second RPM:

2.1 If any NLEB maternity roost trees are identified within the project area, these roosts will be marked and not felled during any project-related activities, unless required to address public or worker safely. The ONF will evaluate planned activities around the roosts and establish appropriate buffers or protective measures in coordination with the USFWS so that project-related activities are not likely to damage or destroy the roosts, or make them unsuitable.

The following terms and conditions implement the third RPM:

3.1 Due to the difficulty to detect and quantify the actual incidental take of NLEB, the areal extent of potential roosting and foraging habitat affected will be used as surrogate to monitor the level of take. In order to track the amount of take that occurred during the year and cumulatively to date, the ONF will provide the

Service with an updated project list (Appendix A) that identifies the number of acres where project activities were implemented and if any timing restrictions were followed. The annual report, to be provided by April 1 of each year, will also include the number of live or dead NLEB encountered and the results of any NLEB surveys conducted.

3.2 The Forest Service or project contractors shall immediately notify the Service upon locating an injured or dead NLEB. Report the discovery of an injured or dead NLEB within 24 hours (48 hours if discovered on a Saturday) to the East Lansing Field Office (517) 351-2555.

CONSERVATION RECOMMENDATIONS

Section 7(a) (1) of the ESA directs federal agencies to utilize 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 adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. As described in the Conservation Measures section, the ONF has already been pro-active in participating in a number of efforts to contribute to the conservation of the NLEB and other forest bat species. These efforts contribute to the conservation and recovery of the NLEB consistent with Section 7(a) (1) of the ESA. The Service strongly supports these efforts and encourages the ONF to continue these efforts in the future.

The Service has identified the following additional actions that, if undertaken by the Forest Service, would further the conservation and assist in the recovery 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.

- Northern long-eared bats would benefit from minimizing activities with adverse effects during the period of summer occupancy (May 15 – September 1). Bats cannot be directly injured or killed if they are not present when the activities are in progress. Summer occupancy (First Tier) is defined as the time reasonably to be expected for bats to arrive at their summer home range until when most have migrated from the summer home range. If an activity with potential adverse effects cannot avoid the summer occupancy period, consideration should be made for implementation outside of the important non-volant period (Second Tier) when NLEB pups are born to the time they are flying (June 15 – August 1). Once bats are capable of flight, their ability to flush and evade injury and mortality from certain USFS actions is enhanced. Adverse effects to NLEB would be minimized by following these timing restrictions.

- To protect swarming and staging areas, the ONF should emphasize the conservation of NLEB habitat within 5 miles of hibernacula. Incorporating NLEB habitat features into other activities compatible with NLEB conservation, where feasible or practical, would benefit the species. In addition, where feasible or practical, project activities should occur at times when impacts to the bat would be minimized.

- Continue to gather information on the NLEB's distribution and use of the ONF during the spring, summer, and fall. For example:
    - Conduct inventory surveys
    - Conduct radio telemetry to monitor status of NLEB colonies
    - Participate in North American Bat Monitoring Program (NABat) surveys
    - Investigate habitat characteristics of the forest in areas where post-WNS NLEB occurrences have been documented (e.g. forest type, cover, distance to water)
    - Investigate NLEB use (acoustics, radio telemetry) of recently managed areas of different prescriptions

- Provide support to expand on scientific studies and educational outreach efforts on NLEB and White Nose Syndrome. For example:
    - Monitor the status/health of the known colonies
    - Collect samples for ongoing or future studies
    - Provide funding for WNS research activities (on or off USFS lands)
    - Allow USFS staff to contribute to administrative studies (on or off of USFS lands)

- Continue to assess (through Biological Assessments and/or NEPA associated assessments) the potential for activities (e.g., mining, drilling, fill, timber management, prescribed fire, etc.) to influence hibernacula or their microclimate.

- Continue to assess (through Biological Assessments and/or NEPA associated assessments) human access near hibernacula (e.g., trails and roads) that may increase the accessibility of hibernacula and evaluate for evidence of human access to hibernacula and the need for additional protective measures.

- The ONF should continue to work with the Service to reassess these Conservation Recommendations using best available science.

In order to be kept informed of actions minimizing or avoiding adverse effects, or benefitting listed species or their habitats, the ONF should notify the Service if any of these additional conservation actions are planned or if additional measures consistent with these conservation recommendations are implemented.

REINITIATION NOTICE

This concludes formal consultation for the ONF actions outlined in your request dated April 8, 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, as measured by acres of potential habitat, is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat is designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such a take must cease pending reinitiation.

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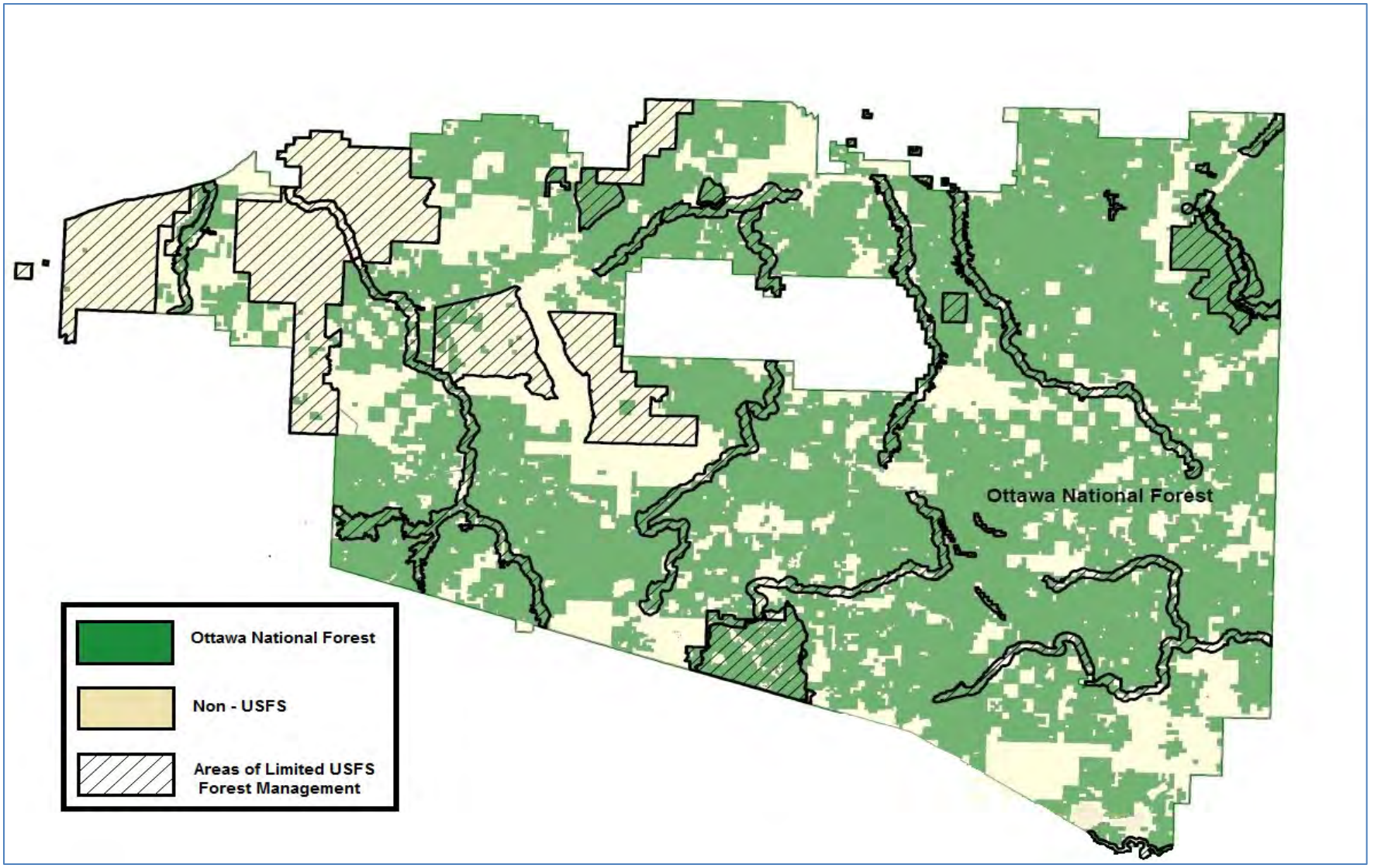
Appendix A - List of Actions

District	NEPA Document Name	Decision	Activity	Cutting Veg > 3" DBH?	Vegetative Community	Matrix Code	Number of Units Planned	UOM	Number of Units Implemented	Number of Units To Be Implemented (Calculated)	Under Contract?	Existing Timing Restrictions (NLEB is May 15 to Aug 15)	Can Incorporate Additional Mitigations for NLEB?	Exempt	Exemption Category	Comments
KEN/ONT	Baraga Plains Restoration	DN	Jack Pine Clearcut	Yes	Conifer	(CONCUT-LAA)	380	Acres	201.0	179.0	Yes, what's implemented	No	No	Yes	Forest Mngmt	
KEN/ONT	Baraga Plains Restoration	DN	Sanitation Salvage	Yes	Conifer	(CONCUT-LAA)	71	Acres	37.6	33.4	Yes, what's implemented	No	No	Yes	Forest Mngmt	
KEN/ONT	Baraga Plains Restoration	DN	Thin	Yes	Conifer	(CONCUT-LAA)	1010	Acres	534.3	475.7	Yes, what's implemented	No	No	Yes	Forest Mngmt	
KEN/ONT	Baraga Plains Restoration	DN	Prescribed fire	Yes	Conifer	(CONLMB-NLAA)	520	Acres	50	470.0	N/A	No	No	Yes	Forest Mngmt	
KEN/ONT	Baraga Plains Restoration	DN	Clearcut	Yes	Aspen	(HWDCUT-LAA)	750	Acres	396.7	353.3	Yes, what's implemented	No	No	Yes	Forest Mngmt	
KEN/ONT	Baraga Plains Restoration	DN	Improvement Cut	Yes	Hardwood	(HWDCUT-LAA)	49	Acres	25.9	23.1	Yes, what's implemented	No	No	Yes	Forest Mngmt	
KEN/ONT	Baraga Plains Restoration	DN	Paper Birch Clearcut	Yes	Hardwood	(HWDCUT-LAA)	73	Acres	38.6	34.4	Yes, what's implemented	No	No	Yes	Forest Mngmt	
KEN/ONT	Baraga Plains Restoration	DN	Selection	Yes	Hardwood	(HWDCUT-LAA)	86	Acres	45.5	40.5	Yes, what's implemented	No	No	Yes	Forest Mngmt	
KEN/ONT	Baraga Plains Restoration	DN	Shelterwood Harvest	Yes	Hardwood	(HWDCUT-LAA)	135	Acres	71.4	63.6	Yes, what's implemented	No	No	Yes	Forest Mngmt	
KEN/ONT	Baraga Plains Restoration	DN	Prescribed fire	No	Opening	(OPNBRN-NLAA)	141	Acres	141	141.0	N/A	No	No	Yes	Forest Mngmt	
KEN/ONT	Baraga Plains Restoration	DN	System Road Construction	Yes	Mixed Hardwood/Conifer	(HWDCUT-LAA)	3.78	Acres	2.03	1.75	N/A	No	No	No	Will need incidental take	
BESS/WAT	Beaton VMP	DN	Clearcut	Yes	Conifer	(CONCUT-LAA)	645	Acres	476.7	168.3	Yes, what's implemented	No	No	Yes	Forest Mngmt	
BESS/WAT	Beaton VMP	DN	Removal Cut	Yes	Conifer	(CONCUT-LAA)	12	Acres	9.2	3.2	Yes, what's implemented	No	No	Yes	Forest Mngmt	
BESS/WAT	Beaton VMP	DN	Clearcut	Yes	Aspen	(HWDCUT-LAA)	1080	Acres	798.2	281.8	Yes, what's implemented	No	No	Yes	Forest Mngmt	
BESS/WAT	Beaton VMP	DN	Improvement Cut	Yes	Hardwood	(HWDCUT-LAA)	43	Acres	31.9	11.3	Yes, what's implemented	No	No	Yes	Forest Mngmt	
BESS/WAT	Beaton VMP	DN	Selection	Yes	Hardwood	(HWDCUT-LAA)	6804	Acres	5028.6	1775.4	Yes, what's implemented	No	No	Yes	Forest Mngmt	
BESS/WAT	Beaton VMP	DN	Shelterwood	Yes	Hardwood	(HWDCUT-LAA)	35	Acres	25.6	9.0	Yes, what's implemented	No	No	Yes	Forest Mngmt	
BESS/WAT	Beaton VMP	DN	Openings	Yes	Opening	(OPNMM-LAA)	68	Acres	50.1	17.7	Potentially	No	No	Yes	Forest Mngmt	
BESS/WAT	Beaton VMP	DN	Long-Lived Conifer release Beatons and Little Beatons Lake shoreline	Yes	Mixed Hardwood/Conifer	(WLFISHSTR-LAA)	162	Acres	119.7	42.3	Potentially	No	No	Yes	Forest Mngmt	
BESS/WAT	Beaton VMP	DN	Stand Structural Impovement	Yes	Mixed Hardwood/Conifer	(WLFISHSTR-LAA)	931	Acres	688.1	242.9	Yes, what's implemented	No	No	Yes	Forest Mngmt	
BESS/WAT	Beaton VMP	DN	System Road Construction	Yes	Mixed Hardwood/Conifer	(HWDCUT-LAA)	16.29	Acres	11.9	4.36	N/A	No	No	No	Will need incidental take	
KEN/WAT	Bluff Divide VMP	DN	Clearcut	Yes	Conifer	(CONCUT-LAA)	318	Acres	295.5	22.5	Yes, what's implemented	No	No	Yes	Forest Mngmt	
KEN/WAT	Bluff Divide VMP	DN	Thin	Yes	Conifer	(CONCUT-LAA)	1672	Acres	1553.8	118.2	Yes, what's implemented	No	No	Yes	Forest Mngmt	
KEN/WAT	Bluff Divide VMP	DN	Clearcut	Yes	Aspen	(HWDCUT-LAA)	1110	Acres	1031.5	78.5	Yes, what's implemented	No	No	Yes	Forest Mngmt	
KEN/WAT	Bluff Divide VMP	DN	Clearcut	Yes	Hardwood	(HWDCUT-LAA)	88	Acres	81.8	6.2	Yes, what's implemented	No	No	Yes	Forest Mngmt	
KEN/WAT	Bluff Divide VMP	DN	Overstory Removal	Yes	Hardwood	(HWDCUT-LAA)	141	Acres	131.0	10.0	Yes, what's implemented	No	No	Yes	Forest Mngmt	
KEN/WAT	Bluff Divide VMP	DN	Shelterwood	Yes	Mixed Hardwood/Conifer	(HWDCUT-LAA)	28	Acres	26.0	2.0	Yes, what's implemented	No	No	Yes	Forest Mngmt	
KEN/WAT	Bluff Divide VMP	DN	Thin	Yes	Mixed Hardwood/Conifer	(HWDCUT-LAA)	247	Acres	229.5	17.5	Yes, what's implemented	No	No	Yes	Forest Mngmt	
KEN/WAT	Bluff Divide VMP	DN	Thin	Yes	Hardwood	(HWDCUT-LAA)	4746	Acres	4410.5	335.5	Yes, what's implemented	No	No	Yes	Forest Mngmt	
KEN/WAT	Bluff Divide VMP	DN	Opening maintenance	Yes	Opening	(OPNMM-LAA)	196	Acres	182.3	13.7	Potentially	No	No	Yes	Forest Mngmt	
KEN/WAT	Bluff Divide VMP	DN	Alder openings	Yes	Other	(OPNMM-NLAA)	14	Acres	13.0	1.0	Yes, what's implemented	No	No	N/A	N/A	
KEN/WAT	Bluff Divide VMP	DN	System Road Construction	Yes	Mixed Hardwood/Conifer	(HWDCUT-LAA)	9.31	Acres	8.7	0.58	N/A	No	No	No	Will need incidental take	
FOREST	Building Maintenance, Removal or Demolition		Building Structure Removal or Demolition	No	Other	(BUILDING-NLAA)	2	Structure	0	2.0	No	No	No	N/A	N/A	
KEN	Davidson Lakes Prescribed Burn	DN	Prescribed fire - openings maintenance	Yes	Opening	(OPNBRN-NLAA)	80	Acres	0	80.0	N/A	No	No	N/A	N/A	
FOREST	Firewood Cutting per year		Firewood Cutting	Yes	Mixed Hardwood/Conifer	(FIREWD-LAA)	98	Acres		98.0	N/A	No	No	Yes	Limited Tree Removal	
FOREST	Forestwide Openings Maintenance	DM	Opening Maintenance	Yes	Opening	(OPNMM-LAA)	500	Acres	350	150.0	Yes, what's implemented	No	No	Yes	Forest Mngmt	
FOREST	Hazard Tree Removals per year		Hazard Tree Removal	Yes	Mixed Hardwood/Conifer	(HAZTREE-LAA)	600	Each		600.0	N/A	No	No	Yes	Hazard Tree	
FOREST	Holiday Tree Harvest		Holiday Tree Harvest	Yes	Conifer	(HOLIDAYTREES-NLAA)	85	Each		85.0	N/A	No	No	N/A	N/A	
KEN/WAT	Interior	DN	Mechanical Treatment (timber harvest) fuels reduction/RxFire	Yes	Conifer	(CONCUT-LAA)	3227	Acres	0	3227.0	No	No	No	Yes	Forest Mngmt	
KEN/WAT	Interior	DN	Thinning	Yes	Conifer	(CONCUT-LAA)	2759	Acres	0	2759.0	No	No	No	Yes	Forest Mngmt	
KEN/WAT	Interior	DN	Clearcut	Yes	Mixed Hardwood/Conifer	(HWDCUT-LAA)	2711	Acres	0	2711.0	Yes, what's implemented	No	No	Yes	Forest Mngmt	
KEN/WAT	Interior	DN	Long-lived Conifer Release	Yes	Mixed Hardwood/Conifer	(HWDCUT-LAA)	443	Acres	0	443.0	No	No	No	Yes	Forest Mngmt	
KEN/WAT	Interior	DN	Pre-Commercial Thin	Yes	Mixed Hardwood/Conifer	(HWDCUT-LAA)	106	Acres	0	106.0	No	No	No	Yes	Forest Mngmt	
KEN/WAT	Interior	DN	Salvage	Yes	Mixed Hardwood/Conifer	(HWDCUT-LAA)	380	Acres	0	380.0	No	No	No	Yes	Forest Mngmt	
KEN/WAT	Interior	DN	Selection	Yes	Hardwood	(HWDCUT-LAA)	6219	Acres	0	6219.0	No	No	No	Yes	Forest Mngmt	
KEN/WAT	Interior	DN	Shelterwood	Yes	Hardwood	(HWDCUT-LAA)	99	Acres	0	99.0	No	No	No	Yes	Forest Mngmt	
KEN/WAT	Interior	DN	Thinning	Yes	Hardwood	(HWDCUT-LAA)	4027	Acres	0	4027.0	No	No	No	Yes	Forest Mngmt	
KEN/WAT	Interior	DN	Opening Maintenance	Yes	Opening	(OPNMM-LAA)	286	Acres	0	286.0	Potentially	No	No	Yes	Forest Mngmt	
KEN/WAT	Interior	DN	Vegetation removal along roads to reduce fuels	Yes	Mixed Hardwood/Conifer	(RDBRUSH-LAA)	128	Acres	0	128.0	No	No	No	Yes	Forest Mngmt	
KEN/WAT	Interior	DN	Mechanical Treatment (site prep)/Rx fire	Yes	Hardwood	(SPREP-NLAA)	152	Acres	0	152.0	No	No	No	N/A	N/A	
KEN/WAT	Interior	DN	Mechanical Treatment (site prep)/Rx fire	Yes	Conifer	(SPREP-NLAA)	242	Acres	0	242.0	No	No	No	N/A	N/A	
KEN/WAT	Interior	DN	Large Woody Material placement along lakes	Yes	Mixed Hardwood/Conifer	(WLFISHSTR-LAA)	38	Acres	0	38.0	No	No	No	Yes	Limited Tree Removal	
KEN/WAT	Interior	DN	Large Woody Material placement along streams	Yes	Mixed Hardwood/Conifer	(WLFISHSTR-LAA)	127	Acres	0	127.0	No	No	No	Yes	Limited Tree Removal	
KEN/WAT	Interior	DN	System Road Construction	Yes	Mixed Hardwood/Conifer	(HWDCUT-LAA)	26.18	Acres	0	26.18	N/A	No	No	No	Will need incidental take	
KEN/ONT	Pori VMP	DN	Clearcut	Yes	Conifer	(CONCUT-LAA)	233	Acres	0	233.0	No	No	No	Yes	Forest Mngmt	
KEN/ONT	Pori VMP	DN	Kits Creek Timber Harvest	Yes	Conifer	(CONCUT-LAA)	3	Acres	0	3.0	No	No	No	Yes	Forest Mngmt	
KEN/ONT	Pori VMP	DN	Salvage	Yes	Conifer	(CONCUT-LAA)	38	Acres	0	38.0	No	No	No	Yes	Forest Mngmt	
KEN/ONT	Pori VMP	DN	Short-lived conifer improvement	Yes	Conifer	(CONCUT-LAA)	200	Acres	0	200.0	No	No	No	Yes	Forest Mngmt	
KEN/ONT	Pori VMP	DN	Thinning	Yes	Conifer	(CONCUT-LAA)	4035	Acres	0	4035.0	No	No	No	Yes	Forest Mngmt	
KEN/ONT	Pori VMP	DN	Clearcut	Yes	Aspen	(HWDCUT-LAA)	1838	Acres	0	1838.0	No	No	No	Yes	Forest Mngmt	
KEN/ONT	Pori VMP	DN	Gravel Pit construction	Yes	Mixed Hardwood/Conifer	(HWDCUT-LAA)	8	Acres	0	8.0	N/A	No	No	No	Will need incidental take	
KEN/ONT	Pori VMP	DN	Improvement Harvest	Yes	Hardwood	(HWDCUT-LAA)	345	Acres	0	345.0	No	No	No	Yes	Forest Mngmt	
KEN/ONT	Pori VMP	DN	Selection	Yes	Hardwood	(HWDCUT-LAA)	8068	Acres	0	8068.0	No	No	No	Yes	Forest Mngmt	
KEN/ONT	Pori VMP	DN	Shelterwood	Yes	Hardwood	(HWDCUT-LAA)	350	Acres	0	350.0	No	No	No	Yes	Forest Mngmt	
KEN/ONT	Pori VMP	DN	Thinning	Yes	Hardwood	(HWDCUT-LAA)	1271	Acres	0	1271.0	No	No	No	Yes	Forest Mngmt	
KEN/ONT	Pori VMP	DN	Kits Creek Opening Maintenance	Yes	Opening	(OPNMM-LAA)	121	Acres	0	121.0	No	No	No	Yes	Forest Mngmt	
KEN/ONT	Pori VMP	DN	Opening maintenance	Yes	Mixed Hardwood/Conifer	(OPNMM-LAA)	65	Acres	0	65.0	Potentially	No	No	Yes	Forest Mngmt	
KEN/ONT	Pori VMP	DN	Large Woody Material placement	Yes	Mixed Hardwood/Conifer	(WLFISHSTR-LAA)	109	Acres	0	109.0	No	No	No	Yes	Limited Tree Removal	
KEN/ONT	Pori VMP	DN	System Road Construction	Yes	Mixed Hardwood/Conifer	(HWDCUT-LAA)	32	Acres	0	32	N/A	No	No	No	Will need incidental take	
FOREST	Red Pine Thinning	DN	Thinning	Yes	Conifer	(CONCUT-LAA)	29400	Acres	0	29400.0	No	No	No	Yes	Forest Mngmt	
BESS	RedBoat RMP	DN	Group Select	Yes	Conifer	(CONCUT-LAA)	124	Acres	20.5	103.8	Yes, what's implemented	No	No	Yes	Forest Mngmt	
BESS	RedBoat RMP	DN	Salvage	Yes	Conifer	(CONCUT-LAA)	14	Acres	2.4	12.0	Yes, what's implemented	No	No	Yes	Forest Mngmt	
BESS	RedBoat RMP	DN	Thin	Yes	Conifer	(CONCUT-LAA)	401	Acres	66.1	334.9	Yes, what's implemented	No	No	Yes	Forest Mngmt	
BESS	RedBoat RMP	DN	Clearcut	Yes	Aspen	(HWDCUT-LAA)	1911	Acres	315.1	1595.9	Yes, what's implemented	No	No	Yes	Forest Mngmt	
BESS	RedBoat RMP	DN	Clearcut	Yes	Mixed Hardwood/Conifer	(HWDCUT-LAA)	697	Acres	114.9	582.1	Yes, what's implemented	No	No	Yes	Forest Mngmt	
BESS	RedBoat RMP	DN	Habitat Improvement Paper Birch Regeneration	Yes	Hardwood	(HWDCUT-LAA)	14	Acres	2.3	11.6	Yes, what's implemented	No	No	Yes	Forest Mngmt	
BESS	RedBoat RMP	DN	Improvement Cut	Yes	Mixed Hardwood/Conifer	(HWDCUT-LAA)	347	Acres	57.3	290.1	Yes, what's implemented	No	No	Yes	Forest Mngmt	
BESS	RedBoat RMP	DN	Long-lived Conifer Release	Yes	Mixed Hardwood/Conifer	(HWDCUT-LAA)	190	Acres	31.4	158.8	Yes, what's implemented	No	No	Yes	Forest Mngmt	
BESS	RedBoat RMP	DN	Overstory Removal	Yes	Hardwood	(HWDCUT-LAA)	70	Acres	11.6	58.6	Yes, what's implemented	No	No	Yes	Forest Mngmt	
BESS	RedBoat RMP	DN	Selection	Yes	Hardwood	(HWDCUT-LAA)	7338	Acres	1210.0	6127.7	Yes, what's implemented	No	No	Yes	Forest Mngmt	
BESS	RedBoat RMP	DN	Shelterwood	Yes	Hardwood	(HWDCUT-LAA)	38	Acres	6.3	31.7	Yes, what's implemented	No	No	Yes	Forest Mngmt	
BESS	RedBoat RMP	DN	Thin	Yes	Hardwood	(HWDCUT-LAA)	417	Acres	68.8	348.2	Yes, what's implemented	No	No	Yes	Forest Mngmt	
BESS	RedBoat RMP	DN	Opening Maintenance	Yes	Opening	(OPNMM-LAA)	57	Acres	9.4	48.1	Potentially	No	No	Yes	Forest Mngmt	
BESS	RedBoat RMP	DN	Fish Habitat Improvement - LWM	Yes	Conifer	(WLFISHSTR-LAA)	7	Acres	1.1	5.5	No	No	No	Yes	Limited Tree Removal	
BESS	RedBoat RMP	DN	Fish Habitat Improvement - LWM	Yes	Hardwood	(WLFISHSTR-LAA)	6	Acres	1.0	5.1	No	No	No	Yes	Limited Tree Removal	
BESS	RedBoat RMP	DN	Structural Improvement	Yes	Mixed Hardwood/Conifer	(WLFISHSTR-LAA)	865	Acres	142.6	722.1	Yes, what's implemented	No	No	Yes	Forest Mngmt	
BESS	RedBoat RMP	DN	System Road Construction	Yes	Mixed Hardwood/Conifer	(HWDCUT-LAA)	9.3	Acres	1.5	7.85	N/A	No	No	No	Will need incidental take	
BERG	Ridge VMP	DN	Salvage for White Pine	Yes	Conifer	(CONCUT-LAA)	21	Acres	16.0	5.0	Yes, what's implemented	No	No	Yes	Forest Mngmt	
BERG	Ridge VMP	DN	Shelterwood Seed Cut for White Pine	Yes	Conifer	(CONCUT-LAA)	30	Acres	22.9	7.1	Yes, what's implemented	No	No	Yes	Forest Mngmt	
BERG	Ridge VMP	DN	Thinning in Spruce Plantations	Yes	Conifer	(CONCUT-LAA)	646	Acres	492.9	153.1	Yes, what's implemented	No	No	Yes	Forest Mngmt	
BERG	Ridge VMP	DN	Clearcut for Aspen	Yes	Aspen	(HWDCUT-LAA)	1,990	Acres	1518.3	471.7	Yes, what's implemented	No	No	Yes	Forest Mngmt	
BERG	Ridge VMP	DN	Commercial Thinning in Hardwoods	Yes	Hardwood	(HWDCUT-LAA)	792	Acres	604.3	187.7	Yes, what's implemented	No	No	Yes	Forest Mngmt	
BERG	Ridge VMP	DN	Expand Gravel Pit	Yes	Mixed Hardwood/Conifer	(HWDCUT-LAA)	1	Acres	0	1.0	N/A	No	No	No		
BERG	Ridge VMP	DN	Improvement for Hardwoods	Yes	Hardwood	(HWDCUT-LAA)	266	Acres	203.0	63.0	Yes, what's implemented	No	No	Yes	Forest Mngmt	
BERG	Ridge VMP	DN	Selection	Yes	Hardwood	(HWDCUT-LAA)	3374	Acres	2574.3	799.7	Yes, what's implemented	No	No	Yes	Forest Mngmt	400 Hardwood Sale with Require Incidental Take
BERG	Ridge VMP	DN	Shelterwood Seed Cut for Paper Birch	Yes	Hardwood	(HWDCUT-LAA)	32	Acres	24.4	7.6	Yes, what's implemented	No	No	Yes	Forest Mngmt	



Appendix B: Ottawa National Forest Management Areas (MAs 5.2, 5.3, 7.1, 8.1, 8.2, 8.3, 9.2, and 9.3) with limited or no timber management potential. Not pictured is the McCormick Wilderness Area (MA 5.1).

Appendix A - List of Actions

District	NEPA Document Name	Decision	Activity	Cutting Veg > 3" DBH?	Vegetative Community	Matrix Code	Number of Units Planned	UOM	Number of Units Implemented	Number of Units To Be Implemented (Calculated)	Under Contract?	Existing Timing Restrictions (NLEB is May 15 to Aug 15)	Can Incorporate Additional Mitigations for NLEB?	Exempt	Exemption Category	Comments
BERG	Ridge VMP	DN	Prescribed burning	Yes	Hardwood	(HWDLMB-NLAA)	20	Acres	0	20.0	N/A	No	No	N/A	N/A	
BERG	Ridge VMP	DN	Opening maintenance	Yes	Opening	(OPNMM-LAA)	200	Acres	152.6	47.4	Potentially	No	No	Yes	Forest Mngmt	
BERG	Ridge VMP	DN	Trail Construction	Yes	Mixed Hardwood/Conifer	(HWDCUT-LAA)	2.76	Acres		1.71	Yes, what's implemented	No	No	No	Will need incidental take	Hardwood conversion to OHV trail.
BERG	Ridge VMP	DN	System Road Construction	Yes	Mixed Hardwood/Conifer	(HWDCUT-LAA)	8.72	Acres	6.68	2.04	N/A	No	No	No	Will need incidental take	
FOREST	Riparian Restoration		Long-lived tree species release and tree planting	Yes	Mixed Hardwood/Conifer	(WLFISHSTR-LAA)	100 - 200	Acres/yr		100 - 200	Potentially	No	No	Yes	Forest Mngmt	
FOREST	Road and Stream Crossing (AOP)	DM	Replace cluverts	Yes	Water	(RDBRUSH-LAA)	19.1	Acres	0.91	18.2	Potentially	No	No	Yes	Limited Tree Removal	
ONT	Rousseau VMP	DN	Clearcut	Yes	Aspen	(HWDCUT-LAA)	580	Acres	325.4	254.6	Yes, what's implemented	No	No	Yes	Forest Mngmt	
ONT	Rousseau VMP	DN	Improvement Cut	Yes	Hardwood	(HWDCUT-LAA)	376	Acres	210.9	165.1	Yes, what's implemented	No	No	Yes	Forest Mngmt	
ONT	Rousseau VMP	DN	Removal Cut	Yes	Hardwood	(HWDCUT-LAA)	80	Acres	44.9	35.1	Yes, what's implemented	No	No	Yes	Forest Mngmt	
ONT	Rousseau VMP	DN	Selection Cut	Yes	Hardwood	(HWDCUT-LAA)	3,918	Acres	2198.1	1719.9	Yes, what's implemented	No	No	Yes	Forest Mngmt	
ONT	Rousseau VMP	DN	Shelterwood Cut	Yes	Mixed Hardwood/Conifer	(HWDCUT-LAA)	621	Acres	348.4	272.6	Yes, what's implemented	No	No	Yes	Forest Mngmt	
ONT	Rousseau VMP	DN	Site Preparation for Hemlock Regeneration	Yes	Mixed Hardwood/Conifer	(HWDCUT-LAA)	913	Acres	512.2	400.8	Yes, what's implemented	No	No	Yes	Forest Mngmt	
ONT	Rousseau VMP	DN	Thinning	Yes	Mixed Hardwood/Conifer	(HWDCUT-LAA)	4,301	Acres	2413.0	1888.0	Yes, what's implemented	No	No	Yes	Forest Mngmt	
ONT	Rousseau VMP	DN	Opening maintenance	Yes	Opening	(OPNMM-LAA)	85	Acres	47.7	37.3	Potentially	No	No	Yes	Forest Mngmt	
ONT	Rousseau VMP	DN	Alder regeneration	No	Other	(OPNMM-NLAA)	3	Acres	0	3.0	Potentially	No	No	N/A	N/A	
ONT	Rousseau VMP	DN	System Road Construction	Yes	Mixed Hardwood/Conifer	(HWDCUT-LAA)	11.63	Acres	6.39	5.24	N/A	No	No	No	Will need incidental take	
FOREST	Special Use Permits with Veg. Mngmt ROW	DMs	Vegetation treatment to access sites	Yes	Mixed Hardwood/Conifer	(SUP-LAA)	3126.68	Acres	0	3126.7	N/A	No	No	Yes	ROW	338 Permits
FOREST	Special Use Permits with Veg. Mngmt MTR	DMs	Vegetation treatment to access sites	Yes	Mixed Hardwood/Conifer	(SUP-LAA)	150.39	Acres	0	150.39	N/A	No	No	Yes	Limited Tree Removal	40 Permits
FOREST	Total Forest Road Decomm/Closing each year		Road Decomm/Closing	Yes	Mixed Hardwood/Conifer	(RDCLOSE-LAA)	29	Acres	0	29	No	No	No	Yes	Limited Tree Removal	
FOREST	Total Roadside Brushing (contract brushing)		Roadside Brushing	Yes	Mixed Hardwood/Conifer	(RDBRUSH-LAA)	194	Acres	0	194.0	Recurring Contract	No	No	Yes	ROW	
ONT	Trans Superior Mineral Prospecting	DN	Drill pad for core samplingy	Yes	Mixed Hardwood/Conifer	(MINORTREE-LAA)	720	Acres	0	720.0	Required to Allow by law	No	No	Yes	Limited Tree Removal	
FOREST	Weed EA	DN	Bio Control Insects	No	Other	(HERB-NLAA)	10	Up to sites/year		10.0	N/A	No	No	N/A	N/A	
FOREST	Weed EA	DN	Herbicide	Yes	Other	(HERB-NLAA)	400	Up to acres/yr		400.0	N/A	No	No	N/A	N/A	