

Biological Opinion for the Northern Long-eared Bat (*Myotis septentrionalis*) for the USDA Forest Service to Complete Six Ongoing Projects at the Wayne National Forest in Southern Ohio

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Prepared by:
U.S. Fish and Wildlife Service
Ohio Ecological Services Field Office
4625 Morse Road
Columbus, OH 43230
(614) 416-8993

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INTRODUCTION

This document transmits the U.S. Fish and Wildlife Service's (Service) Conference Opinion (CO) based on our review of the U.S. Forest Service's (FS) ongoing activities on the Wayne National Forest (WNF), 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.*). This Biological Opinion (BO) is in response to the FS' February 19, 2015 request for conferencing, prior to the final listing of the species and pursuant to section 7 of the ESA, regarding six proposed, ongoing projects that have been previously reviewed and coordinated due to potential impacts to the Indiana bat and are now being reviewed for potential impacts to the NLEB. On April 2, 2015, the Service published a final rule to list the NLEB as threatened (80 FR 17974). Therefore, this document is a Biological Opinion instead of a Conference Opinion as requested by the FS. The projects being evaluated are 2006 Athens Prescribed Burning, Pleasant Bear Vegetation Management, Ironton Habitat Enhancement and Fuels Management, Pine Creek Historic Forest Restoration, Gore-Greendale Diverse Continuous Forest, and Athens Tornado Salvage Treatment. All projects will occur within the Wayne National Forest (WNF) located within parts of the Athens and Ironton Ranger Districts in southeastern Ohio. The FS determined that all activities have had prior coordination/consultation for all other involved federally-listed species. Therefore, this BO addresses one species, the NLEB.

This BO is based on information provided in the February 19, 2015 letter from the FS, previously provided information on the individual projects, unpublished reports from the FS, and additional information from FS and Service biologists. A complete administrative record of this consultation is on file at the Service's Columbus Ohio Field Office.

CONSULTATION HISTORY

On November 22, 2005, the Service issued a programmatic biological opinion (PBO) for the Wayne National Forest's Revised Land and Resource Management Plan (Forest Plan) (USFS 2006). This PBO established a two-tiered consultation process for Forest Plan activities, with issuance of the programmatic opinion being Tier 1 and all subsequent site-specific project analyses constituting Tier 2 consultations. Under this tiered process, the Service will produce tiered biological opinions when it is determined that site-specific projects are likely to adversely affect federally listed species. When may affect, not likely to adversely affect determinations are made, the Service will review those projects and if justified, provide written concurrence and section 7(a)(2) consultation will be considered completed for those site-specific projects. The NLEB was not considered in the PBO and this document will fulfill consultation requirements for this species.

The ongoing projects are consistent with the Forest Plan (USFS 2006). The main activities comprising the projects include prescribed fire, fire line construction and maintenance, timber harvest, construction of roads, skid trails, and log landings, permanent openings creation, and timber stand improvement (TSI). All applicable Standards and Guidelines from the Forest Plan are incorporated into the projects. The measures include such practices as avoiding impacts to all shagbark or shellbark hickory trees greater than 6 inch diameter at breast height (dbh), and

removing all unavoidable potential Indiana bat roost trees between September 15 and April 15. All of these projects have been previously consulted with the Service to determine potential impacts to federally listed species that were listed at the time of consultation as required under ESA. Other effects from activities in the ongoing projects are not likely to adversely affect NLEBs, such as white pine harvest and wildlife habitat improvement activities. Since these other activities are not expected to directly or indirectly impact the NLEB and they will not impact suitable habitat they do not require coordination with the Service. The ongoing projects, in their entirety were disclosed in previous project-specific analyses for Indiana bats.

On April 2, 2015, the Service published a final rule to list the NLEB as threatened (80 FR 17974). Recently white-nose syndrome (WNS), a novel fungal pathogen, has caused serious declines in the NLEB population in the northeastern U.S. WNS has also been documented in Ohio. The Service and the FS have already begun discussions at the national, regional, and local levels to determine how to best address cooperative conservation of this species, and we have been working with staff from WNF to begin incorporating conservation measures into projects to protect the NLEB prior to any potential final listing decisions.

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

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

The Service's interim 4(d) rule for the NLEB exempts the take of NLEBs from the section 9 prohibitions of the ESA, as follows:

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

Thus any take of the NLEB occurring in conjunction with these activities that complies with the conservation measures, as necessary, is exempted from section 9 prohibitions by the interim 4(d) rule, and does not require incidental take authorization.

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.

Pursuant to section 7(a)(4) of the ESA, Federal action agencies are required to confer with the Service if their proposed action is likely to jeopardize the continued existence of a proposed species (50 CFR 402.10(a)). Federal action agencies may also voluntarily confer with the Service if the proposed action may affect a proposed species. Species proposed for listing are not afforded protection under the ESA; however as soon as a listing becomes effective, the prohibition against jeopardizing its continued existence and “take” applies regardless of an action’s stage of completion. If the Federal agency retains any discretionary involvement or control over on-the-ground actions that may affect the species after listing, section 7 applies. Therefore, because the NLEB has been documented within WNF and may be present within the proposed project area, the FS requested initiation of conferencing for this species prior to the final listing of this species.

The conference process is similar to the consultation process and may be either informal or formal. Critical Habitat has not been proposed for this species and therefore will not be modified or destroyed. The FS has determined that the proposed six ongoing projects *may affect and are likely to adversely affect* the NLEB. However, they will not result in jeopardy of this species. This BO will address this determination and provide a jeopardy analysis. This document therefore serves as BO for formal conferencing on the NLEB.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The Federal actions being evaluated in this conference opinion are the six ongoing projects listed below. The FS reviewed all their ongoing actions and determined that these projects were ongoing or are expected to be implemented near the time of the April 2, 2015 listing determination for the NLEB. These projects include the 2006 Athens Prescribed Burning, Pleasant Bear Vegetation Management, Ironton Habitat Enhancement and Fuels Management, Pine Creek Historic Forest Restoration, Gore-Greendale Diverse Continuous Forest, and Athens Tornado Salvage Treatment. These projects were identified as having the potential to negatively affect the NLEB. Other projects with activities that are not expected to adversely affect this species were reviewed and coordinated separately.

The following are descriptions of the activities that will be conducted as a part of these six projects listed above and are expected to have an adverse effect to the NLEB. These projects have been or will be initiated near April 2, 2015. Thus the information below reflects that maximum impacts that will occur over the life of the projects from beginning to end. For projects that have already been initiated some impacts will have already occurred. Activities that have

totally been completed are not included below. This BO will consider the primary remaining treatments listed below.

The following project background and descriptions are summarized from the February 19, 2015 letter from the FS. Additional information on these projects can be found in the original project descriptions and are incorporated here by reference.

2006 Athens Prescribed Burning

The project is being implemented to restore and maintain an oak-hickory ecosystem. This activity will include prescribed fire and fire line construction and maintenance as needed. Prescribed fire is expected to occur between and August 15 (and more likely after October 15) and spring green-up of local plants, which is expected to occur by the end of April. No burns will occur during the period when bats are born or young are expected to be non-volant (June –July). Tree clearing and snag removal associated with fire line preparation is routinely conducted after October 1 and before March 31 to be prepared for available burn windows. The project is located on approximately 2,052 acres of the Athens Ranger District. Approximately 666 acres of prescribed burning and 2.6 miles of fire line remain to be conducted and maintained. All applicable Standards and Guidelines from the 2006 Forest Plan will be implemented.

Pleasant Bear Vegetation Management

This activity will occur on the Marietta Unit of the Athens Ranger District. It includes prescribed fire, fire line construction and maintenance as needed, timber harvest, construction of roads, skid trails, and log landings, and permanent openings creation. The project will develop wildlife habitat by creating early successional habitat, restoring oak-hickory ecosystems, increasing diversity in age class, and establishing structural diversity in existing even-aged forest stands. All applicable Standards and Guidelines from the 2006 Forest Plan will be implemented. Approximately 2,000 acres will be impacted by the activities described above over the life of this project. Permanent openings will be created on twelve acres. New road construction will create 29.4 acres of impacts. Construction of fire line will require impacts to 21.4 miles of WNF, and prescribed fire on 870 acres is expected to occur between and August 15 (and more likely after October 15) and spring green-up of local plants, which is expected to occur by mid-April. No burns will occur during the period when bats are born or young are expected to be non-volant (June –July). Tree clearing and snag removal associated with fire line preparation is routinely conducted after October 1 and before March 31 to be prepared for available burn windows. However, some tree removal may occur between April 1 to April 15 and September 1 to September 30.

Ironton Habitat Enhancement and Fuels Management

This project will occur on the Ironton Ranger District and it will involve prescribed fire and fire line construction and maintenance as needed. The purpose of the project is to improve habitat and reduce fire hazard on approximately 2,228 acres. In addition to all applicable Standards and Guidelines from the 2006 Forest Plan that will be implemented, the following requirements will also be implemented: snags and trees identified as potentially suitable Indiana bat maternity roosting trees within the burn unit will not be removed unless they are near a fire line and pose a hazard to firefighter safety; fires will be planned when convection patterns lift the smoke relatively straight upwards, thus preventing it from drifting toward the vicinity of swarm sites or

hibernacula. Prescribed burns will occur between August 15 (and more typically after October 15) and mid- to late April. No burns will occur during the period when bats are born or young are expected to be non-volant (June –July). The total amount of fire line that will be constructed and maintained for multiple re-entries is 59.1 miles. Most tree removal associated with the construction of fire lines occurs when the fire lines are first established. In succeeding years the fire lines are maintained before each burn. The amount of tree clearing for maintenance of these fire lines in succeeding years is expected to decline as these fire lines would have been maintained more recently. The 59.1 miles includes the multiple times that these miles of fire line are maintained. Tree clearing and snag removal associated with fire line preparation is routinely conducted after October 1 and before March 31 to be prepared for available burn windows. However, some tree removal may occur between April 1 to April 15 and September 1 to September 30.

Pine Creek Historic Forest Restoration

This project will restore the oak-hickory ecosystem on the Ironton Ranger District. It will include timber harvest and construction of roads, skid trails, and log landings. The total area of impact over the life of the project will be approximately 4,256 acres. Permanent road construction, temporary road construction, and creation of skid trails and log landings will result in impacts to a total of 88.15 acres. All applicable Standards and Guidelines from the 2006 Forest Plan will be implemented.

Gore-Greendale Diverse Continuous Forest

This project will increase vigor of overcrowded forests, reduce hazardous fuel loads, and promote oak-hickory regeneration on the Athens Ranger District. It will involve prescribed fire, fire line construction and maintenance as needed, and timber harvest. Prescribed fire will impact 147 acres and 2.0 miles of fire line. There are three units of white pine harvest (32.7 acres) and one unit of hardwood harvest (29.0 acres). The access trails, and log landings have already been established. White pine, which provides limited habitat for the NLEB, is being treated (32.7 acres) to encourage conversion back to native hardwoods.

Athens Tornado Salvage Treatment

This project will occur on the Athens Ranger District. It will involve timber stand improvement (TSI) on approximately 65 acres of the 97-acre unit. The activity will include felling of trees 2-6 inches dbh which are creating competition for the larger trees. Larger trees, snags, and oak species will be avoided. This work may not occur for 5-8 years.

The FS determined that all six of these ongoing projects are likely to adversely affect the NLEB. All of these projects either involve prescribed fire in forested areas and/or tree removal outside the hibernation period, and thus, have the potential to adversely affect roosting and/or foraging habitat for the NLEB. Many of these projects were initiated several years ago and as a result are largely completed, while some projects have just recently begun implementation.

The FS and the Service previously consulted on these projects under the PBO. Previous consultation documents provided full descriptions of the proposed actions for each of these projects, and are incorporated herein by reference.

The Service concurs that these six projects are likely to adversely affect the NLEB. The remainder of the BO will address impacts from these six ongoing projects.

Conservation Measures

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

To be in compliance with the interim 4(d) rule for NLEB, the FS has committed to the following conservation measures as part of the project description:

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

Proposed NLEB conservation measures include the Standards and Guidelines from the 2006 Forest Plan that were established to avoid and minimize incidental take of the Indiana bat. The Service recognizes that, individually and/or cumulatively, these bat conservation measures will contribute to the avoidance and minimization of adverse effects to the NLEB; however, these measures do not necessarily eliminate all adverse effects that may result from the proposed actions. These conservation measures are included by reference and are described fully in Appendix D of the Forest Plan (USFS 2006).

The WNF provides swarming, hibernating, and summering habitat for the NLEB and the Forest Plan already includes some conservation measures that will protect and manage habitats that support these three key life stages. For example, one of the known NLEB hibernacula on the WNF also supports Indiana bats. Therefore, the protection measures already in place around this site will also protect its use as a NLEB hibernacula and the swarming habitat around it. The WNF's ongoing bat monitoring efforts also serve to provide information on the presence and abundance of NLEBs on the WNF. Similarly the Forest Plan includes measures to conserve bat roosting and foraging habitat that apply to all projects implemented under the Forest Plan regardless of whether they occur in areas known to support the Indiana bat. These measures, which also protect the NLEB, include retaining all shagbark hickory trees 6 inches in dbh or greater in harvest units, and retaining an average of 12 live trees per acre that are greater than or equal to 6 inches dbh with large areas of loose bark and an additional minimum of 9 live, greater than or equal to 11 inches dbh of preferred Indiana bat roost tree species to provide a supply of future roost trees 6 snags per acre that are 9 inches dbh or greater within harvest units.

However, some of the conservation measures in the Forest Plan are specific to the Indiana bat maternity habitat and would not be protective of the NLEB unless known Indiana bat maternity colonies were also present. These measures include the requirements to establish buffers around known Indiana bat maternity sites, retention of known Indiana bat roost trees, and the requirement to develop additional site-specific protective measures when projects are planned within buffers around maternity sites.

Action Area

The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. Summer roost trees are often clustered together and located some distance from foraging areas (Sasse and Pekins 1996). Points of capture are generally considered to be in foraging habitat. Distances between roost trees and points of capture in northeast Ohio varied from 158-1,550 m (Krynak 2010), the mean in southeast Ohio was 300 ± 40 m (range 100-800 m; Schultes 2002), and it was 602 m (range 60-1,179 m) in New Hampshire (Sasse and Pekins 1996). The average distance between roost trees and point of capture in eastern Canada was 285 ± 121 m with the maximum foraging distance recorded as 1,163 m (Henderson and Broders 2008). In the southern Appalachian Mountains, the mean distance from capture to first roost location was 709 m for females (range = 252-1,817 m) and 278 m for males (O'Keefe 2009).

The ongoing projects will occur on both Ranger Districts of the WNF. Four projects will occur on the Athens Ranger District (three on the Athens Unit and one on the Marietta Unit), and two occur on the Ironton Ranger District. For the purposes of this BO, the Action Area includes the entire WNF. Therefore, the Action Area includes all of the 834,000 acres within the Proclamation Boundary of the WNF. It includes all areas that will be physically impacted, as well as suitable habitat that may be within the territory of NLEBs. The Action Area contains a significant amount of forested habitat including Dean State Forest, Crown City Wildlife Area, Trimble State Wildlife Area, parts of Burr Oak State Park and Zaleski State Forest, and limited low-density residential development and agricultural areas. The WNF is located in parts of Athens, Hocking, Jackson, Lawrence, Monroe, Morgan, Noble, Perry, Scioto, Vinton, and Washington Counties in southeastern Ohio.

STATUS OF THE SPECIES

The current status of the NLEB, its life history, current rangewide population and trends, and continued threats are thoroughly described in the Federal Register notice that proposed the species for listing, which is hereby incorporated by reference (Service 2013b). The Northern Long-eared Bat Interim Conference and Planning Guidance (Conference Guidance) was released by the Service on January 6, 2014 (Service 2014). This document represents the most current summary of information on the species and plan for its recovery. The 2014 Conference Guidance identified several threats including: 1) disease introduction; 2) restriction of hibernacula openings; 3) human disturbance while hibernating; 4) quarrying and mining operations; 5) loss of clean water resources; 6) forest conversion and firewood collection; 7) predation; 8) prescribed burning; 9) removal of occupied suitable roost structures; and 10) collisions with man-made objects (e.g., wind turbines, communication towers, airplanes, and vehicles) (Service 2014). However, WNS is currently the most significant threat to the recovery of this species.

Status of the Northern Long-eared Bat in Ohio

Prior to WNS the NLEB was one of the most common species in Ohio and throughout the Midwest. Based on limited data there appears to have been a decline in summer populations as well as a decline at one hibernaculum. It does not appear that summer habitat has been a limiting factor for this species. However, due to the spread of WNS, the loss of forest cover and degradation of forested habitat may have an impact on the NLEB as populations are reduced or individuals are compromised.

Critical Habitat

Critical habitat has not been proposed for the NLEB.

Conservation Needs of the Species

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

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

ENVIRONMENTAL BASELINE

Status of the Northern Long-eared Bat within the Action Area

Bat Survey Results

General Indiana bat surveys have been conducted on WNF since 1997 to inventory this bat species and others to help understand relative abundance and habitat use across the Forest. The most recent surveys were completed in 2014. Survey sites have included summer habitat, swarming areas, and hibernacula. As previously stated, NLEBs were frequently captured and observed during these surveys. White-nose syndrome, a devastating fungal disease that attacks bats while hibernating in underground caves and mines was first discovered in Ohio on the WNF in March 2011. Winter, summer, and fall swarming survey data collected from across the Forest in 2014 suggest an overall decline in cave-hibernating bats, including NLEBs. However, post-WNS sampling has been limited, and may not adequately reflect the overall status of the

population in the state. These results should be considered carefully in determining how significantly WNS has impacted NLEBs in Ohio at this time.

Summer Survey Results

In total, 747 NLEBs have been identified at 170 summer capture sites within the proclamation boundary of WNF (Lott 2015, personal communication). Since not all of these individuals were banded, it is unknown how many of these may have been recaptures. Prior to WNS (7 years of sampling), the NLEB was the most commonly captured species in summer across the WNF and made up 31% of all bats captured. Post-WNS (one sampling year only), the NLEB only made up 18% of bats captured (Schultes 2015). This species may no longer be as common within the Action Area, and WNS has been identified as the primary cause of the decline of this species (Service 2015).

During the summer of 2014, 16 sites were mist-netted to identify bat species and use across the Athens Unit. These sites had been sampled previously between 1997 and 2004, prior to the confirmation of WNS in Ohio. The 2014 surveys recorded 49 individuals of 5 species of bats (ESI 2014). Prior to WNS, NLEBs were the third most common species detected on the Athens Unit in summer. During the 2014 surveys no NLEBs were captured on this Unit. Due to the limited sampling, NLEBs are still expected to be present in the area in low numbers.

The Marietta and Ironton Units were also surveyed in summer 2014 (TRC 2014). The Ironton Unit had been previously mist-netted in 1997-2000, 2004, 2006, and 2008 prior to the confirmation of WNS in Ohio, while the Marietta Unit was only mist-netted in 2004 (Schultes 2015). Results of the 2014 surveys indicated a steep decline in capture rate of NLEBs on the Ironton Unit and only four individuals were captured for a relative abundance pre-WNS of 34% down to 5% post-WNS. However, they still made up 40% of the bats captured on the Marietta Unit, although this is down from 70% of captures in 2004. Again, due to the limited sampling, current status is not known, but it appears that NLEBs have experienced a decline but are still expected to be present in the area.

Swarming Survey Results

Due to the legacy of natural resources extraction on the WNF some areas have been significantly impacted by acid mine drainage (AMD), which negatively impacts water quality. In efforts to remediate these conditions the WNF often conducts projects that impact abandoned coal mine openings. These sites sometimes provide swarming habitat and therefore they are monitored both before and after project completion. In swarming surveys conducted at 11 sites on the Athens Unit between 2000 and 2010 where bats were captured, the NLEB was recorded at 10 sites. There was only a single location where other species were captured but NLEBs were not (Schultes 2015). In addition to project determined swarming surveys, other swarming surveys have been conducted to obtain data on sites that appeared to be high quality habitat. A total of approximately twenty-six swarming surveys have detected NLEBs across the Athens and Ironton Units (Lott, 2015, personal communication). Some of these sites may also be used as hibernacula; however, due to accessibility and/or safety concerns, these cannot be entered for confirmation.

Hibernacula Survey Results

A single hibernaculum on the WNF has been monitored every other year since 2003 to record the diversity of species and the number of individual bats. Overall the percentage of NLEBs in the hibernaculum compared to other species is very low. On average, NLEBs made up less than 1% of the total number of bats using the site. The NLEB was first detected at the site in 2005. The highest number of NLEBs recorded at the site was 24, in 2012. This was 1 year after WNS was documented in Ohio at this site, and the increase may have been a result of WNS-induced behavior in bats to move to the coldest part of the hibernaculum, near the entrance where they were more easily observed. In 2013, all species declined, except for big brown bats and NLEBs that remained close to historic levels. In 2014 numbers of every species of bat in the hibernaculum declined significantly and NLEB and Indiana bats were absent (Schultes 2015).

Potential Population in the Action Area

Potential Maternity Colonies in the Action Area

Evidence of reproduction in NLEBs has been documented across the WNF in all summer survey years through the capture of lactating and post-lactating females as well as juveniles (Schultes 2015, personal communication). For example, in 2000, of the 29 sites that documented NLEBs, 66% of these sites recorded juveniles or reproductive females (ATS 2000). Thus, it is likely that the WNF supports multiple NLEB maternity colonies on all Units (ATS 2000, Schultes 2002, Schultes 2015, personal communication). WNS may be affecting occupancy of these sites, but the habitat is still available.

Potential Population of Northern Long-eared Bats in the Action Area

At least one NLEB hibernaculum and multiple swarming sites occur within the Action Area. In addition, a large amount of summer habitat is present. The Action Area contains a landscape dominated by forest habitat at various stages of succession. During winter, the NLEB hibernates in caves and abandoned mines. While this species has been previously common in Ohio and on the WNF, it now appears there may be a decline on the WNF, as documented in recent surveys. Summer surveys in 2014 show that individuals do still occupy the WNF, although current occupancy may be more scattered than prior to WNS. Due to the lack of surveys throughout the entire Action Area the precise population of the NLEB cannot be determined.

Habitat Conditions in the Action Area

According to the 2006 PBO approximately 80% of all lands within the WNF proclamation boundary are forested (Ohio Land Use Cover, based on Landsat TM 1994). Just over 94% of WNF lands are forested with the remaining 6% covered by non-forest lands such as roads, water, grasslands and other open habitat. WNF lands are dominated by hardwood forest types, however some pine is also present. These land use proportions have not changed significantly since the Forest Plan was finalized, and it is unlikely that significant land use changes will occur in the Action Area during implementation of the projects proposed under the 2006 Forest Plan.

Prior to WNS the NLEB was one of the most common species in Ohio and throughout the Midwest. It does not appear that summer habitat has been a limiting factor for this species. However, due to the spread of WNS, the loss of forest cover and degradation of forested habitat may have an impact on the NLEB as populations are reduced or individuals are compromised.

The Action Area contains extensive forest habitat. It also contains multiple wetlands, riparian corridors, and fencerows that provide connectivity between forested habitats. The WNF will continue to conduct projects under the Standards and Guidelines of the 2006 Forest Plan. The Forest Plan identifies activities that are expected to routinely occur on the WNF. While these projects may impact forest habitat through timber harvest and tree removal, these would not substantially affect the amount of forested habitat. They may affect the forest composition as some activities encourage the establishment of oak species over maple. The Action Area is primarily forested with some areas used for agriculture and low density residential areas. The occasional tree/snag removal or timber harvesting by non-Federal entities may take place within privately owned property with the Proclamation Boundary. Additional single family residences, out buildings, and other small scale development may also occur within the Action Area during the implementation of the ongoing projects. In addition, there are multiple parcels of state-owned land within the proclamation boundary. These include state parks, state forests, and state wildlife areas. State forests and wildlife areas may implement timber harvesting activities. No quantification of the number or location of activities and both private and state-owned land is available. It is possible that tree harvest associated with any of these activities could affect the NLEB, depending on the acreage of trees cleared, the proximity of the impacts to maternity colonies, and the time of year that tree clearing occurs. In addition, removal of sheds or barns that may provide suitable roosting habitat could impact NLEBs if they were removed during the summer roosting season. These additional activities that may occur across the Action Area will likely be separated both spatially and temporally, spreading out and reducing negative impacts across a broad area and timespan.

The only activity in this group of on-going projects that will result in the permanent loss of forest habitat is permanent openings creation. This activity will be limited to 12 acres that will be scattered throughout the Pleasant Bear Vegetation Management site. These small openings may provide edge habitat for foraging. They may also increase the quality of suitable roost trees by providing solar exposure to roost trees that are located along the perimeter. All other tree removal is done to improve the timber stands and will not result in an overall permanent loss of forest habitat.

The ongoing projects include the removal of some trees through prescribed fire, TSI, and timber harvest. In general, older more mature forests in Ohio are often dominated by oaks with a more open understory, while younger maple forests are dense. According to research in Arkansas female NLEBs preferred roost sites with fewer midstory trees (Perry and Thill 2007). In a study on the WNF, four of the 9 species of trees (44%) used by the NLEB as roosts were oaks, and 11 of the 21 roost trees (52%) were oak (Schultes 2002). The WNF uses prescribed fire and other management techniques to encourage the growth of oak species. Oak species are removed through harvest; however, management on the WNF will increase the overall abundance of oak in the forest, which may improve the long-term quality of habitat for the NLEB.

Forest Habitat

WNF provides a significant amount of forest habitat with over 244,000 acres of National Forest Service land within the 834,000-acre proclamation boundary. The proclamation boundary includes properties owned by the WNF as well as state parks, forests, and wildlife areas as well as privately owned land. Approximately 190 bat surveys of all types, summer and swarming

habitat, have been conducted in this area. Of those, nearly all included the capture of at least one NLEB. Not all areas of WNF have been surveyed. It is anticipated that areas of habitat suitable for the Indiana bat would also be suitable for the NLEB. Multiple Indiana bats have been captured on the WNF. In a 1999 study by Foster and Kurta, Indiana bats and the NLEB utilized the same area in southern MI. Individuals from both species were documented using two of the same roost trees, although both species did not occupy the same tree simultaneously.

The Action Area includes large forested parcels as well as smaller areas with connectivity. High quality habitat for the NLEB contains mature trees and relatively large woodlots or areas of forest with significant connectivity.

Roost Trees

The NLEB will roost in live and dead trees with cavities or peeling bark. They often roost within intact forest habitat (Carter and Feldhamer 2005). The WNF contains extensive forest habitat and supports many potential roost trees. In addition, the NLEB has been identified roosting in barns, sheds, attics, and bat houses. These types of roosting sites will not be disturbed by the proposed projects. The NLEB utilizes roosts under bark as frequently as they roost in hollows and crevices (Foster and Kurta 1999). Since they do use sites other than exfoliating bark, they have a greater variety of roost opportunities compared to Indiana bats. Multiple potential roost trees are located throughout the Action Area. Maternity roost trees are larger roost trees and have significant amounts of peeling or flaky bark. NLEBs do not require a large amount of solar exposure for a maternity roost tree. According to the Forest Inventory Analysis (FIA), it is estimated that over 2 million snags greater than 5 inches dbh exist on WNF (USFS 2015). Therefore, this number of trees indicates that there is currently a significant amount of roost tree habitat available for the NLEB.

Foraging Habitat

NLEBs frequently feed in upland areas which dominate the WNF. The project area does contain many ponds, wetlands, and streams including riparian habitat. These areas may provide foraging habitat for the NLEB as this species will glean insects from water surfaces.

Other Natural or Man-made Factors Impacting the Population within the Action Area Disease or Predation

As introduced above, WNS is a devastating disease affecting many eastern U.S. bats including the NLEB. The disease was first documented in Ohio in 2011 and has since spread to multiple hibernacula throughout the Midwest. The two largest NLEB hibernacula known in Ohio (Preble and Lawrence Counties) are infected. WNS was detected within the Action Area in 2011 when it was confirmed in the Lawrence County hibernaculum. It is likely that most bats within the Action Area have been exposed to WNS due to its ubiquitous spread to hibernacula across the Midwest population.

Survey events have occurred at the Lawrence County hibernaculum over the past several years to attempt to document WNS population impacts. NLEBs were first documented at this site in 2005. As mentioned above this species prefers to hibernate in tiny cracks and crevices. This behavior makes it a challenge to observe individuals and get an accurate count during hibernation. Between the first year WNS was documented in this hibernaculum (2011) and the

2012 survey event, the NLEB count increased (Schultes 2015). This perceived increase may actually be the result of NLEBs moving closer to the entrance and being more readily observed, a behavior associated with WNS. In 2013, while NLEB and big brown bat numbers remained close to historic levels, all other species number declined. However, the most recent survey conducted in 2014 at this location found no NLEBs (Schultes 2015). The numbers of each species of bat declined in 2014 when the site was surveyed. This hibernaculum has a small population overall, and has been variable over time; however, prior to 2014, NLEBs were documented in low numbers during every survey event since this species was recorded in this location in 2005.

As stated above the mist net survey of sixteen sites on the Athens Unit of the Athens Ranger District failed to identify any NLEBs in 2014 (ESI 2015). Surveys of the Marietta Unit and the Ironton Ranger District documented an apparent decline in the overall number of bats. However, these were limited surveys and include just a single year of data.

From a range-wide and local perspective, the impact of WNS has been variable with a decline after initial exposure to WNS and a continued decline as it spreads through the area. WNS in the Midwest population appears to be starting to follow the pattern documented in the northeast region. It is anticipated that the spread of WNS across the landscape will result in a continued decline in the NLEB population within the next few years, although the extent of this decline is unknown.

Spread of non-native, invasive insects

On June 17, 2011, Asian longhorned beetle (ALB) life stages were confirmed in Clermont County, Ohio, likely from wood packaging material from Asia received at a nearby warehouse. Other non-native pests have also entered the U.S. in a similar manner. The emerald ash borer was first detected in the U.S. in southeast Michigan in 2002 and has since spread to 21 other states. Other non-native forest pests include the hemlock woolly adelgid and the gypsy moth. These forest pests have a variety of impacts on forest habitat depending on how quickly they spread, the diversity of host species they use, and the rate of reproduction. Impacts to forest habitat occur due to their life history as well as techniques to limit their spread or eliminate them.

According to the Ohio Department of Agriculture (ODA) the emerald ash borer was identified in Perry County on the Wayne National Forest in June 2010. Infested ash trees usually die in three to five years. As they die, ash trees may provide suitable roost habitat for bats for several years. Long-term impacts to forests include loss of diversity and the potential for increases in the number of forest openings as ash trees in every age class die. The intensity of the forest effects depends on the distribution of ash trees. In an intact forest system natural succession will limit the impacts as additional species in the understory will be available to replace infested ash trees. However, in smaller patches of trees, such as fencerows, the loss of mature ash trees may impact connectivity if the site lacks additional species of trees in the understory. Due to the length of time since confirmation of infestation, most ash trees within the Action Area are probably already infested, and many may have already died. At this stage no significant impacts from the emerald ash borer on forest habitat are expected within the Action Area.

According to ODA, the hemlock woolly adelgid was first identified in Ohio from a Summit County location in 2008. Another infestation was identified in Cuyahoga County in 2009. Since then it has been documented in Meigs and Washington Counties. Most infestations have been identified on landscape trees and Christmas tree farms which have been monitored for this pest. In small, isolated infestations such as those in Summit and Cuyahoga Counties, tree removal has been used to eradicate this pest. For the infestation in Meigs County tree removal and chemical treatment has been used. Future plans include biological control for this eradication. In late 2013 an infestation was detected in Hocking County which has a significant population of hemlocks. Management at this infestation currently includes chemical treatment. Future efforts include mapping of infested trees and monitoring to determine effectiveness of treatments. Due to the limited number of hemlocks within the Action Area no significant forest impacts are expected.

The gypsy moth is another non-native species which has had an impact on forests. While this pest is less lethal to its host trees than other species, it can cause tree mortality when densities of the gypsy moth remain high in an area for several years. In addition, actions to reduce impacts by this species may involve the use of selective and non-selective pesticides potentially causing additional impacts to forest ecosystems. The ODA has been conducting suppression projects since 1990. It coordinates with the Service on gypsy moth treatments annually so that impacts to federally listed species are avoided.

Widespread establishment of any non-native, invasive insect species in the U.S. could cause significant ecological damage. Impacts to habitat are expected especially in areas where the preferred host plants of invasive species are dominant. The extent of damage and its impact on the ecological community is determined by a variety of factors. In areas where the host trees are not a major component of the forest stand, the impacts may be less. In locations where host species occur in high densities and are a significant species within that forest type, the impacts will be substantial. The loss of host species and the associated impacts to ecosystem function have been documented in forests where invasive forest insect pests were introduced (Ellison et al., 2005). While some forest pests present chronic ongoing impacts such as the frequent outbreaks of the gypsy moth, others such as the emerald ash borer have more acute impacts as all the ash trees begin to decline over several years and progressively weaken until every ash in the area is dead. The severity of impacts to the NLEB from non-native, invasive species will depend on the rate and intensity of the disruption to forest function. These impacts may mimic natural disturbances or they may create novel circumstances to which NLEBs have to adjust.

Conservation Needs of the Species in the Action Area

The conservation needs of the species in the Action Area are similar to the needs rangewide. The WNF provides habitat for swarming, hibernating, and summering NLEBs, and NLEBs on the WNF have already been exposed to WNS. Therefore, within the Action Area the conservation needs include: 1) reducing WNS-related mortality and injury; 2) maintaining suitable conditions within hibernacula and protecting them from disturbance; 3) providing suitable habitat conditions for NLEB swarming, foraging, and roosting; 4) maintaining suitable habitat conditions in identified maternity areas and reducing the removal of roost trees; 5) searching for previously unidentified areas of maternity and hibernation activity; and 6) conducting research to understand the migration patterns of NLEBs that use the area during the summer or winter.

EFFECTS OF THE ACTION

This BO evaluates the effects of six ongoing projects on the WNF. The remaining acres left in these projects will adversely affect a total of 6,826 acres, including 2,428 acres of prescribed fire, 85.1 miles of fire line construction and maintenance, 4,216 acres of hardwood timber harvest and crop tree release, 171.2 acres of roads, skid trails, and log landings, and 11 acres of permanent openings (Table 1). Other ongoing activities that are not likely to adversely affect the NLEB will occur on approximately 2,255 acres and 0.24 mile of fire line, including mainly non-native invasive species control and also shoreline tree felling, wetland restoration, white pine harvest, wildlife habitat enhancements, and a short section of ORV trail reroute were reviewed in a separate document. 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.

Table 1. Adverse Impacts from Proposed Ongoing Activities

Project	Prescribed Fire	Fire Line Construction and Maintenance	Hardwood Timber Harvest and Crop Tree Release	Roads, Skids Trails, and Log Landings	Permanent Openings Creation	Total		Total Excluding Prescribed Fire
	Acres	Miles	Acres	Acres	Acres	Acres	Miles	Acres
2006 Athens Prescribed Burning	666	2.6	0	0	0	666	2.6	0
Pleasant Bear Vegetation Management	870	21.4	1,093**	83	11	2,057	21.4	1,187
Ironton Habitat Enhancement and Fuels Management	745	59.1	0	0	0	745	59.1	0
Pine Creek Historic Restoration	0	0	3,029	88.2	0	3,117	0	3,117
Gore-Greendale Diverse Continuous Forest	147	2	29**	0	0	176	2	29
Athens Tornado Salvage Treatment	0	0	65*	0	0	65	0	65
Total	2,428	85.1	4,216	171.2	11	6,826	85.1	4,398

* Crop Tree Release only.

** Acres of hardwood timber harvest. Additional areas of white pine harvest also are planned.

Proximity of the action:

The NLEB has been documented year-round throughout the Action Area, including the summer roosting season, as well as during the swarming season, the hibernation period, and during spring staging. Potential roosting, foraging, and hibernating habitat are located throughout the Action Area. At least some individuals hibernate within the Lawrence hibernaculum and multiple swarming sites have been documented.

Distribution:

Direct impacts to NLEBs and suitable habitat will occur within the Action Area. Tree removal activities will be concentrated to the areas of projects identified above. Additional impacts from ongoing projects that have been coordinated with the Service are expected to be minimal.

Timing:

Some activities will occur throughout the year. Depending on when tree clearing and other activities occurs, these activities may impact NLEBs during the summer roosting season and sensitive periods of their life cycle such as during pregnancy, the birth of young, and the pre-volant juvenile period between June and July.

The NLEB spends the winter hibernating and utilizes summer roosting habitat primarily between April 1 and September 30. Within the Action Area activities that are conducted between October 1 and March 31 should avoid direct impacts to this species.

Nature of the effect:

It is likely that the proposed projects will have a variety of potential effects on NLEB individuals. For instance, any individuals roosting in unidentified roosting trees may be disturbed, injured, harassed, or killed from direct physical impact if the tree is removed during the summer roosting season (April 1 through September 30). Reduced fitness may occur if individuals have to search for new roosts, foraging, or travel corridors if forest habitat is fragmented or removed during the winter. However, impacts resulting from winter tree clearing are expected to be minimal, as the proposed projects will include identification of potential roost trees. Removal of these trees may include avoidance of possible and emergence surveys or seasonal clearing. However, hazard trees may be removed at any time of year to prevent death or injury of humans, such as firefighters on a prescribed burn.

Implementation of the Forest Plan will reduce rangewide forest impacts by maintaining the overall forested landscape. Because avoidance measures identified as Standards and Guidelines in the Forest Plan will be implemented, take of the NLEB is minimized. Due to continued forest growth and succession, the overall area of forest habitat is not expected to significantly decrease.

Duration:

During the ongoing projects, short-term impacts to the NLEB may occur during implementation of forest management activities. In addition, some temporary impacts may occur to bats returning the summer after tree clearing has occurred within an individual bat's home range as it may need to search for additional habitat. However, permanent effects to habitat including isolation and fragmentation are not anticipated to occur as impacted forest will grow and mature

through natural succession. Only the permanent opening creation associated with the Pleasant Bear Vegetation Management Project is expected to result in permanent loss of forested habitat and the amount of forest habitat lost is relatively minimal at a total of twelve acres.

Disturbance frequency:

Disturbance to the NLEB may occur during implementation of the ongoing projects in their specific areas. As projects within a specific area are completed there should not be any additional disturbance from the ongoing projects.

Disturbance intensity:

The disturbance intensity is expected to be dissimilar throughout the Action Area. The intensity of the disturbance is expected to be greatest in association with projects that involve larger areas of tree removal such as timber harvest. Reduced impacts such as the creation of skid trails will result in limited disturbance. No additional, significant disturbance to the NLEB is expected to occur on National Forest System lands in areas outside of the ongoing projects. Other activities on the WNF are planned and these will be evaluated and reviewed for the potential impacts to the NLEB in coordination with the Service. All activities will be coordinated under the 2006 Forest Plan.

Disturbance severity:

The disturbance severity of the projects is expected to primarily impact NLEBs nearest proposed ongoing projects due to the potential for removal of unidentified roost trees and increased disturbance. The recovery rate of the NLEB in the Action Area is unknown. However, the NLEB has been observed to continue to use the same area after a disturbance to its roost tree (Schultes 2002). It has also been observed using forest habitat that has been previously managed (Perry and Thill 2007). In addition, NLEBs tracked before and after did not exhibit a change in the size of home range (Lacki et al. 2009). Taken as a whole, the overall disturbance severity is expected to be minor to populations of the NLEB in the midwest and range-wide.

Beneficial Effects:

Timber harvest and Forest Management Practices

Timber harvest and other forest management practices such as TSI could create higher quality habitat by removing understory species and giving high quality, native species such as oak more open opportunity to grow. Lacki and Schwierjohann (2001) stated that silvicultural practices could meet both male and female roosting requirements by maintaining large-diameter snags, while allowing for regeneration of forests. These activities may also provide more favorable habitat for maternity colonies as female NLEBs have selected areas with fewer midstory trees (Perry and Thill 2007).

Prescribed Fire

Prescribed fire may provide more favorable habitat for maternity colonies as female NLEBs have selected areas with fewer midstory trees (Perry and Thill 2007). Prescribed fire can also potentially improve habitat for the NLEB by creating additional snags for roosting. Prescribed fires can cause bark of live trees to peel away from the sapwood creating the sloughing bark that is often used for roosting (Johnson et al. 2010). The availability of suitable roosts (including roosts with cavities and exfoliating bark) is greater in burned areas compared to unburned areas

(Boyles and Aubrey 2006, Dickenson et al. 2009, Johnson et al. 2010). Fire can also create small openings that may provide increased solar exposure to allow for regeneration of high quality tree species. Tree species that consistently form high quality bat roosts include shellbark hickory (*Carya laciniosa*), shagbark hickory (*C. ovata*), and white oak (*Quercus alba*). Regeneration of white oak and hickory increases as a result of low-intensity fires and/or repeated fires below open canopies (Johnson et al. 2010, Dickinson et al. 2009). Therefore, over the long-term, prescribed fire is anticipated to increase the abundance of tree species that form high quality NLEB roosts.

Fires can also create a more open canopy structure that can improve roost quality by increasing the amount of solar radiation reaching the roost. Canopy light penetration was higher and canopy tree density was lower in burned forest than in unburned forest (Boyles and Aubrey 2006). Additionally, canopy gaps in the burned area are associated with slightly higher maximum daily temperatures at roost trees (Johnson et al. 2009). Higher roost temperatures could facilitate more rapid growth of developing juvenile bats (Johnson et al. 2009). As a result, the abundance of trees with characteristics suitable for roosting, and the percentage of the forested area with suitable bat roosts, should be increased after fires (Boyles and Aubrey 2006). Studies in West Virginia found that the NLEB responded favorably to prescribed fire by using new roost trees that were located in canopy gaps created as a result of the fire (Johnson et al. 2009). Therefore, over the long-term, prescribed fire is anticipated to increase the abundance of tree species that form high quality NLEB roosts.

Direct and Indirect effects:

Direct effects occur when bats are present while the activities are being conducted. Indirect effects to bat species are those effects that are caused by or will result from the proposed action and are later in time but are still reasonably certain to occur.

Effects to Hibernating Bats and Hibernacula

Prescribed Fire

Prescribed fire is usually conducted during the period when most bats are still hibernating, which could potentially impact NLEB individuals through exposure to smoke or carbon monoxide. WNF has protocols in place to reduce the potential for smoke to drift into hibernacula and result in smoke inhalation. Impacts to swarming habitat and hibernacula will be avoided by limiting prescribed fire to conditions in which smoke is expected to disperse straight upward or away from, and will not drift to, target hibernacula or swarming habitat.

Effects to Habitat

Loss of Forest Habitat

Forest removal may cause direct effects to the NLEB if suitable roost trees are removed during the summer roosting season. Indirect impacts may occur if large amounts of forest habitat are removed or there is a loss in connectivity between roosting habitat and foraging habitat and bats have to forage further to find suitable habitat.

Prescribed fire is a forest management tool used to discourage maple trees and other shade-tolerant species and provide additional opportunities of sunlight for oaks. Most trees that will be impacted by prescribed fire will be small maple trees. The overall area of forest cover will

remain the same. However, the density of trees will be reduced and the species composition will be altered.

Areas of timber harvest will also alter the density and species composition of trees. However, this activity, as well as fire line construction and maintenance, and construction of roads skid trails and log landings are expected to only cause temporary impacts to forest habitat. Through continue growth of avoided trees and succession of habitat, the area of forest habitat will remain constant.

The Standards and Guidelines of the Forest Plan will be implemented. These include avoidance of shagbark and shellbark hickory trees as well as removal of any trees that are identified as having roosting potential between September 15 and April 15 unless it is identified as an imminent threat to human safety. These trees would be removed as hazard trees at any time of the year. Since there are many potential roost trees on the landscape and the amount of tree clearing is relatively small compared to the overall forested habitat within the Action Area, the potential to impact individual NLEBs is also small. Indirect impacts are also not expected to occur as the overall amount of forest habitat is not expected to significantly decrease. In addition, since NLEBs frequently switch roost trees it is expected that they would have alternate trees to use in the event that a roost tree were to be removed.

Fragmentation of Habitat

The NLEB uses forested areas, including upland, wetland, and riparian areas, for roosting, foraging, and traveling. Therefore, impacts to forested habitats from project activities have the potential to indirectly affect the NLEB by decreasing roost availability, decreasing foraging habitat availability, and requiring additional time to search for suitable roost trees. NLEBs prefer to roost in intact forest (Carter and Feldhamer 2005). Habitat loss or loss of connectivity can have reproductive and survival consequences for reproductive NLEB individuals.

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

Impacts to forest patches will be minimal. In addition, due to the heavily forested landscape, it is expected that sites will maintain connectivity with other forested parcels. Only twelve acres of habitat will be permanently converted to non-forest habitat as wildlife openings are created through the Pleasant Bear Vegetation Management Project. Since these wildlife openings are relatively small it is anticipated that bats could still use the perimeters for foraging and travel corridors. The potential indirect adverse effects to the NLEB from fragmentation of forest are therefore discountable.

Loss of Foraging Habitat

In addition to impacts on roost sites, we consider effects of forest management practices on foraging and traveling behaviors of NLEBs. In southeastern Missouri, the NLEB showed a preference for contiguous tracts of forest cover (rather than fragmented or wide open landscapes) for foraging or traveling and, different forest types interspersed on the landscape increased likelihood of occupancy (Yates and Muzika 2006). Similarly, in West Virginia, female NLEBs spent most of their time foraging or travelling in intact forest, diameter-limit harvests (70–90 year-old stands with 30–40 percent of basal area removed in the past 10 years), and road corridors, with no use of deferment harvests (similar to clearcutting) (Owen et al. 2003). In Alberta, Canada NLEB avoided the center of clearcuts and foraged more in intact forest than expected (Patriquin and Barclay 2003). On Prince Edward Island, Canada, female NLEBs preferred open areas less than forested areas, with foraging areas centered along forest-covered creeks (Henderson and Broders 2008). In general, NLEBs prefer intact mixed-type forests with small gaps (*i.e.*, forest trails, small roads or forest covered creeks) in forest with sparse or medium vegetation for forage and travel rather than fragmented habitat or areas that have been clearcut.

The NLEB frequently forages in upland areas. Limited removal of trees as described above will reduce impacts to foraging habitat. Overall, forest management is expected to maintain a forest over the long term for the species. However, localized long-term reductions in suitable roosting and/or foraging habitat can occur from various forest practices (*e.g.*, clearcuts). As stated above, the NLEB has been found in forests that have been managed to varying degrees and as long as there is sufficient suitable roosting and foraging habitat within their home range and travel corridors between those areas, we would expect NLEB colonies to continue to occur in managed landscapes.

Many timber harvest regimes will result in minimal change in terms of providing suitable roosting or foraging habitat for the NLEB. For example, selective harvest regimes are not anticipated to result in alterations of forest to the point where NLEBs would be expected to significantly alter their normal behaviors. This is because the treatment areas will still be forested with small openings. Similarly, small patch cuts, wildlife openings, and forest roads would be expected to serve as foraging areas or travel corridors. Therefore, the only impacts of concern from these forest treatments are the potential for death or injury during active season tree removal.

Alternatively, large clearcuts (that remove a large portion of a known or assumed home range) would result in a temporary “loss” of forest for the NLEB. In these cases, “temporary” would be for many years. Foraging would be possible prior to roosting, depending on the juxtaposition of cuts to other forest regimes.

Some portions of the NLEB range are more forested than others. In areas with little forest or highly fragmented forests (*e.g.*, western U.S. edge of the range, central Midwestern states), impacts of forest loss would be disproportionately greater than similar sized losses in heavily forested areas (*e.g.*, Appalachians and northern forests) including WNF. Also, the impact of habitat loss within an individual NLEB home range is expected to vary depending on the scope of removal. Silvis et al. (2014) modeled roost loss of NLEBs and Silvis et al. (2015) removed known NLEB roosts during the winter in the field to determine how this would impact the

species. Once removals totaled 20–30 percent of known roosts, a single maternity colony network started showing patterns of break-up. Sociality is hypothesized to increase reproductive success (Silvis et al. 2014), and smaller colonies would be expected to have reduced reproductive success.

Longer flights to find alternative suitable habitat and colonial disruption may result from removal of roosting or foraging habitat. NLEBs emerge from hibernation with their lowest annual fat reserves, and return to their summer home ranges. Since the NLEB has summer home range fidelity (Foster and Kurta 1999; Patriquin et al. 2010; Broders et al. 2013), loss or alteration of forest habitat may put additional stress on females when returning to summer roost or foraging areas after hibernation. Females (often pregnant) are forced to seek out new roosts or foraging areas and must expend additional, but limited, energy. Hibernation and reproduction are the most energetically demanding periods for temperate-zone bats, including the NLEB (Broders et al. 2013). Bats may reduce metabolic costs of foraging by concentrating efforts in areas of known high prey profitability, a benefit that could result from the bat's local roosting and home range knowledge and site fidelity (Broders et al. 2013). Cool spring temperatures provide an additional energetic demand, as bats need to stay sufficiently warm or enter torpor (state of mental or physical inactivity). Entering torpor comes at a cost of delayed parturition; bats born earlier in the year have a greater chance of surviving their first winter and breeding in their first year of life (Frick et al. 2009). Delayed parturition may also be costly because young of the year and adult females would have less time to prepare for hibernation (Broders et al. 2013). Female NLEBs typically roost colonially, with their largest population counts occurring in the spring, presumably as one way to reduce thermal costs for individual bats (Foster and Kurta 1999). Therefore, similar to other temperate bats, NLEBs have multiple high metabolic demands (particularly in spring), and must have sufficient suitable roosting and foraging habitat available in relatively close proximity to allow for successful reproduction.

In summary, timber harvests and tree clearing-associated forest management activities could have both adverse and beneficial effects on habitat suitability for the NLEB. The approximately 6,338 acres and 85.1 linear miles of habitat that will be affected by these activities (Table 1) are scattered throughout the 834,000 acres of the Proclamation Boundary, so there will be large amounts of unaffected, intact forested habitat adjacent to each treatment area. In addition, while the diversity and density of forest habitat may change the overall quantity of forested area is not expected to decrease.

As a result, we conclude that the overall habitat suitability or availability within the Action Area should be minimally affected by timber harvest and forest management activities under the proposed actions.

Loss of Roost Trees

Within a given home range, the NLEB uses multiple roosts throughout the season. Therefore, only a certain number of roosts are anticipated to be occupied in any given day and within any given year. Therefore, the risk of encountering roosting NLEB individuals during a given forest treatment is associated with the percentage of home range impacted and the type of forest treatment. Larger acreages of treatment have greater risk than smaller acreages. Similarly,

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

The NLEB utilizes roost trees during the summer, usually between April 1 and September 30. They have been documented roosting in over 35 different species of trees, and it appears that they choose roost trees based on their structural composition and not the species. Through implementation of the Standards and Guidelines, impacts to potential roost trees will be reduced.

Prescribed fire is used to promote growth of high quality roost species such as oak. However, fire may also destroy or accelerate the decline of existing roost trees, particularly of older snags, by burning the bases of the trees and weakening their structure, causing them to fall over quicker (Johnson et al. 2009, Dickenson et al 2009). One study found that up to 20 percent of existing standing snags were lost post-fire, and that few new snags were created (Lacki et al. 2009).

Roost trees are an ephemeral resource and will often become unsuitable. On a study at WNF, 11.1% of NLEB roost trees became unsuitable in a year (Schultes 2002). NLEBs will frequently switch trees, although they may have a primary tree that they utilize more often. In addition, they often select sites that have a significant amount of potential roost trees. Therefore, it should be feasible for NLEBs to locate an alternate roost site. The potential indirect adverse effects to NLEBs from loss of current and future roost trees are therefore discountable.

In addition, it is expected that NLEBs are not limited by roost tree availability and that there are sufficient numbers of potential roost trees on the landscape. According to the Forest Inventory Analysis (FIA), it is estimated that over 2 million snags greater than 5 inches dbh exist on the WNF. This species will use a variety of tree sizes as roosts. It is likely that any forest parcel that they are found in would contain a sufficient variety of tree sizes and tree conditions to provide alternate roosts in the future. In addition, this species will sometimes use artificial structures such as buildings, barns, bridges, and bat houses.

Loss of Maternity Roost Trees

NLEB females are known to exhibit site fidelity to their summer maternity grounds, and will use suitable roost trees in consecutive years, if they remain suitable. Traditional summer sites are essential to the reproductive success of local populations. It is not known how long or how far female NLEBs will search to find new roosting habitat if their traditional roost habitat is lost or degraded. If they are required to search for new roosting habitat, it is assumed that this effort places additional stress on pregnant females at a time when fat reserves are low or depleted and they are already stressed from the energy demands of migration. Removal of potential maternity roosts during the winter when bats are hibernating should avoid direct adverse impacts to the NLEB; however, loss of a maternity roost tree will also impact the cohesion of the maternity colony.

The NLEB appears to be less colonial than Indiana bats. Pregnant NLEBs form the largest colonies. Then, as the season and reproductive condition progresses, the colonies become progressively smaller as the young disperse (Lacki and Schwierjohann 2001). Removal of maternity roost trees between October 1 and March 31 would eliminate the potential for immediate death and injury of bats. However, owing to their site fidelity and their energetically

stressed condition in spring, loss of an unidentified primary maternity roost tree could cause indirect adverse effects to individuals. These effects may include delayed fetal development, fetal abortion, and reduced body condition. NLEBs are known to use multiple roost trees each year, and to switch between roost trees regularly. They have been documented to switch roost trees frequently, as often as every two days (Foster and Kurta 1999) and they are frequently found roosting in forests where management regularly occurs. If a maternity roost tree is removed in the winter it is likely that the bats could use one of the alternate maternity roost trees.

Considering the forested landscape and the capture of the multiple NLEBs from many different areas, it is plausible that many alternate maternity roosts occur outside of the tree removal activities within the Action Area. It is unlikely that a maternity colony would experience more than the loss of 1 or 2 unidentified alternate maternity roost trees during the winter season as efforts will be made to avoid impacts to potential maternity roost trees. Known maternity roost trees will be avoided and disturbance will be limited in the habitat around them.

The avoidance of impacts to roost trees, minimal areas of tree removal, likelihood that some alternate roosts will remain standing outside the footprint of tree clearing, the use of multiple roosts and frequent roost changes, and availability of a considerable amount of suitable roosting habitat in the surrounding landscape combine to suggest that individuals may successfully locate new alternate roosts relatively quickly in the event that a potential roost tree is removed.

The Service does not anticipate that the tree removal associated with the proposed ongoing projects will induce reproductive or survival consequences for the NLEB within the Action Area. The reasons for this are as follows: tree removal overall will be limited, potential roost trees would be avoided as much as possible, not all activity will occur during the summer roosting season, and the habitat impacts will be dispersed throughout the Action Area.

Effects to Bats during the Active Season

Loss of Prey Base

The NLEB has been documented within the Action Area. Insects are the primary food of this species with a majority of their diet composed of Coleoptera, Diptera, and Lepidoptera (Lee and McCracken 2004). Impacts to insects will vary based on the time of prescribed fire, the phase of insect life that is exposed, and variation in susceptibility to prescribed fire. In addition to Coleoptera and Lepidoptera, the NLEB will also feed on Diptera, Trichoptera, Hymenoptera, and other orders of insects (Carter et al. 2003). Not all types of insects that the bat feeds on will be exposed to prescribed fire.

Prescribed fire may have a short-term impact on local insect populations; however its impact on the landscape is less than naturally occurring factors such as disease, parasitism, predation, and weather. These factors, as well as others, can cause insect species to have cyclic population dynamics. Insects are also expected to disperse into areas where prescribed fire has occurred. Prescribed fire will be used in a limited area and due to the patchy mosaic pattern of burning it is expected that insects from unburned areas would quickly disperse into burned areas.

These unexposed insects would be available as prey for bat species. Overall, it is expected that all insects on the landscape would have limited exposure to prescribed fire. Although the WNF is

permitted to burn August 15 through late spring, successful burns are dependent on the presence of suitable environmental conditions, such as dry leaf litter on the ground and dormant vegetation. These conditions are typically found after October 15 and prior to late-April. In a typical year, prescribed fire would not begin until November 1, but it may impact volant bats during the beginning of the active bat season through the end of April (Schultes 2015, personal communication). Thus, no significant reduction in prey is anticipated due to the timing of the burn (mainly during the hibernation period), the variety of insects that the NLEB consumes, and the limited reduction in the number of insects available in a relatively small area.

Prescribed Fire

As noted above, prescribed fire is not typically undertaken during the summer roosting season on the WNF, except for sometimes during a short period in early to mid-April and less typically to the end of April during a later spring. If prescribed fire is conducted during the summer roosting season when bats are spread across the landscape and are occupying roost trees, there is the potential for direct and indirect impacts.

Conducting prescribed fires outside the hibernation period could result in direct mortality or injury to NLEB individuals by burning, heat exposure, or smoke inhalation. Bats also may be exposed to elevated concentrations of potentially harmful compounds within the smoke (e.g., carbon monoxide and irritants) (Dickinson et al. 2009). Exposure risk depends on a variety of factors including height of roosts, timing and behavior of fire, winds, proximity of fire to roosts. Risk of direct mortality and injury to bats from prescribed fire is low as long as fire intensity and crown scorch height are low (Dickinson 2010). Prescribed fire is used on WNF to promote the growth of oak species by reducing competition from maples and other shade tolerant tree species. Fire intensity and crown scorch height are expected to be low as the goal is to maintain some of the established trees while thinning out the understory. In addition, WNF manages prescribed burns to create a mosaic pattern in which some patches are skipped, providing refuge for insect prey as well as maintenance of some smaller trees. Avoiding burns during the non-volant period of June through July will prevent loss of non-volant pups.

Threats to adult bats from prescribed burns are greatest in the spring when energy needs are high. Since the prescribed fire will most likely be conducted prior to April 30, as the phenology after that often results in vegetation that is too green to burn, it is anticipated that bats are just beginning to emerge from hibernation and that they most likely they have just started to disperse into summer habitat and are mobile. Thus NLEBs are expected to have limited exposure (April 1-30) to prescribed fire on their summer roosting habitat at this critical time in their life history.

If prescribed burning were conducted during the period of time when bats are non-volant, the young could be exposed to smoke inhalation, heat exposure, or burning. As indicated in the Federal Register Notice to list the NLEB with an interim 4(d) rule, it is expected that the non-volant period for NLEBs is from June 1 to July 31 (Service 2015). Since no prescribed burning will take place during this time no direct impacts to non-volant young are expected.

The disturbance from prescribed burns that occur outside the hibernation season and non-volant period should be enough to arouse any individual roosting bats and cause them to seek out an alternate roost. For any prescribed burns that occur outside the hibernation season and the period

of non-volant young, impacts to adult NLEBs are expected to be minimal, as research has shown that adult bats will fly from roosts as prescribed fire approaches and then return to roost in the same general area post-burn (Dickinson et al. 2009, Lacki et al. 2009). In addition, during activities to mark an identified roost tree, an individual NLEB was disturbed causing it to flee from the roost and take refuge in another tree (Schultes 2002). It is expected that a prescribed burn would cause enough disturbance to wake NLEBs and cause them to flee to another roost tree and they are not expected to be harmed by prescribed fire. Prescribed burns conducted between August 15 and September 30 have limited potential to impact NLEBs. All juvenile bats will be volant at this time, and therefore, they should be able to flee from burn areas.

Impacts to known roost trees will be minimized by removing nearby fuels. Fuels around snags will also be removed to reduce the risk of burning. Trees identified as potential maternity roost along fire line will be protected when possible. However, trees identified as a hazard may be removed at any time to protect fire fighter safety.

In summary, due to the timing of the prescribed burns and the efforts to avoid impacts to potential roost trees, we do not expect lethal take from prescribed fires, but NLEBs may be forced to flee from roosting areas. However, these adverse effects are expected to be short-term and localized.

Increased Disturbance

Increases in disturbance (i.e., in the form of increases in noise, human activity, and vibrations from equipment) are expected to result from tree clearing. Tree clearing activities are expected to occur during daylight hours. Some activities will occur during the hibernation season when bats would not be roosting in trees. However, others, such as timber harvest may occur during the summer roosting season. The maximum potential clearing disturbance at any particular location would occur over a few weeks to up to a few months. Shifts in NLEB activity that may occur are likely to be temporary, since tree removal activity is not likely to exceed a few weeks at any one location. Shifts in NLEB activity that may occur are likely to be short-term, and disturbed bats may return to the area once the tree removal work has been completed and the noise has ceased. Shifts in bat activity that may occur are likely to be localized as the amount of forest disturbance will be minimal.

Noise

NLEBs have the potential to occur in suitable habitat throughout the Action Area. Thus, individuals within the specific project areas could be exposed to noise levels that they have not experienced in the past if unidentified roost trees are located in close proximity to activities. Equipment to be used in tree removal may include chainsaws and logging trucks. This disturbance could cause some NLEBs to abandon primary roosts in the immediate vicinity of the disturbance, shift their centers of activity to secondary roosts, or temporarily avoid foraging areas near disturbances. Other individuals may not be disturbed by these activities as male NLEBs have been documented roosting in trees adjacent to busy ATV trails (Schultes pers comm. 2015).

Current ambient noise within the Action Area varies depending on proximity to roads, trails, and adjacent properties. The highest project noise levels are expected to occur with tree removal.

Tree removal activities typically involve sawing equipment which can generate high noise levels (for example, chainsaws can generate a noise level of 110 dB). NLEBs may also tolerate some temporary disturbance, as they may be used to the sounds of farm equipment and resource extraction that occurs in the Action Area. A long-term change from the current ambient noise levels is not expected as the sources of noise will be eliminated after the ongoing projects have been completed. The potential direct adverse effects to NLEBs from increased noise are temporary and discountable.

Tree Removal Associated with Timber Harvest and Other Forest Management Activities

Impacts to the NLEB from forest management would be expected to vary depending on the timing of removal, location (within or outside an NLEB home range), and extent of removal. While bats can flee during tree removal, removal of occupied roosts (during spring through fall) is likely to result in direct injury or mortality to some percentage of bats. This is particularly likely during cool spring months (when bats enter torpor) and if flightless pups or inexperienced flying juveniles are also present. Forest management outside of NLEB summer home ranges or away from hibernacula would not be expected to result in impacts to this species. However, forest management within a summer home range (regardless of when it is removed) may, depending on the extent of removal and amount of remaining suitable roosting and foraging habitat.

Again, risk of injury or mortality is greatest in April through July when NLEB colonies are most concentrated and more bats may be found using fewer trees associated with their roosting networks. In addition, June through July is the period most likely to have non-volant pups. Removal of trees outside this period is less likely to result in injury or mortality when the majority of bats can fly and are more dispersed.

The greatest risk of take is associated with projects within known NLEB home ranges where no or few roost trees have been documented. This is because NLEBs are known to be present but it is unclear where the core roosting area is located. Areas outside of known home ranges have some probability of occupancy from 0-100% and therefore some probability of being impacted by timber management activities.

Non-harvest Tree Removal

As discussed above, NLEBs select roost trees based on the characteristics of the tree including the presence of peeling, flaky bark and/or cavities, cracks or crevices. NLEBs have been documented to use live trees with cracks or crevices just as frequently as they use dead trees (Foster and Kurta 1999). Live hickory trees (*Carya* species) also exhibit this type of bark and are used by the NLEB. The FS will implement all applicable Standards and Guidelines of the Forest Plan. These include avoidance of shagbark hickory trees as well as potential roost trees. Required tree removal is expected to be minimal for each project. Identified potential roost trees will be avoided. However, if these trees cannot be avoided they will only be removed after an emergence survey has been conducted and no bats were observed on either night of the survey.

Due to the large amount of forested habitat available on the landscape and the minimal required tree clearing, it is expected that NLEBs would be able to find additional suitable habitat in the event that trees within their home range were impacted.

Removal of Hazard Trees

Removal of hazard trees is conducted to prevent death or injury to people. Most hazard tree removal in the ongoing projects is associated with fire line construction and maintenance. Tree clearing and snag removal associated with fire line preparation is routinely conducted after October 1 and before March 31 to be prepared for available burn windows (Schultes, 2015 personal communication); however, dead trees that could fall across a fire line and spread fire or hit a firefighter during the prescribed burn can be removed at any time of the year. Under the interim 4(d) rule, all hazard tree removal is exempt.

Removal of Potential Roost Trees

Removal of non-maternity roost trees could impact NLEBs by requiring the bats to expend time and energy to identify an alternate roost site. NLEBs used dead trees as roost trees approximately half the time (Foster and Kurta 1999). Solitary male NLEBs are more likely to roost in cavities of live trees while colonial females are more likely to roost in cavities or under the peeling bark of dead trees (Lacki and Schwierjohann 2001). Since the FS avoids impacts to potential roost trees when possible it is unlikely that any dead trees that are being used as roost trees by colonial female NLEBs would be removed as these larger dead trees are easier to identify. In addition, timber harvest removes live trees and not dead trees. Therefore, an unidentified maternity roost trees is less likely to be removed. Live shagbark hickory trees provide suitable roost habitat and removal of this species is also avoided.

Identification of potential roost trees will reduce potential impacts to roost trees that may be used by NLEBs. Large oak trees also often provide the peeling, flaky bark needed for roost trees. Oak species are removed through harvest and other forest management techniques; however management on the WNF will increase the overall abundance of oak in the forest which may improve the quality of habitat for the NLEB.

Any obvious potential roost trees identified by the FS for removal will be removed during the winter season (September 15 to April 15). Removal of roost trees that occurs during the winter when NLEBs are hibernating away from the area will not directly impact them. If potential trees cannot be removed during this time then an emergence survey will be conducted to avoid potential impacts to the NLEB.

Removal of trees April 15 through September 15 has the potential to directly impact individual bats. Removal of trees during the maternity season when young are non-volant, from June 1 to July 31, would also have the greatest impact to the local population as the number of individuals within a tree is expected to be at its peak. Lacki and Schwierjohann documented that NLEBs formed colonies in larger trees than solitary roosts. Therefore we assume that pregnant and lactating females will require larger roost trees as their colonies are largest during these reproductive phases. These trees should be easier to identify and therefore avoid.

Removal of an unidentified non-maternity roost tree during the summer could result in crushing or injury of adult bats. This threat is minimized by the skill and experience that the FS biologists have identifying potential roost trees of the Indiana bat and conducting mist netting and radio telemetry of the NLEB.

In addition, timber harvest activities will not result in the removal of any dead trees. Thus NLEBs roosting in dead trees within the areas of timber harvest will not be harmed or injured through tree removal activities.

Tree removal actions during the summer should result in sufficient disturbance to arouse any adult bats and cause them to leave the roost if an unidentified roost is removed during the summer roost season. During a study that identified roost trees a NLEB was disturbed by efforts to mark the tree. The bat aroused and fled the tree for a location in another tree (Schultes 2002). There is a low probability of an unidentified roost tree being removed during the summer. Roost tree used by NLEBs can be relatively small and have a limited number of cavities or crevices as this species roosts in smaller groups than the Indiana bat. In addition, they have been documented roosting low to the ground. NLEBs appear to be less colonial than Indiana bats. Female NLEBs form colonies during pregnancy and lactation and will use solitary roost during other times, while male NLEBs were never observed using a colony roosting site (Lacki and Schwierjohann 2001). Since the males are less colonial the number of bats affected by summer removal of a small unidentified, non-maternity roost tree has the potential to impact fewer bats.

There is a low probability of an unidentified roost tree being removed during the summer. Due to the less specific requirements of non-maternity roost trees it is expected that there are sufficient numbers of these trees on the landscape and it should be feasible for a NLEB to locate an alternate roost site. NLEBs frequently switch roost and it is expected that they utilize multiple roost trees during the summer season.

Removal of Potential Maternity Roost Trees

As indicated above, the probability of any tree removal impacting a potential maternity roost trees is very low, due to implementation of standards and guidelines meant to protect Indiana bats. In addition, it is expected that since the NLEB is less selective in its use of roost trees, many other trees may also provide alternative roosting habitat. The FS biologists have the ability and skill to identify potential and maternity NLEB roost trees as they have been identifying Indiana bat roost trees for years and the two species select similar characteristics in roost trees. Removal of maternity roost trees between October 1 and March 31 would eliminate the potential for immediate death and injury of bats. However, tree harvest activities will occur throughout the year.

No clear-cutting will occur within $\frac{1}{4}$ mile of a known maternity roost tree during the non-volant period of June 1 through July 31. In addition, no known maternity roost trees will be removed during the non-volant period.

NLEBs appear to be less colonial than Indiana bats. NLEBs are most colonial when they are pregnant and that is the time when they form the largest colonies. Then as the season and reproductive condition progresses the colonies become progressively smaller (Lacki and Schwierjohann 2001). Colonies are formed in larger trees than solitary roosts (Lacki and Schwierjohann 2001). Due to the larger size of NLEB maternity roost trees, it is expected that potential maternity roost trees are more easily identified and less likely to be inadvertently removed.

While maternity colonies are usually located in larger trees they may also occur in smaller trees where they may not be identified. Colonial females are more likely to roost in cavities or under the peeling bark of dead trees (Lacki and Schwierjohann 2001). Since timber harvest removes live trees and not dead trees, any unidentified maternity roosts located within dead trees on a timber harvest site will be avoided. Live shagbark hickory trees provide suitable roost habitat and removal of this species is also avoided

If a potential maternity roost tree is not identified it would most likely be a smaller tree that would be more conducive to habitat for smaller groups of bats such as those formed by post-lactating bats. NLEB maternity colonies disperse soon after the young become volant. Thus, removal of a small unidentified roost tree could result in take of a relatively small number of bats. Removal of an unidentified maternity roost tree between April 1 and September 31 could result in take of individual NLEBs. It would be expected that adult bats could arouse and flee if their maternity roost trees was impacted by removal. However, some non-volant young may be injured or killed.

If an unidentified maternity roost tree is removed during May through July when NLEBs are pregnant or lactating this could impact colonies when they have the highest number of bats. Lacki and Schwierjohann (2001) documented that NLEBs formed colonies in larger trees than solitary roosts. Therefore we assume that pregnant and lactating females will require larger roost trees as their colonies are largest during these reproductive phases.

During the period of June through July any young present would most likely be non-volant. Non-volant bats would be most susceptible to death and injury as they would be unable to fly away from the tree before it is felled. Adult bats are expected to arouse and can fly to additional host trees. It is expected that most adult females would be able to retrieve young. NLEBs are known to use multiple roost trees each year, and to switch between roost trees regularly. If a maternity roost tree is removed during the summer it is likely that the bats could use an alternate maternity roost tree.

In summary, timber harvests and tree clearing associated forest management activities could have both adverse and beneficial effects on habitat suitability for the NLEB. The approximately 6,338 acres and 85.1 linear miles of habitat that will be affected by these activities are scattered throughout the 834,000 acres of the WNF Proclamation Boundary, so there will be large amounts of unaffected, intact forested habitat adjacent to each treatment area. In addition, while the diversity and density of forest habitat may change the overall quantity of forested area is not expected to decrease.

As a result, we conclude that the overall habitat suitability or availability within the Action Area should be minimally affected by timber harvest and forest management activities under the proposed actions.

Cumulative Effects

In addition to the effects from the proposed actions, the implementing regulations require us to evaluate the effects of the action (above) taken together with cumulative effects. Cumulative

effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the Action Area considered in this conference opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation under section 7 of the Act. Any actions conducted on National Forest System lands will either be conducted by the FS, or will require approval by the FS and thus will require separate section 7 consultation. However, additional activities may occur within the Proclamation Boundary on properties not owned by the FS. This section analyzes the added impact from cumulative effects.

Though we have not identified any proposed developments that would affect NLEB habitat, we anticipate that occasional tree/snag removal or timber harvesting by non-Federal entities on private land or land owned by the state of Ohio, may take place occasionally within the Action Area. In addition, removal of abandoned buildings may occur. Burr Oak state park and Trimble State wildlife area are located within the Athens Unit of the Athens Ranger District. In addition, portions of Strouds Run state park and Zaleski state forest also fall within the WNF Proclamation Boundary. There are no state-owned parcels on the Marietta Unit. On the Ironton Ranger District, Dean state forest and Crown City wildlife area are present.

Timbering on these areas could harm or harass individual NLEBs that inhabit the impacted area, depending on the acreage of trees cleared, the proximity of the impacts to maternity colonies, and the time of year that tree clearing occurs. It is expected that timbering that would occur on state-owned land would be conducted as part of timber management and that no significant decline in the area of forest cover would occur. As indicated in the forest plans for Zaleski and Dean state forests timber harvesting levels will be at sustainable rates and substantially less than the current annual growth. In addition, prescribed fire will be used as a management tool to promote the growth of oak and hickory species. Approximately 100-200 acres will be burned on average in Zaleski on an annual basis (ODNR DOF 2010). No prescribed burns are planned for Dean under the current state forest plan (ODNR DOF 2011).

These impacts would not significantly impact the quantity or distribution of suitable habitat in the Action Area as a whole, and would not rise to the level of causing population-level impacts.

Some land in the Action Area is privately owned and used for agricultural purposes, residential property, and natural resource use. Additional single family residences, out buildings, and other small scale development may also occur within the Action Area during the life of the ongoing projects. No quantification of the number or location of these activities is available. It is possible that tree harvest associated with these activities could harm or harass individual NLEBs that inhabit the impacted area, depending on the acreage of trees cleared, the proximity of the impacts to maternity colonies, and the time of year that tree clearing occurs. However, the scale of these types of projects would not result in habitat loss on a scale that would significantly impact the quantity or distribution of suitable habitat within the Action Area and would not rise to the level of causing population-level impacts. Standard farming practices would not result in effects to NLEBs or suitable habitat for these species.

The Service is unaware of any other tribal, state, local, or private actions, other than those described above, presently occurring or that are reasonably certain to occur in the future, which

would destroy, modify or curtail the remaining patches of NLEB summer habitat within the Action Area. Therefore we do not anticipate significant cumulative effects from the proposed action, combined with other reasonably foreseeable non-Federal actions.

Summary of Effects

Impacts to Individuals

Potential effects of the action include direct effects to individual NLEBs present within the Action Area while activities are being conducted and indirect effects as a result of changes in habitat suitability. Direct effects include mortality, injury, harm, or harassment of individual bats as a result of removal or burning of unidentified roost trees.

The conservation measures will reduce the potential for direct effects to the NLEB. Overall, the potential for direct mortality of NLEBs from prescribed burns associated with the proposed action is low, especially with a burn season mostly restricted to the hibernation period. Direct mortality as a result of fire line construction and maintenance is also limited, since most of the associated snag removal is routinely accomplished after October 1 and before March 31. However, the potential for direct effects from timber harvest, construction of roads, skid trails, and log landings, permanent openings creation, and TSI is greatest during spring and early summer (April to July) when bats return from hibernation, spring temperatures result in periodic use of torpor, non-volant young may be present, and bats impacted by WNS may have additional energetic demands and reduction in flight ability.

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 forest management 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 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.

While none of the FS's proposed actions will alter the amount or extent of mortality or harm to NLEBs resulting directly from WNS, the FS's proposed action can be neutral or beneficial to bats exposed to WNS by providing higher quality roost sites will increased solar exposure that may reduce the bats thermoregulatory needs. The continued implementation of the FS's monitoring effort will provide additional information on the effect of the FS's actions on affected bats. No cumulative effects are expected.

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

- 1) There is no proposed critical habitat for the NLEB, and thus, none will be adversely affected.
- 2) Impacts to hibernating bats or their hibernacula will be minimized.
- 3) NLEBs during the spring-fall period will be exposed to various project stressors and are likely to adversely respond to some of them. As stated in the environmental baseline, we believe that multiple maternity colonies and an unknown number of adult males occur in the Action Area.

We considered the possibility for exposure to NLEBs at currently unknown roost sites in the vicinity of forest management activities. If this should occur, we anticipate minor impacts to forest habitat including the potential removal of unidentified roost trees and possibly harassment of some NLEBs that may flush during daylight and temporarily or permanently abandon their roosts (which may have pups).

Impacts to Populations

Numbers of individuals/populations in the Action Area affected:

While general inferences may be gleaned from past bat surveys described above, it is the opinion of the Service that these surveys do not provide sufficient data to determine the precise number of NLEB individuals present in the Action Area. In light of this, it should be clarified that the FS is assuming presence of the NLEB. Due to the decline of this species due to WNS and the number and locations of NLEB captures, they are not expected to be evenly distributed.

Sensitivity to change:

The degree to which this bat species is prone to change when disturbed is unknown. NLEBs frequently switch roost trees and will use areas that have been altered by tree removal activities and prescribed burning (Perry and Thill 2007, Lacki et al. 2009). In addition, it is assumed that if an unidentified roost tree was cut down most of the adults would be able to arouse and flee from the roost tree, similar to observations of the Indiana bat (Belwood 2002). A NLEB was disturbed by humans working around its roost tree and fled to another tree but apparently returned to the original tree the next two days as a bat was observed in the same location under the bark (Schultes 2002).

Resilience:

Resilience relates to the characteristics of populations or a species that allow them to recover from different magnitudes of disturbance. Assuming that the area of forest cover in the Action Area remains relatively the same, that growth and natural succession occurs allowing the forest habitat to return to a similar density, and the magnitude of disturbance is expected to be low, resilience is not expected to decrease from its current level.

Recovery Rate:

In this CO, the recovery rate relates to the time required for an individual bat or population to return to equilibrium after exposure to a disturbance. Individual NLEBs are expected to continue to breed and recruit new individuals into the population; however, the level of successful recruitment to the adult stage is unknown, especially due to the continued impacts from WNS.

As we have concluded that individual bats are likely to experience minor reductions in either their annual or lifetime survival or reproductive rates, we need to assess the aggregated consequences of the anticipated reductions in fitness (i.e., reproductive success and survival), of the exposed individuals on the population to which these individuals belong.

The FS's previous and ongoing efforts have served to identify areas of NLEB maternity, swarming, and hibernation activity. After completion of the ongoing projects, the area will continue to provide suitable habitat conditions for NLEB foraging and roosting during the summer and fall swarming period, as well as swarming and hibernating during the fall and winter. 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 WNF (as described in the Environmental Baseline), the NLEB should be able to continue to survive and reproduce. We recognize the potential for a small amount of lethal take of adults and/or juveniles. NLEB colonies should be able to sustain the losses discussed above.

In order to assess the biological significance of this amount of NLEB mortality, many factors must be considered, such as the species life history strategy, its sensitivity to change, resilience (ability to recover after a disturbance), and recovery rate (progress towards recovery over time). Similar to most other bat species, NLEBs exhibit a low birth rate, long life span, and naturally low mortality rate. We must also take into consideration the fact that WNS has arrived relatively recently (winter of 2010-2011) within Ohio, and so mortality attributed to this devastating disease has yet to peak within populations of NLEBs likely to be affected by the ongoing projects. Further, the Midwestern population has experienced a delay in post-WNS population declines, compared to those seen in the northeast region—after 3 years of WNS the Midwest population is now beginning to see declines in all-bat winter numbers. The northeast region did not show large scale declines until five years post-WNS. Therefore, it is prudent to consider the current and future impacts of WNS on the biological significance of take using the most current scientific information available regarding WNS decline rates. As stated previously, WNS has caused a significant decline on NLEB populations, especially in the northeast region of the U.S. (Service 2013a), and may have a similar effect on NLEBs within the Midwestern population in the next few years.

CONCLUSION

Reductions in the maternity colonies' and associated wintering population fitness are unlikely to occur. In fact, we find that many of the proposed actions of the FS 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. We recognize that the status of the species is uncertain due to WNS. We have considered the current environmental baseline and the relatively low intensity, frequency, and duration of the project impacts. Thus, we found that the proposed ongoing projects are unlikely to have population-level impacts. Therefore, the ongoing projects are also unlikely to decrease the reproduction, numbers, or distribution of the NLEB.

Jeopardy Analysis

WNS is the primary threat to the 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 the NLEB, and adopted as a part of this proposed action, 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, while allowing impacts to populations.

Analysis of Impacts within the Action Area

It is anticipated that, over the course of project completion, potentially several unidentified non-maternity roost trees would be removed during the summer occupancy period within the Action Area. These trees may be small trees or trees with small cavities or crevices that were not identified and may provide habitat for individual male bats or females and young that have dispersed from the colony after the young became volant. Since adult bats are able to flee and NLEBs have been documented flying from roost trees within the Action Area when they are disturbed, we anticipate that most individuals would be alerted by the disturbance and would flee from the roost prior to the felling of the tree. Thus only a few individuals of any unidentified roost trees removed during the roosting season would be killed.

In addition, due to the limited amount of time that maternity colonies spend together we anticipate that impacts to a fully formed maternity colony within the Action Area would happen exceedingly rarely as these fully formed maternity colonies primarily occur during June and July when females are pregnant or lactating. In addition, these larger roost trees are more likely to be identified by FS field staff and therefore avoided. Since maternity roost trees are often dead trees, these trees would not be harvested and impacts to them would be limited to construction of roads, skid trails, log landings, and construction and maintenance of fire lines. These activities cause much less disturbance on the landscape as they require a much smaller area than the timber harvest and prescribed burn sites. In addition, these sites would be reviewed by the FS biologists or trained staff, and any identified potential maternity roost that could not be avoided would be removed during the winter or require emergence surveys. We do not anticipate any unidentified maternity roost trees to be removed during the summer roosting season over the completion of the projects.

Therefore, over the life of the ongoing projects, it is anticipated that only a few adult male, adult female, or juvenile bats will be taken by the six ongoing projects. These individuals would be lost due to the summer removal of unidentified non-maternity roost trees.

Analysis of Impacts Rangelwide

Implementing regulations for section 7 of the ESA (50 CFR 402) defines "jeopardize the continued existence of" as, "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species."

Jeopardy determinations for NLEBs are made at the scale of the listed entity, which is the range wide distribution of the species (32 FR 4001). The jeopardy analysis in this BO follows a hierarchal relationship between units of analysis that characterize effects at the lowest level or smallest scale, and then aggregated to the highest level or largest scale of analysis.

As described in the effects of the action section in this BO, we anticipate some lethal take of individuals over the continued implementation of the ongoing projects. The analysis above demonstrates how impacts to individuals will be minimized by avoiding impacts to potential roost trees, maintaining approximately the same overall area of forest cover, avoiding impacts to known hibernacula and swarming sites and ¼ mile around these sites, avoiding impacts to known maternity roost trees during June and July when pups are non-volant, and avoiding clearcuts within ¼ mile of known maternity roost trees when pups are non-volant.

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 NLEB (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 NLEBs 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 unidentified 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 NLEBs will be directly impacted by forestry management activities.

Also according to the interim 4(d) rule, the Service anticipated that hazard 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 result in only low levels of take of individuals in the season during which they occur.

Based on the analysis above, despite the anticipated 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 the NLEB, the environmental baseline for the Action Area, the effects of completing the six ongoing projects, implementation of the Standards and Guidelines of the Forest Plan, and the cumulative effects, it is the Service's opinion that completion of the ongoing projects, as proposed, is not likely to jeopardize the continued existence of the NLEB.

Critical Habitat Adverse Modification Analysis

No critical habitat for NLEBs is designated and therefore no modification will occur.

INCIDENTAL TAKE STATEMENT

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

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

- (1) Take that is incidental to forestry management activities, maintenance/limited expansion of existing rights-of way, prairie management, projects resulting in minimal (<1 acre) tree removal, provided these activities:
 - a. Occur more than 0.25 mile (0.4 km) from a known, occupied hibernacula;
 - b. Avoid cutting or destroying known, occupied roost trees during the pup season (June 1–July 31); and
 - c. Avoid clearcuts (and similar harvest methods, *e.g.*, seed tree, shelterwood, and coppice) within 0.25 (0.4 km) mile of known, occupied roost trees during the pup season (June 1–July 31).
- (2) Removal of hazard trees (no limitations).
- (3) Purposeful take that results from
 - a. Removal of bats from and disturbance within human structures and
 - b. Capture, handling, and related activities for NLEBs 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 ITS. 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. Since all six projects are being conducted as part of forest management on the WNF all of the activities are covered by the interim 4(d) rule.

AMOUNT OR EXTENT OF TAKE:

If the NLEB is present or utilizes an area proposed for timber harvest, prescribed fire, or other disturbance, incidental take of NLEB individuals 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) NLEBs 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.

The Service anticipates adverse effects to no more than 6,338 acres and 85.1 linear miles of potential NLEB habitat as a result of these ongoing project activities on the WNF, including 11,045 acres from prescribed fire, 140.44 miles of fire line construction and maintenance, 2,628 acres of hardwood timber harvest, 180.5 acres of roads, skid trails, and log landings, and 12 acres of permanent openings. This impact to suitable habitat is based on the continued work on the ongoing projects until completion. Since all activities are forest management activities and the conservation measures identified in the interim 4(d) rule (80 FR 17984) will be followed, this take is exempt.

EFFECT OF THE TAKE

Impact of Take on the Midwest Population

Permanent loss of suitable habitat is minimal. Temporary loss of habitat through tree removal and other forest management practices and the associated loss of some individual NLEBs may reduce the current population and have a limited impact on future reproduction. However, since habitat is not a limiting factor the effects of impacts to habitat are minimal.

We do not anticipate that the projected habitat loss associated with the proposed action will induce reproductive or survival consequences for the NLEBs using the Action Area. The reasons for this are as follows: Removal of potential roost trees will be minimized through the use of Standards and Guidelines, removal when unavoidable will routinely occur during the winter when NLEBs would not be exposed to clearing activities or after an emergence survey has been completed, the interim 4(d) conservation measures will be implemented, the habitat loss will be dispersed throughout the Action Area, and the overall amount of forest habitat will remain relatively the same.

WNS has been present in the Midwest population for 4 years and declines in the Lawrence County hibernaculum are now being observed. We assume that the Midwest population would follow a similar delay in WNS-population declines as the northeastern population did—the northeastern population did not show WNS-declines until year 5 of WNS. Since WNS was

observed in the Midwest population during the winter of 2010-2011, that was assigned to be Year 1 of WNS. Year 5 of WNS would be 2015. Last year there was a decline in the winter population at the Lawrence County hibernaculum and no NLEBs were captured on the Athens Unit during summer surveys in 2014. Population numbers of the Midwest population are now expected to decline. In addition, the percentage of NLEBs captured on the Marietta and Ironton Units also declined in 2014 (ESI 2014).

If the populations continue to decline, it is expected that the potential for take would also decline as there would be fewer occupied roost trees on the landscape and the chance of impacting an unidentified roost tree would decrease.

We believe that take is commensurate with population size in the Midwest population (as population size decreases, so too will take, as the number of occupied unidentified roost trees would be expected to decrease). No impacts would occur to hibernacula or migrating bats from the proposed ongoing projects. Due to the localized impacts and the small amount of take compared to the population of the Midwest population, there would be no appreciable impact on the Midwest population.

REASONABLE AND PRUDENT MEASURES

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

TERMS AND CONDITIONS

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

Reporting Requirements

1. The FS shall provide a report summarizing the activities described in this ITS upon completion of the project(s).
2. The FS shall make all reasonable efforts to educate personnel to report any sick, injured, and/or dead bats (regardless of species) located on WNF immediately to Katrina Schultes. The FS point of contact will subsequently report to the Service's Columbus, Ohio Field Office (COFO) (614-416-8993) and Jennifer Norris at the Ohio Department of Natural Resources (ODNR). No one, with the exception of trained staff or researchers contracted to conduct bat monitoring activities, should attempt to handle any live bat, regardless of its condition. If needed, COFO and/or ODNR will assist in species determination for any dead or moribund bats. Any dead bats believed to be NLEB individuals will be transported on ice to the COFO or ODNR. If a NLEB is identified, COFO will contact the appropriate Service law enforcement office. Care must be taken in handling dead specimens to preserve biological material in the best possible state. In conjunction with the care of sick and injured fish or wildlife and the preservation of biological materials from dead specimens, the FS has the responsibility to ensure that information relative to the date, time, and location of the NLEB, when found, and possible cause of injury or death of each is recorded and provided to the Service. In the extremely rare event that someone has been bitten by a bat, please keep the bat in a container and contact the local health department.

CONSERVATION RECOMMENDATIONS

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

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

1. Assist with WNS investigations. For example:
 - a. Monitor the status/health of the known colonies;
 - b. Collect samples for ongoing or future studies; and
 - c. Allow FS staff to contribute to administrative studies (on or off of FS lands).
2. Monitor post-WNS distribution of the NLEB on WNF.
 - a. Conduct inventory surveys
 - b. Conduct radio telemetry to monitor status of NLEB colonies
 - c. Participate in NABat surveys
3. Encourage research and administrative studies on the summer habitat requirements of the NLEB on WNF that:
 - a. Investigate habitat characteristics of the forest in areas where post-WNS NLEB occurrences have been documented (acoustically or in the hand) (e.g. forest type, cover, distance to water).
 - b. Investigate NLEB use (acoustics, radio telemetry) of recently managed areas of different prescriptions.

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

The proposed action includes avoidance and minimization activities. As explained under the Description of the Proposed Action section above, the FS has proposed a number of measures to avoid and minimize the potential for take of NLEBs. The primary methods for avoidance and minimization are implementing all applicable Standards and Guidelines from the Forest Plan which include avoidance of impacts to hickory trees, seasonal restrictions on some activities (such as prescribed fire) when possible, and identification of potential roost trees for further evaluation and/or seasonal clearing when bats are not active. The effects of these avoidance and minimization measures are already incorporated into our effects analysis above.

REINITIATION NOTICE

This concludes formal consultation for the FS program to complete six ongoing activities, as proposed, on the WNF in southeastern Ohio. The FS submitted the required information requesting formal consultation for the NLEB in the Action Area. 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 incidental take is exceeded (more than 6,338 acres and 85.1 linear miles of habitat over the completion of all six projects); (2) new information reveals effects of the program that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the projects are 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 designated that may be affected by the action.

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