



United States Department of the Interior Fish and Wildlife Service



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8 October, 2015

Michael Chaveas
Hoosier National Forest
811 Constitution Avenue
Bedford, IN 47421

RE: Biological Opinion for Ongoing Projects affecting the Northern long-eared bat on the Hoosier National Forest

Dear Mr. Chaveas:

This document transmits the U.S. Fish and Wildlife Service's (Service's) final Biological Opinion (BO) based on our review of the U.S. Forest Service - Hoosier National Forest's (HNF) ongoing projects that may impact the recently listed northern long-eared bat (NLEB) (*Myotis septentrionalis*) under section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). Your 31 March, 2015 request for formal consultation was received on 3 April 2015. The Biological Opinion is based on information provided in the 31 March 2015 Biological Assessment (BA), other available literature and information provided in the Service's final rule of April 2, 2015, listing the NLEB as a threatened species, which was published in the *Federal Register* (80FR 17974). A complete administrative record of this consultation is on file at this office.

The enclosed BO addresses effects of 3 ongoing projects: Buffalo Pike Project, Uniontown South Restoration Project and Oriole Restoration Project, which the HNF determined were "likely to adversely affect" (LAA) the NLEB. Included in your BA were 8 ongoing projects for which your agency made a "no effect" (NE) determination (listed in Table 5 of BA) and 4 continuing projects where you concluded a "may affect, not likely to adversely affect" (NLAA) determination (listed in Table 6 of BA). We concur with your determinations for the 4 NLAA projects as all anticipated affects to NLEB will be insignificant and discountable.

This BO specifically covers the Buffalo Pike, Uniontown South Restoration and Oriole Restoration projects for which the Service concurred that they were likely to adversely affect the NLEB. This opinion provides an effects and jeopardy analysis based upon anticipated incidental take as a result of these projects. After reviewing the status and environmental baseline of the NLEB and analysis of potential effects of the ongoing actions to the species, it is our determination that these forest management activities are not likely to jeopardize the continued existence of the NLEB.

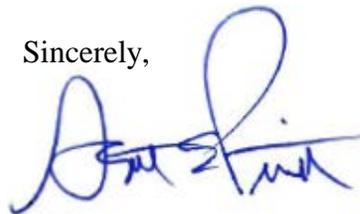
In our final listing decision of April 12, 2015 (80FR 17974), the Service provided an interim 4(d) rule that allows for take exemption provided conservation measures are implemented that will aid in the conservation of the species. Activities for which take is exempted under the interim 4(d) rule include the following:

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

Thus, any take of NLEB occurring in conjunction with these activities that complies with the conservation measures, as necessary, is exempted from section 9 prohibitions by the 4(d) rule and does not require incidental take authorization. In your BA dated 31 March 2015, you noted that your agency will be able to implement all these conservation measures and that no known occupied NLEB roosts or hibernacula were in or near the project areas. Consequently, the activities associated with the 3 ongoing LAA projects are exempted under the interim 4(d) rule.

This concludes formal consultation on the Buffalo Pike Project, Uniontown South Restoration Project and Oriole Restoration Projects and precludes the need for additional consultation for 4 other NLAA projects for the NLEB as required under section 7 of the Endangered Species Act of 1973, as amended. If, however, new information on endangered species within the proposed project area becomes available or if significant changes are made to ongoing projects, or if you have questions regarding the BO, then please contact Andy King at (812) 334-4261 ext. 1216.

Sincerely,



Scott E. Pruitt
Field Supervisor

Enclosure

cc: Kevin Amick, HNF, Bedford Office

BIOLOGICAL OPINION

ON THE

EFFECTS OF THREE ONGOING PROJECTS

ON THE HOOSIER NATIONAL FOREST

IN JACKSON AND PERRY COUNTIES IN INDIANA

ON THE FEDERALLY THREATENED

NORTHERN LONG-EARED BAT

(Myotis septentrionalis)

Submitted to the

Hoosier National Forest

October 8, 2015

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EXECUTIVE SUMMARY

This Biological Opinion (BO) was issued by the U.S. Fish and Wildlife Service's (FWS) Bloomington Field Office (BFO) to the Hoosier National Forest (HNF) and analyzed effects of land management activities associated with three ongoing projects in Jackson and Perry counties on the federally threatened northern long-eared bat (NLEB; *Myotis septentrionalis*). The intent of this BO was to analyze any anticipated adverse effects from the Buffalo Pike, Uniontown South Restoration Project and Oriole Restoration Projects on the NLEB and determine whether individual and/or cumulative effects were likely to adversely impact local or regional populations such that they could jeopardize the species' continued survival and recovery in the wild. The HNF took a "batched" consultation approach under Section 7 of the Endangered Species Act (ESA) for these three projects which previously had been found not to jeopardize the federally endangered Indiana bat (*Myotis sodalis*). The NLEB has been documented in numerous areas on the HNF and throughout many forested areas in Indiana, but has experienced severe declines in the eastern USA in recent years due to the fungal disease white-nose syndrome (WNS), which prompted its recent listing under the the Endangered Species Act (ESA) of 1973, as amended (16 United States Code [USC] §1536) .

Section 7(a)(2) of the ESA, requires Federal agencies (U.S. Forest Service in this case) to 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 critical habitat that has been designated for those species. In addition, under section 7(a)(1) of the ESA, all federal agencies are required to carry out programs for the conservation of federally listed species. This BO satisfies the HNF's section 7(a)(2) consultation requirement and documents some of their proactive conservation efforts in accordance with Section 7(a)(1).

After reviewing the status and environmental baseline of the NLEB and analysis of potential effects of the proposed actions associated with the Buffalo Pike, Uniontown South and Oriole Restoration Projects to the species, the Service concluded that these ongoing activities are not likely to jeopardize the continued existence of the NLEB. As anticipated incidental take of NLEB is associated with forest management activities that are exempted by the interim 4(d) rule, reasonable and prudent measures and terms and conditions have not been included in the incidental take statement. Furthermore, because Critical Habitat has not been designated by the FWS for this species, none will be adversely modified.

INTRODUCTION

This document transmits the FWS' biological opinion (BO), which was primarily based on our review of a biological assessment (BA) prepared by HNF biologists and was received at the Service's Bloomington, Indiana Ecological Services Field Office (BFO) on 3 April 2015 as part of a letter requesting us to initiate formal conference on potential adverse effects on the NLEB. The NLEB had been proposed to be federally listed by the FWS at that time. The NLEB became federally listed as "threatened" when the FWS' final listing decision went into effect on 4 May

2015. Because the formal conference was not completed before the NLEB listing date (i.e., 4 May 2015), the conference transitioned to a formal consultation and thus we prepared this document as a BO (instead of a conference opinion; CO). The USFS determined that all activities addressed in the BA have had prior coordination/consultation for all other involved federally-listed species. Therefore, this BO addresses one species, the NLEB.

This BO was prepared in accordance with section 7(a)(2) of the ESA of 1973, as amended (16 U.S.C. 1531 et seq.) and is the culmination of formal section 7 consultation under the Act. The purpose of formal section 7 consultation is to insure that any action authorized, funded, or carried out by the Federal government is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of any officially designated critical habitat of such species. This BO covers the Proposed Action which includes land management activities associated with the Buffalo Pike, Uniontown South and Oriole Restoration Projects on Forest Service-owned lands.

This PBO is primarily based on information provided from the following sources:

- 1) The HNF's BA referenced above (dated 31 March 2015).
- 2) The BFO's 2006 Programmatic Biological Opinion (2006 PBO; USFWS 2006) issued for the HNF's proposed Land Resource Management Plan (LRMP) for the Hoosier National Forest in Indiana (dated 6 January 2006)
- 3) Biological evaluations (BEs) originally prepared and submitted to the BFO for the Buffalo Pike (22 January 2015), Uniontown South (23 August 2011) and Oriole (19 November 2007) Restoration Projects and their anticipated effects on the Indiana bat.
- 4) Reports and scientific literature on NLEBs and similar bat species' research, and
- 5) Meetings, phone calls, e-mails, other written correspondence with HNF biologists and staff. In addition BFO biologists have conducted numerous field visits and site investigations on HNF lands since Indiana bats were documented there in the 1990s. A complete administrative record of this consultation is on file at the BFO.

Interim 4(d) Rule for the NLEB

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

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

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

- (1) Take that is incidental to forestry management activities, maintenance/limited expansion of existing rights-of way, prairie management, projects resulting in minimal (<1 acre) tree removal, provided these activities:
 - a. Occur more than 0.25 mile (0.4 km) from a known, occupied hibernacula;
 - b. Avoid cutting or destroying known, occupied roost trees during the pup season (June 1–July 31); and

- c. Avoid clearcuts (and similar harvest methods, *e.g.*, seed tree, shelterwood, and coppice) within 0.25 (0.4 km) mile of known, occupied roost trees during the pup season (June 1–July 31).
- (2) Removal of hazard trees (no limitations).
- (3) Purposeful take that results from
 - a. Removal of bats from and disturbance within human structures and
 - b. Capture, handling, and related activities for northern long-eared bats for 1 Year following publication of the interim rule.

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

However, 4(d) rules do not afford exemption from the ESA's section 7 procedural requirements in and of themselves. Therefore, project-by-project consultations remain appropriate when individual actions (even those within the scope of a 4(d) rule) are funded, authorized or carried out by a federal agency unless otherwise analyzed and appropriately addressed within a programmatic-level consultation. This is because the purpose of section 7 consultation is broader than the mere evaluation of take and issuance of an Incidental Take Statement (ITS); such consultations fulfill the requirements of section 7(a)(2) of the ESA, which directs that all Federal actions insure that their actions are not likely to jeopardize the continued existence of any listed species, or result in the destruction or adverse modification of designated critical habitat.

CONSULTATION HISTORY

Although the NLEB undoubtedly was present before, this formerly common species was not documented on HNF lands until bat surveys were first conducted in 1981(; USFWS 2006). Similarly the federally endangered Indiana bat (*Myotis sodalis*) has been documented on HNF lands from at least 1990 (; USFWS 2006). In the intervening years, the BFO and the HNF have conducted numerous informal consultations and several formal consultations for the Indiana bat under section 7 of the Endangered Species Act. The BFO completed a programmatic-level formal consultation on the HNF's LRMP (a.k.a., Forest Plan) (HNF 2005) in 2006 and continues to operate under the 2006 PBO (USFWS 2006).

A chronological summary of subsequent coordination events and actions associated with this consultation is presented below.

- On 2 October 2013, the FWS proposed to list the NLEB as an “endangered” species (78 FR 61046).
- On 2 April 2015, following several public-comment periods, the FWS announced in the Federal Register that the NLEB would be federally listed as “threatened” and that an “interim 4(d) rule” would be implemented effective 4 May 2015.
- On 3 April 2015, the BFO received a letter from the HNF requesting informal and formal conference/consultation from the HNF regarding 7 projects that would still have ongoing

land management activities that may affect the NLEB after it became federally listed. The HNF's letter included a biological assessment (BA) for 3 projects that they determined were likely to adversely affect the NLEB namely the Buffalo Pike, Uniontown South and Oriole Restoration Projects.

- On 13 April 2015, the BFO sent the HNF a letter acknowledging receipt of their request and BA and that formal conference/consultation on the NLEB had been initiated (starting on 3 April) on the Buffalo Pike, Uniontown South and Oriole Restoration Projects.
- On 4 May 2015, the NLEB federal listing as threatened and interim 4(d) rule took effect.
- On 8 October 2015, the BFO issued its final BO to the HNF.

BIOLOGICAL OPINION

I. DESCRIPTION OF THE PROPOSED ACTION

As defined in the ESA Section 7 regulations (50 CFR 402.02), “action” means “all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas.” The “action area” is defined as “all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action.” The direct and indirect effects of the actions and activities must be considered in conjunction with the effects of other past and present Federal, State, or private activities, as well as the cumulative effects of reasonably certain future State or private activities within the action area.

USFS Project/Actions Effects Determinations

The HNF reviewed all their ongoing actions and determined that a total of 15 projects were likely to continue beyond the time when the NLEB was listed. They then reviewed these projects, including their previous consultation documents, to determine whether and/or how these projects would affect the NLEB. They made a “no effect” (NE) determination for 8 projects, a “not likely to adversely affect” (NLAA) determination for 4 projects and a “likely to adversely affect” (LAA) determination for 3 projects (see HNF 2015, Tables 5, 6 and 7. respectively). The USFS included conservation measures to minimize potential adverse impacts of various activities as part of their project description. The Service has analyzed the effects of the proposed actions considering that the projects will be implemented as proposed (including all conservation measures).

The NE determinations made for the 8 projects listed in Table 5 of the BA may be appropriate, but FWS policy prohibits us from providing written concurrence for NE determinations and nor is it required. The FWS concurs with the 4 NLAA determinations made for the following projects: Patoka River Restoration Project, Pleasant Run Habitat Improvement Project, German Ridge Project, and Mogan Ridge Prescribed Burn (HNF 2015, Table 6), because the potential for direct take from any associated tree felling or prescribed burning will be avoided by adhering to appropriate seasonal cutting/burning restriction dates.

The 3 projects with LAA determinations, namely the Buffalo Pike, Uniontown South and Oriole Restoration Projects comprised the Proposed Action for this formal consultation and were thus analyzed in detail. A detailed description of the Proposed Action is provided within the BA and the original biological evaluations (BEs) prepared for the Buffalo Pike, South Union and Oriole Restoration Projects (2006 PBO, Appendices #10, #8 and #3, respectively; USFWS 2006) and are hereby incorporated by reference. A summary of the 3 LAA projects follows.

BUFFALO PIKE PROJECT

The Buffalo Pike Project is located in Jackson County on the Brownstown Ranger District of the HNF (Figures 1 and 2). Although this project was previously consulted on in January 2015 for the Indiana bat (USFWS 2006; PBO Appendix #10), we understand that the HNF's Buffalo Pike Project's remaining activities include approximately 53 acres of selection harvest (38 acres of single-tree selection harvest and approximately 15 acres of group selection harvest) and that these harvests may occur during the NLEB's active season (1 April – 30 September) (Table 1). Based on previously monitored timber harvests, the HNF has estimated that 8 timber operation accidents (i.e., accidental felling of non-target trees) may occur during the harvests. The HNF's timber harvest contractors will not be limited by any seasonal-cutting restrictions and therefore it is assumed that the majority of the harvesting will occur during the drier summer months when soil erosion and heavy rutting can be more easily avoided.

The purpose of the harvest is both to improve stand structure and vigor and to regenerate small groups of declining black and scarlet oak. The harvest would remove approximately one third of the trees in the treatment area. An existing system road would be utilized and no new system road construction is anticipated. Construction of some vernal pools is proposed to replace temporary skid trails where appropriate.

UNIONTOWN SOUTH RESTORATION PROJECT

The Uniontown South Restoration Project is located in Perry County on the Tell City Ranger District of the HNF (Figures 1 and 3). Although this project was originally consulted on in 2012 for the Indiana bat (USFWS 2006; PBO Appendix #8), we understand that the HNF's remaining activities associated with the Uniontown South Restoration Project include

- approximately 482 acres of pine clearcut harvest in nonnative pine stands,
- approximately 261 acres of pine thinning in nonnative pine stands,
- approximately 173 acres of hardwood shelterwood harvest,
- approximately 207 acres of hardwood thinning (estimated 27 accidental tree fellings during timber operations),
- approximately 556 acres of hardwood selection harvest (estimated 72 accidental tree fellings during timber operations),
- approximately 1,828 acres of prescribed fire, which may occur during the NLEB's active season of 1 April-30 September, and
- an estimated 99 timber operation accidents (i.e., accidental felling of non-target trees) may occur during the above activities and the majority of harvest operations would occur during the summer months to prevent equipment operation from causing significant soil erosion or heavy ruts (which occurs more frequently during wetter soil conditions such as those present during the winter and spring) (Table 1).

The HNF's management activities are being proposed in order to:

- Restore dry hardwood forest ecosystems that have been degraded by a lack of fire and

limited oak-hickory regeneration;

- Restore mesic forestland habitats degraded by a lack of stand age-class diversity and structural diversity;
- Improve age-class distribution by regenerating areas of nonnative pine and mature hardwoods to early successional forested habitat;
- Restore native mixed hardwood ecosystems by removing nonnative pine;
- Improve forest health and safety in campgrounds by reducing the density in pine stands in and around campgrounds; and
- Improve the health of all harvest areas making them more adaptable to climate change.

ORIOLE RESTORATION PROJECT

The Oriole Restoration Project is located in Perry County on the Tell City Ranger District of the HNF (Figure 1 and 4). Although this project was originally consulted on in 2007 for the Indiana bat (USFWS 2006; PBO Appendix #3), we understand that the HNF's remaining activities associated with the Oriole Restoration Project include

- approximately 325 acres of pine clearcut harvest in nonnative pine stands,
- approximately 182 acres of pine thinning in nonnative pine stands,
- approximately 179 acres of hardwood shelterwood harvest,
- approximately 202 acres of hardwood thinning (estimated 26 accidental tree fellings during timber operations),
- approximately 484 acres of hardwood selection harvest (estimated 63 accidental tree fellings during timber operations),
- approximately 3,500 acres of prescribed fire, which may occur during the NLEB's active season of 1 April-30 September, and
- an estimated 89 timber operation accidents (i.e., accidental felling of non-target trees) may occur during the above activities and the majority of harvest operations would occur during the summer months to prevent equipment operation from causing significant soil erosion or heavy ruts (which occurs more frequently during wetter soil conditions such as those present during the winter and spring) (Table 1).

Prescribed Fire

Up to 5,328 acres of forest habitat may be treated with prescribed fire on the Uniontown South (1,828 ac.) and Oriole (3,500 ac.) Restoration Projects (Table 1). The prescribed fire acreage values were estimated as the maximum amounts that may occur over the life of the project. An unknown portion could be burned during any given year of the project and are somewhat independent on ignition date in that they're lit when conditions fall within a pre-determined fire prescription for the area (and necessary preparations have been made and personnel available). Prescribed field and staffing conditions may occur early in the spring or later depending on the year. Typically, prescribed burn conditions are unsuitable after April 15. So, it is probable that most of the estimated prescribed fire acres will be burned outside of the bat active season when no take of Indiana bat or NLEBs would be anticipated. Nonetheless, for the purposes of this consultation, we have assumed that all of the burning may occur during the first two or three weeks of the NLEB active season (1 April – 22 April), which represents a worst-case scenario.

TABLE 1. Projects for which the HNF made a “May Affect, Likely to Adversely Affect” determination for the NLEB.

Project Name	HNF Ranger District	Determination for NLEB	Remaining Acreage ¹ (acreage associated with this consultation)					
			Pine		Hardwood			Prescribed Fire ⁴
			Clearcut	Thinning ²	Shelterwood	Thinning ³	Selection ³	
Buffalo Pike (2015)	Brownstown	LAA					53 (8 trees)	
Uniontown South Restoration (2012)	Tell City	LAA	482	261	173	207 (27 trees)	556 (72 trees)	1,828
Oriole Restoration (2007)	Tell City	LAA	325	182	179	202 (26 trees)	484 (63 trees)	3,500
Total			807	443	352	409 (53 trees)	1,093 (143 trees)	5,328

¹ Remaining portions of treatment areas that were previously evaluated for incidental take of Indiana bats per the 2006 PBO (USFWS 2006). Formal consultation letters documenting the USFWS’s review and consistency analysis with the 2006 PBO were received by the HNF for each project (23 January 2015; 24 February 2012; 24 August 2007, respectively).

² Pine thinning was not specifically included in the 2006 Incidental Take Statement (ITS) that accompanied the 2006 PBO. However, the pine shelterwood harvest in the ITS is similar in the amount of trees removed and thus has been used as a surrogate category for pine thinning.

³ Hardwood thinning and selection were not included in the 2006 ITS that accompanied the 2006 PBO. However, take can be estimated from accidental loss/felling of trees from timber operations, which was included as a category in the 2006 ITS (King 2011). Based on an earlier timber operation on the HNF, accidental loss is estimated to be 0.13 trees per acre for selection harvests and thinning (Beck 2011).

⁴ Prescribed burning may occur between April 1 and April 22 (i.e., during the first 3 weeks of the summer maternity season) and has been included here as a potential activity leading to take of NLEB.

CONSERVATION MEASURES

The HNF follows Standards and Guidelines outlined in the LRMP to ensure that timber harvests are conducted in a manner that would maximize the benefit to Indiana bats (and by extension NLEBs)(See pages 3-3 through 3-5 in the LRMP; HNF 2005) and are hereby incorporated by reference.

ACTION AREA

The “Action Area” is defined by regulation as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR § 402.02). The action area is not limited to the “footprint” of the action nor is it limited by the Federal agency’s authority. Rather, it is a biological determination of the reach of the proposed action on listed species.

Because the full “reach” of the various direct and indirect effects of the activities comprising the Proposed Action remain somewhat uncertain, we assumed quantifiable effects to NLEBs would be confined to the project footprint and a .5-mile buffer in all directions. Therefore, the Action Areas defined for this consultation encompass all of the remaining treatment areas within the boundaries of the Buffalo Pike, South Union and Oriole Restoration Projects in Jackson and Perry counties in Indiana plus an additional 0.5-mile buffer area (see Figures 1-4 at the end of this BO).

II. STATUS OF THE SPECIES

This section is a discussion of the range-wide status of the NLEB and presents biological and ecological information relevant to formulating the biological opinion. It includes information on the species’ life history, its habitat and distribution, and the effects of past human and natural factors that have led to the current status of the species.

SPECIES BACKGROUND & HABITAT

The NLEB was listed as a threatened species on 2 April 2015 (federal Register 80[63]:17974; USFWS 2015), under the ESA (became effective on 4 May 2015). The USFWS also established an interim rule under the authority of section 4(d) of the ESA that prohibits purposeful take of NLEBs throughout the species’ range, except in instances of removal of NLEBs from human structures and authorized capture and handling of NLEB by individuals permitted to conduct these same activities for other bats (for a period of 1 year after the effective date of the interim 4(d) rule). In areas not yet affected by white-nose syndrome (WNS), all incidental take resulting from any otherwise lawful activity is excepted from prohibition. In areas currently known to be affected by WNS, all incidental take prohibitions apply, except that take attributable to forest management practices, maintenance and limited expansion of transportation and utility rights-of-way, prairie habitat management, and limited tree removal projects is excepted from the take prohibition, provided these activities protect known maternity roosts and hibernacula. Further, removal of hazardous trees for the protection of human life or property is excepted from the take prohibition. The listing and 4(d) rule went into effect on 4 May 2015. No critical habitat has been proposed for the species.

The NLEB is a temperate, insectivorous, migratory bat that hibernates in mines and caves in the winter and spends summers in wooded areas. The key stages in its annual cycle are: hibernation,

spring staging and migration, pregnancy, lactation, volancy/weaning, fall migration and swarming. NLEB generally hibernate between mid-fall through mid-spring each year. Spring migration period likely runs from mid-March to mid-May each year, as females depart shortly after emerging from hibernation and are pregnant when they reach their summer area. One pup is born per adult female between mid-June and early July, with nursing continuing until weaning, which is shortly after young become volant in mid- to late-July. Fall migration likely occurs between mid-August and mid-October.

Summer Habitat and Ecology

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

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

Upon emergence from the hibernacula in the spring, females seek suitable habitat and actively form maternity colonies in the summer (Foster and Kurta 1999) and exhibit fission-fusion behavior (Garroway and Broders 2007), where members frequently coalesce to form a group (fusion), but composition of the group is in flux, with individuals frequently departing to be solitary or to form smaller groups (fission) before returning to the main unit (Barclay and Kurta 2007). As part of this behavior, NLEBs switch tree roosts often (Sasse and Pekins 1996), typically every 2 to 3 days (Foster and Kurta 1999; Owen et al. 2002; Carter and Feldhamer 2005; Timpone et al. 2010). NLEB maternity colonies range widely in size, although 30-60 may be most common (USFWS 2014). NLEB show some degree of interannual fidelity to single roost trees and/or maternity areas. Male NLEB are routinely found with females in maternity colonies. NLEB use networks of roost trees often centered around one or more central-node roost trees (Johnson et al. 2012). NLEB roost networks also include multiple alternate roost trees and male and non-reproductive female NLEB may also roost in cooler places, like caves and mines (Barbour and Davis 1969; Amelon and Burhans 2006).

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

NLEB are typically born in late-May or early June, with females giving birth to a single offspring. Lactation then lasts 3 to 5 weeks, with pups becoming volant (able to fly) between early July and early August.

Migration

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

Winter Habitat and Ecology

Suitable winter habitat (hibernacula) includes underground caves and cave-like structures (e.g. abandoned or active mines, railroad tunnels). There may be other landscape features being used by NLEB during the winter that have yet to be documented. Generally, NLEB hibernate from October to April depending on local climate (November-December to March in southern areas and as late as mid-May in some northern areas). Hibernacula for NLEB typically have significant cracks and crevices for roosting; relatively constant, cool temperatures (0-9 degrees Celsius) and with high humidity and minimal air currents. Specific areas where they hibernate have very high humidity, so much so that droplets of water are often seen on their fur. Within hibernacula, surveyors find them in small crevices or cracks, often with only the nose and ears visible.

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

Spring Staging and Fall Swarming Habitat and Ecology

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

After hibernation ends in late March or early April (as late as May in some northern areas), most NLEB migrate to summer roosts. Females emerge from hibernation prior to males. Reproductively active females store sperm from autumn copulations through winter. Ovulation takes place after the bats emerge from hibernation in spring. The period after hibernation and just before spring migration is typically referred to as “staging,” a time when bats forage and a limited amount of mating occurs. This period can be as short as a day for an individual, but not all bats emerge on the same day.

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

DISTRIBUTION AND RANGE

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

Although they are typically found in low numbers in inconspicuous roosts, most records of NLEB are from winter hibernacula surveys (Caceres and Pybus 1997). More than 780 hibernacula have been identified throughout the species' range in the United States, although many hibernacula contain only a few (1 to 3) individuals (Whitaker and Hamilton 1998). Known hibernacula (sites with one or more winter records of northern long-eared bats) include: Alabama (2), Arkansas (41), Connecticut (8), Delaware (2), Georgia (3), Illinois (21), Indiana (63), Kentucky (119), Maine (3), Maryland (8), Massachusetts (7), Michigan (103), Minnesota (11), Missouri (more than 269), Nebraska (2), New Hampshire (11), New Jersey (8), New York (90), North Carolina (22), Oklahoma (9), Ohio (7), Pennsylvania (112), South Carolina (2), South Dakota (21), Tennessee (58), Vermont (16), Virginia (8), West Virginia (104), and Wisconsin (67). NLEB are documented in hibernacula in 29 of the 37 States in the species' range. Other States within the species' range have no known hibernacula (due to no suitable hibernacula present, lack of survey effort, or existence of unknown retreats).

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

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

STATUS AND THREATS RANGEWIDE

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

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

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

In areas where WNS is present, there are additional energetic demands for NLEBs. For example, WNS-affected bats have less fat reserves than non-WNS-affected bats when they emerge from hibernation (Reeder et al. 2012; Warnecke et al. 2013) and have wing damage (Meteyer et al. 2012; Reichard and Kunz 2009) that makes migration and foraging more challenging. Females that survive the migration to their summer habitat must partition energy resources between foraging, keeping warm, successful pregnancy/pup-rearing and healing and may experience reduced reproductive success.

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

Lastly, there is growing concern that bats, including the NLEB (and other bat species) may be threatened by the recent surge in construction and operation of wind turbines across the species' range. Mortality of NLEB has been documented at multiple operating wind turbines/farms. The Service is actively working with wind farm operators to avoid and minimize incidental take of bats and mitigate incidental take of bats.

CONSERVATION NEEDS OF THE SPECIES

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

We find that the primary conservation need of the NLEB is to reduce the threat of WNS. This includes minimizing mortality in WNS-affected areas, and slowing the rate of spread into currently unaffected areas. In addition, NLEB that continue to exist within WNS-affected areas need to be able to continue to survive and reproduce in order to stabilize and/or increase the populations. This can be done by reducing the other threats to the species, as listed above. Therefore, efforts to protect hibernacula from disturbances need to continue. 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 avoided when possible. Research to identify important hibernacula and summer areas and to delineate the migratory relationship between summering and wintering populations should also be pursued.

Rangewide Surveys

The NLEB occurrence data prior to the species' Federal listing is widely available from summer mist net survey records, and suggests that they were relatively abundant in throughout much of their range prior to the arrival of WNS. However, for several reasons, interpretation of winter survey data must be made with some caution. First, winter survey data has traditionally been organized by state due to the nature of the data collection and in many states the winter bat surveys traditionally have been focused on the Indiana bat and not NLEB. Furthermore, NLEBs tend to hibernate in deep cracks and fissures making them much more difficult to find and count in hibernacula. Second, as will be further discussed, available information specific to the "reproductive unit" (i.e., maternity colony) of the NLEB is limited. While winter distribution of the NLEB is fairly well documented, relatively little is known as to the size, location and remaining number of NLEB maternity colonies particularly in WNS-impacted areas.

Additionally, the relationship between wintering populations and summering populations is not clearly understood. For example, while it is known that individuals of a particular maternity colony come from one to many different hibernacula, the source (hibernacula) of most, if any, of the individuals in a maternity colony is not known. As such, the specific origin of the NLEBs (i.e., which hibernacula) that form maternity colonies in the action areas is unknown.

Maternity Colonies

Relatively little is known regarding the mean population size and structure of NLEB maternity colonies, but they typically are somewhat smaller in size than maternity colonies of Indiana bats (FWS 2014). Based upon a review of the literature, we assume that most NLEB maternity colonies range in size from 30-60 adult females. Therefore, once pups become volant an average colony size would grow to be from 60-120 bats. The Service recognizes that maternity colonies are not static in size, and the numbers of individuals that comprise a maternity colony likely vary widely as a colony adjusts to current conditions, including the availability and quality of roosting and foraging habitat, and variable climatic conditions. As little research focus has been placed on NLEBs prior to their listing, the vast majority of NLEB maternity colonies have not yet been documented. The location of most maternity colonies may always remain unknown because of the difficulty in detecting maternity activity. Some unknown proportion of these colonies may be at risk when land use practices, habitat alterations, and habitat loss occurs. Therefore, some maternity colonies could be reduced in numbers, and in some cases extirpated, prior to their discovery.

The home range of a colony, i.e., the collective area used by its members over the course of a summer, is necessarily larger than the home range of an individual, due both to the variability of individual behavior and because the center of individual bat activity shifts with frequent roost changes over the course of a summer season. Based on reported maximum individual home range and travel distances between roosts and between roosts and foraging areas, we use 1,000 acres for purposes of this BO as the area a colony uses. Within this area, one or more members of a colony and sympatric adult males would likely appear in mist net or acoustic surveys. Such appearance is the basis for the occupancy rates often used to estimate acreage of available forested habitat that NLEB may use during the active season.

For comparison with data on travel distances, a 1,000-acre circle has a radius of 3,724 ft, or 0.71 mile. This radius is about half of the 1.5-mile radius from NLEB capture records that the Service commonly uses for the purpose of identifying actions that may affect habitats the species is known to use (USFWS 2014), which is different than the purposes for which we use 1,000 acres as the size of a colony (i.e., estimating population size and numbers of individuals affected by activities). The larger radius of 1.5 miles accounts for the highly variable travel distances between roosts and foraging areas reported in the literature, how colonies may overlap and exchange members on the landscape, and how the shape of a home range is not necessarily as compact as a circle.

Previous Incidental Take Authorizations

Summary- All previously issued Conference and Biological Opinions involving the NLEB have been non-jeopardy. These formal conferences and consultations have involved (a) the Forest Service (Regions 8 and 9) for activities implemented under various Land and Resource Management Plans (LRMPs) on National Forests in the eastern United States, (b) the Federal Highway Administration for various transportation projects (e.g., I-69 in Indiana), and the FWS (intra-Service consultation in KY). Additionally, an incidental take permit (ITP) has been amended under section 10 of the ESA to include NLEBs for implementation of the NiSource Multi-species Habitat Conservation Plan (MSHCP), which covers a privately owned natural gas pipeline/storagefield system. Additional HCPs are being developed for State-operated forestry programs in Indiana, Pennsylvania and states in the upper Midwest (MI, MN & WI) and for several private wind power developments throughout the NLEB range.

It is important to note that in many of these consultations, survey information was lacking. As Federal agencies are not required to conduct surveys, often the Service relied on a host of valid factors in helping the Federal agency determine whether NLEB may be present. To ensure the Federal agency and the Service met the mandate of the section 7(a)(2), if the best available data indicated that NLEBs may be present, the assumption was made that a maternity colony (in most instances) occurred within the Action Area. Although we believe this approach fully accords with the intent of Congress and the ESA, it likely resulted in an over-estimate of the number of individuals or colonies that may have been impacted by Federal actions.

National Forests- Within the past decade, nearly all National Forests within the range of the Indiana bat have completed a formal consultation at the programmatic level including the HNF. Consultation under Section 7 of the Act is necessary to ensure agency actions do not jeopardize the continued existence of listed species. These consultations have all led to non-jeopardy biological opinions (BOs) with associated incidental take statements (ITSs). Although some of these ITS anticipated the take of reproductive females, we have not yet confirmed a loss of an Indiana bat or NLEB maternity colony on a National Forest from forest management activities. The reasons for this are likely two-fold. First, the programmatic conservation measures (i.e., standards and guidelines) and second, the project-specific reasonable and prudent measures were designed to minimize maternity colony exposure to the environmental impacts of Forest Plan actions. Specifically, these measures ensured an abundance of suitable Indiana bat habitat on the National Forests, and protected all known or newly discovered maternity colonies. Because NLEBs and Indiana bats share many of the same habitat needs, it is reasonable to assume that the NLEB has also benefited from the same programmatic conservation measures (i.e., standard and guidelines) and project-specific reasonable and prudent measures that originally were designed to protect Indiana bats on national forest lands. Similarly, Approximately 95 percent of previously authorized habitat impacts on National Forests (for Indiana bats) have not been a permanent loss. Rather, they have been varying degrees of temporary alterations and losses (short-term and long-term) resulting from timber management activities. Although this analysis does not include all National Forests that, to date, have received an ITS, the concepts of the analysis are consistent, regardless of the location.

Although NLEB presence has been verified on most, if not all, National Forests within the range of the species, confirmation of maternity activity on these lands is relatively scant. The recent federal listing of the species is expected to prompt more radio-tracking studies and presumably more NLEB maternity colonies will be discovered in coming years. The USFS has reported that WNS has been confirmed on every National Forest in Region 9 (including the Hoosier NF and other northeastern and midwestern states) except the Chippewa and Huron-Manistee. WNS has been confirmed for at least four years in all Forests with known caves, and the disease is likely widespread on these Forests (USDA Forest Service, 2015, unpublished data).

Traditionally, incidental take of bats primarily has been exempted in the form of habitat loss because of the great difficulty of detecting and quantifying take of individual bats because of their small body size, wide and cryptic summer distribution while roosting under loose bark of trees, and unknown spatial extent and density of their summer roosting population range within the respective National Forests. For some ITSs, take has also been extrapolated to include an estimated number of individual bats based on various assumptions. Legal coverage has included the take, by kill, of individual bats; or take, by harm through habitat loss, or harassment.

Other Federal Agencies or Non-Federal Entities- Several incidental take statements have been issued to other Federal agencies. Unlike those issued for the National Forest LRMPs, some of

these projects were certain to impact known occupied habitat. To minimize the effect of these projects, the action agencies agreed to implement various conservation measures. These included: seasonal tree-clearing restrictions to avoid disturbing female Indiana bats and young; protection of all known primary and alternate roost trees with appropriate buffers; retention of adequate roosting and foraging habitat to sustain the maternity colony into the future; and permanent protection of areas and habitat enhancement or creation measures to provide future roosting and foraging habitat opportunities. While a relatively small amount of incidental take associated with activities covered under the interim 4(d) rule for NLEB (e.g., forest management) may occur, it is not expected to be significant source of mortality to regional or the range-wide population of NLEB.

In summary, we believe the take exempted to date via section 7 consultations has resulted in short-term effects to Indiana bat and NLEB habitat and, in limited circumstances, on these species' maternity colonies. As many of these consultations necessarily made assumptions about species' presence, we are uncertain of the actual number of NLEB maternity colonies exposed to environmental impacts of Federal actions throughout the species' range, but we believe the actual number is likely less than what we have assumed to be present. Furthermore, although not definitive, monitoring of maternity colonies (of other bat species; primarily Indiana bat) pre- and post-project implementation preliminarily suggests that our standard conservation measures, when employed in concert, appear to be effective in minimizing adverse effects on the affected maternity colonies.

III. ENVIRONMENTAL BASELINE

This section is an analysis of the past effects of State, tribal, local and private actions already affecting the species within the Action Areas and the present effects within the Action Area that will occur contemporaneously with the consultation in progress. It includes a description of the known status of NLEBs and their habitats within or near the Action Areas.

NLEB STATUS WITHIN THE HNF ACTION AREAS

The Hoosier National Forest is comprised of 202,814 acres (317 sq. mi.) of federally owned land managed for multiple uses by the U.S. Forest Service across portions of nine counties in southern Indiana. Central hardwoods, primarily oak and hickory are predominant in southern Indiana. The pine on the Forest was mostly planted as a way to restore eroding land and is not native to the area. The barren communities on the Forest have many rare species and are fire-dependent ecosystems which are burned periodically by prescription. Timber harvest and vegetative management are used to perpetuate and enhance biological diversity. The Hoosier has inventoried 41 different forest types. A sustainable yield of high-quality hardwood products is also a priority in some areas. Management is a balance of uneven-aged and even-aged systems. The allowable sale quantity on the Hoosier has a ceiling of 5.77 million board feet per year. The average amount sold since 1990 has been about 1 million board feet per year (HNF 2015).

Summer NLEB Habitat

Whitaker and Brack (2002) assessed population levels over time of 10 species of bats in Indiana and found populations of NLEB to be relatively low but stable between 1980 and 2000.

Summer bat mist-netting has occurred on HNF since at least 1981, with 1,184 bat captures through 2014 (see HNF 2015, Table 1; Brack et al. 2004). Survey sites were located across the Forest in a variety of cover types, ranging from riparian to oak-hickory and northern hardwood forests. Nets were generally set in the vicinity of bat travel corridors and water sources (e.g., forest roads, streams and isolated ponds), but efforts were not consistent among years. Some sites were surveyed during multiple years, but none are established as long-term monitoring sites. NLEBs have been acoustically detected and/or captured in mist nets within or near each of the 3 ongoing LAA project areas on the HNF (Figures 2-4; Appendices C-E in HNF 2015). At present, no known occupied NLEB roost trees have been recorded on the HNF.

Prior to the arrival of WNS in Indiana in 2011, NLEB was the most common bat species captured (27% of bats caught) followed closely by red bats and tri-colored bats (26% and 24%, respectively)(Brack et al. 2004). After the arrival of WNS, NLEB captures declined to 14% of bats caught with none being captured during 2014 mist net surveys on the HNF. The post-WNS occupancy rate of NLEB on the HNF has been estimated at 29.4%, which was computed from the number of net sites with NLEB captures divided by the total number of bat capture sites (of any species) on the Forest (USFWS, 2015, unpublished data).

Of 200 individual captured NLEBs with known sex, age and reproductive status, 124 were females (12 juveniles, 112 adults). Ninety-one adult females (81%) were reproductively active (i.e., pregnant, lactating or post-lactating) when captured. Therefore, NLEB maternity colonies undoubtedly occur/occurred on and around the HNF, but no maternity colonies/maternity roost trees have been located to date (HNF 2015). In 1992, attempts to locate roost sites of two radio-tagged NLEBs were unsuccessful (Whitaker 1996). Plans to attach radio transmitters and locate roost sites in 2014 were not fulfilled because mist netting efforts failed to capture any NLEBs.

Five acoustic survey routes were established in 2009 on the HNF; three in the Tell City Ranger District and two in the Brownstown Ranger District. By 2011, a standardized survey protocol based on those of Britzke and Herzog (2009) was implemented across all Forest Service units within Region 9 of the USFS with the intent to monitor trends in bat populations. When possible, each route is surveyed annually during three time periods (June 1 to 15, June 16 to 30, July 1 to 15). The timeframe was selected as a general period that fits most of the eastern Forests to account for volant young and to minimize migrating bats.

Winter NLEB Habitat

In Indiana, a total of 69 hibernacula (i.e., caves and mines) have records of NLEB (USFWS BFO, unpublished data, 2015), but none of these are within or near the Action Areas. Only one known NLEB hibernaculum occurs on the HNF in Lawrence County, Indiana.

Maternity Colonies within the Action Areas

For this consultation, each NLEB maternity colony's roosting and foraging area was assumed to cover approximately 1000 acres of forest habitat (i.e., a circle with a 0.78-mile radius). Using the approximate number of acres of forested habitat within the three project area boundaries, the Service estimated that a maximum of 17 NLEB maternity colonies could be roosting and/or foraging within portions of the three project Action Areas (Buffalo Pike Project - 1 colony; Uniontown South Restoration Project - 7 colonies; and Oriole Restoration Project 9 colonies). A maternity colony typically consists of reproductively active female Indiana bats and their young (i.e., typically 1 pup/adult female/year). A maternity colony is typically presumed to be present

if there is evidence of reproduction in an area during the summer reproductive season (the capture of a reproductive female and/or juvenile, or high emergence counts at an identified roost). While there are some previous mist net captures of reproductively active adult females and juvenile NLEBs (from the pre-WNS period) and some acoustic detections of NLEBs (age and gender unknown) (Appendices B-E in BA), there are no known occupied NLEB roost trees or hibernacula within the Action Areas.

Number of Potential NLEB Maternity Colonies on the HNF

The exact number of individual NLEBs and maternity colonies on the HNF and the Action Areas is unknown, but using the estimate of 1,000 acres of forest/colony discussed above, we estimated that there may be up to 17 maternity colonies within the Action Area that could be exposed to project-related stressors. The following assumptions were made when estimating the total number of NLEB maternity colonies across the whole HNF.

- There are 202,814 acres on the HNF
- We assumed 5% of this area does not provide NLEB habitat: $202,814 \text{ acres} \times 95\% = 192,673 \text{ acres}$ of forested habitat available to the species
- $192,673 \text{ acres of available forested habitat} / 1,000 \text{ acres per NLEB colony} \approx \underline{192 \text{ NLEB maternity colonies on the HNF}}$

Maternity Colony Population Size Estimates

Because it is practically impossible, cost-prohibitive, and highly disruptive to capture and radio-tag all maternity colony members, locate all of their roost trees and have a large enough field staff to conduct simultaneous nightly emergence counts at every known roost tree, **the Service has decided to conservatively assume that each maternity colony is comprised of approximately 45 adult females and their single offspring/pup** (Whitaker and Mumford 2009). **This would result in a maximum of 90 bats per colony by mid-June when the young are born and when they become volant (i.e., capable of flight) around mid-July.** The Service believes a 45-adult female colony size is a reasonable assumption based on reported colony size estimates in the literature of 30-60 (USFWS 2014), but we acknowledge that most of the previously reported estimates were from pre-WNS studies. To be conservative towards the bats, we are assuming that 100% of adult females will successfully bear a live pup and that 100% will survive to volancy, which is probably higher than reality, but gives the benefit-of-the-doubt to the species. The actual reproductive rate of adult females in each maternity colony is unknown as is the current mortality rate of adults and juveniles.

Because a relatively low number of non-reproductive females have been captured at HNF and elsewhere, we assume that non-reproductive females in the Action Area are associated with a maternity colony and are thereby being accounted for within the 45 adult females being estimated per maternity colony. Therefore, given the presumed presence of 17 maternity colonies in the Action Area and an approximate total of 45 adult females and 45 pups per colony, then we can assume that there are approximately 765 adult females and a similar number of juveniles (i.e., $+765 \text{ juvenile bats by mid-July} = 1,530 \text{ bats/maternity colony}$) within or adjacent to the defined Action Areas and that variable proportions of the bats in these colonies are likely to be exposed to direct and/or indirect effects from the Proposed Action. Lastly, we assume 1

adult male per adult female NLEB in the Action Areas based upon a roughly 1:1 capture ratio observed in Kentucky (USFWS 2015, unpublished data) (i.e., an additional 765 adult male bats). So, by mid- to late summer there could be approximately 2,295 NLEBs in the Action Area (i.e., 765 adult females + 765 juveniles + 765 adult males = 2,295 bats total).

Ongoing Stressors in the Action Area

The majority of the Action Area is owned and managed by the Forest Service. The USFWS believes the following State, local, and private actions are currently occurring within the non-federal forest lands surrounding the project areas and are likely to be adversely affecting some percentage of NLEBs to variable degrees, and are likely to continue into the reasonably foreseeable future.

- Loss and degradation of roosting and foraging habitat – Most of the surrounding forest habitat within the Action Area is on HNF and is being maintained and available for use by NLEB. However, outside of HNF boundaries, an unknown amount of forest habitat is being lost and/or degraded by private and public, commercial and residential developments, which are converting, fragmenting, or otherwise degrading some relatively small percentage of forest habitat available for roosting and foraging, particularly along primary and heavily traveled secondary roadways and their main intersections.
- Commercial and private timber harvesting – Some private timbering is assumed to occur on private lands along HNF's boundaries while bats are roosting in trees between 1 April and 30 September. Therefore, some unknown number are likely exposed to this stressor and some individuals may be directly killed, harmed, or displaced as trees are felled in the summer.
- Cutting of Snags - While most primary and many alternate roost trees are dead snags that are ephemeral/short-lived, some small proportion are likely to be cut down before they would naturally fall in order to reduce safety risks (i.e., hazard tree removal), to provide firewood, or to improve aesthetics. Cutting of snags is generally avoided on the HNF unless they pose an imminent safety hazard.
- Degraded water quality – Point and non-point source pollution and contaminants from agricultural, commercial, and residential areas are likely present in waterways within the Action Areas and may at times reduce aquatic insect biomass that may form a portion of the NLEB prey base and/or have direct or other indirect adverse effects on the bats themselves (e.g., females may have reduced reproduction in heavily contaminated areas)(Secord et al. 2015).

IV. EFFECTS OF THE ACTION

While analyzing direct and indirect effects of the Proposed Action on Indiana bats, the Service considered the following factors:

- proximity of the action to known species locations and designated critical habitat,
- distribution of the disturbances and impacts,
- timing of the effects in relation to sensitive periods in the species' lifecycle,
- nature of the effects – how the effects of the action may be manifested in elements of a species' lifecycle, population size or variability, or distribution, and how individual animals may be affected,
- duration of effects - short-term, long-term, permanent,

- disturbance frequency - number of events per unit of time, and
- disturbance severity - how long would it take a population to recover?

We deconstructed the Proposed Action into its various project elements and determined the direct and indirect environmental consequences that NLEB would be exposed to. We conducted various exposure analyses for each proposed activity that may directly or indirectly affect (positively and negatively) the bats and determined the likely responses of the bats and their local populations to each potential stressor. Analyses focused on NLEBs that roost and forage on the forest during the summer season (1 April – 30 September) with a primary focus on effects to the 17 presumed maternity colonies in the Action Areas. Table 1 contains a summary of the proposed forest management activities that could act as stressors on NLEBs.

Stressors

Primary stressors that NLEBs in the Action Areas are likely to be directly or indirectly exposed to that are reasonably certain to have adverse effects and may lead to some level of incidental “take” via death, injury, “harm” and “harassment” include:

- accidental/incidental felling of snags and other potential roost trees during active-season timber management activities including pine clearcuts, pine and hardwood thinning, hardwood shelterwood cuts and hardwood selective cuts between 1 April and 30 September.
- prescribed burns conducted during the NLEB active season (15 April – 15 September).

Effects of Conservation Measures

HNF has incorporated conservation measures into their LRMP (HNF 2005) and Proposed Action to avoid, minimize and mitigate adverse impacts of their proposed management activities to the extent practical. These measures are referred to as Standards and Guidelines and are outlined in the LRMP to ensure that timber harvests are conducted in a manner that would maximize the benefit to Indiana bats and by extension NLEBs (See pages 3-3 through 3-5 in the LRMP) and are hereby incorporated by reference.

Although snags will not be purposefully felled in most cases, some potential bat roosting habitat may be adversely affected in the short-term and a small chance of incidentally disturbing and taking one or more NLEBs during timber harvest operations and associated accidental tree fellings cannot be wholly discounted. In contrast, the overall effects from the proposed management activities should contribute to conservation and long-term habitat improvements (e.g., improved foraging habitat) for this species over time. No long-term adverse impacts to local NLEB populations are anticipated and no measurable impacts to regional or range-wide populations are anticipated.

Maternity Colonies – Previous bat surveys have documented the presence of NLEBs on the HNF, but no maternity colonies have been documented on the Action Areas. We have assumed that up to 17 maternity colonies, comprised of 45 adult females and their 45 young (17 colonies x 90/colony = 1,530 reproductive female and juvenile bats) may occupy portions of the Action Areas plus an additional 765 adult males. The likelihood of project-related stressors leading to incidental take of NLEBs within all (100%) of the 17 potential colonies is remote (i.e., not reasonably likely to occur).

Timber Harvests

We estimate that during the next 5 to 10 years (i.e., over the remaining life of the 3 ongoing projects) that up to 75% of maternity colony members may be exposed to timber harvest related stressors across 3,104 acres (1,148 out of 1,530 adult female and juvenile bats) and that up to 2% of exposed bats (2% of 1,148 = 23 bats) may be directly or indirectly taken (i.e., death, injury, harm and harassment) with the majority of the taken bats being non-volant pups/juveniles. We anticipate that take of these individuals would not be evenly spread among the 17 maternity colonies, but take would be most likely to occur in colonies having the majority of their range within the boundaries of the 3 LAA ongoing projects. Under no likely scenarios, however, is the estimated small amount of loss/take of reproductive individuals likely to cause an appreciable long-term change in viability of an individual maternity colony or to the species' regional or range-wide status. Juvenile bats naturally incur a high mortality rate and their survival rate has a relatively small influence on population rate of change (λ) (Thogmartin et al. 2013). Therefore, a small amount of incidental take of juveniles and the loss of a few adult females spread across multiple colonies is only likely to lead to a short-term (2 or 3 maternity seasons) reproductive loss and/or short-term reduction in numbers of these local maternity colonies. In none of the presumed maternity areas is the extent or intensity of proposed timber harvest likely to cause a NLEB maternity colony to be permanently displaced from its traditional summer range and a large amount of suitable summer habitat will remain available for continued use by the bats.

Prescribed Burning

Perry (2012) provides a review of fire effects on bats in the eastern oak region of the U.S., and Carter et al. (2002) provides a similar review for bats in the southeastern and mid-Atlantic states. Forest-dwelling bats, including the wide-ranging NLEB, were presumably adapted to the fire-driven disturbance regime that preceded European settlement and fire suppression in many parts of the eastern U.S. Concurrent changes in habitat conditions preclude any reasonable inferences about the overall impact of fire suppression on populations of forest-dwelling bats. It is apparent that fire may affect individual bats directly (negatively) through exposure to heat, smoke, and carbon monoxide, and indirectly (both positively and negatively) through habitat modifications and resulting changes in their food base (Dickinson et al. 2009).

Direct Effects – Summer Roosting

Little is known about the direct effects of fire on cavity and bark roosting bats, such as the NLEB, and few studies have examined escape behaviors, direct mortality, or potential reductions in survival associated with effects of fire. Dickinson et al. (2009) monitored two NLEB (one male and one female) in roosts during a controlled summer burn. Within 10 minutes of ignition near their roosts, both bats flew to areas that were not burning. Among four bats they tracked before and after burning, all switched roosts during the fire, with no observed mortality. Rodrigue et al. (2001) reported flushing a *Myotis* bat from an ignited snag during an April controlled burn in West Virginia.

Carter et al. (2002) suggested that the risk of direct injury and mortality to southeastern forest-dwelling bats resulting from summer prescribed fire is generally low. During warm temperatures, bats are able to arouse from short-term torpor quickly. Most adult bats are quick, flying at speeds > 30 km/hour (Patterson and Hardin 1969), enabling escape to unburned areas. NLEB use multiple roosts, switching roost trees often, and could likely use alternative roosts in unburned areas, should fire destroy the current roost. Non-volant pups are likely the most vulnerable to death and injury from fire. Although most eastern bat species are able to carry

their young for some time after they are born (Davis and Hitchcock 1965), the degree to which this behavior would allow females to relocate their young if fire threatens the nursery roost is unknown.

Dickinson et al. (2010) used a fire plume model, field measurements, and models of carbon monoxide and heat effects on mammals to explore the risk to the Indiana bat and other tree-roosting bats during prescribed fires in mixed-oak forests of southeastern Ohio and eastern Kentucky. Carbon monoxide levels did not reach critical thresholds that could harm bats in low-intensity burns at typical roosting heights for the Indiana bat (8.6 m) (28.2 ft). NLEB roost height selection is more variable, but on average lower (6.9 m) (22.8 ft) than the Indiana bat (Lacki et al. 2009b). In this range of heights, direct heat could cause injury to the thin tissue of bat ears. Such injury would occur at roughly the same height as tree foliage necrosis (death) or where temperatures reach 60 °C (140 °F). Most prescribed fires for forest management are planned to avoid significant tree scorch.

Given the proposed time frame of when prescribed fires may overlap with the NLEB active season (i.e., 1-22 April), only adult bats would be exposed to this potential stressor (i.e., juveniles are not born until June and July). Likewise given that the HNF's proposed control-burn methods, prescriptions and seasonal timing result in low-intensity burns, little harm is anticipated to NLEB roosting and foraging habitat.

Prescribed fire is proposed to be applied across 5,328 acres within the Uniontown South and Oriole restoration projects and may expose up to 16 maternity colonies to related stressors (e.g., smoke and heat). We estimate that during the next 5 to 10 years (i.e., over the remaining life of the ongoing projects) that up to 75% of adult females and adult males (1080 out of 1,440 adult bats) may be exposed to fire-related stressors and up to 1% of these bats (i.e., 11 adult bats) may be directly or indirectly taken (via death, injury, harm and harassment). We anticipate that take of these individuals would not be evenly spread among the 16 exposed maternity colonies, but with more take occurring in colonies whose range falls largely within the boundaries of the ongoing projects. Under no likely scenarios, however, is the estimated small amount of loss/take of reproductive individuals likely to cause an appreciable long-term change in viability of an individual maternity colony or to the species' regional or range-wide status.

While, harassment to individual NLEBs or maternity colonies from prescribed fire is not discountable, it is not anticipated to be a significant stressor at the maternity colony level. Prescribed burns are not likely to permanently displace exposed bats or colonies from their traditional summer ranges. If any NLEBs exposed to fire are temporarily displaced within the Action Areas, then additional suitable forest habitat is available in adjacent areas where they could presumably relocate with relatively minimal effort (volant bats are highly mobile).

Summary of Effects

In summary, the following effects are anticipated for the presumed NLEB individuals and maternity colonies within the Action Area:

- Habitat alteration will be minimal for most colonies: The total amount of timber harvest/forest alteration is relatively insignificant for each assumed colony. It is also unlikely that any maternity area would experience a significant long-term decrease in quality of roosting or foraging habitat as a direct result of the Proposed Action. In contrast, the management activities are likely to improve the foraging habitat for NLEB

in the long-term. Affects to roosting habitat are likely to be neutral or somewhat improved over time.

- All presumed NLEB maternity colonies at HNF appear to have additional habitat that is available nearby if some individual bats should become displaced by timber harvest activities, prescribed fire or related habitat alterations.
- Although there may be some short-term loss and impacts to individuals, these impacts are not likely to affect a colony's long-term reproduction and survival. Thus, all currently extant NLEB maternity colonies are likely to persist within the Action Area following implementation of the Proposed Action.

Local Populations of Males– Because adult males (and presumably many non-reproductive females) do not participate in the rearing of offspring, they typically lead solitary lives or in some cases form small bachelor colonies during the summer. Because these individuals are not burdened with a dependent young, they presumably would be more likely to flee from their roost sites/trees than reproductive females when faced with a management-related disturbance. Therefore, it is very unlikely that the felling of an occupied roost tree would ever have more than a few adult males in it at any one time and even more unlikely for take of more than one male to occur per event. We estimated a maximum total of 10 adult males may be taken as a result of the Proposed Action over the life of the projects. The potential loss of this relatively small number of male bats will have no measureable or significant impact on the breeding or non-breeding NLEB populations in the Action Area or beyond.

V. CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private (i.e., non-federal) actions that are reasonably certain to occur in the Action Area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered because they require separate consultation pursuant to section 7 of the Endangered Species Act. Reasonably foreseeable non-federal activities that are anticipated to occur within the Action Area for the NLEB are timber harvest, agricultural production, and a limited amount of development for residential and/or light industry use, however the majority of the lands within the Action Areas are federally owned and managed by the HNF.

We typically can not accurately quantify how much forest land on private lands will be converted to other habitat types, the extent of future timber harvests on private lands, nor the amount of privately owned habitat that will be developed for other purposes. However, we can look at the trends state-wide and extrapolate assumptions as to how the private lands within the Action Areas will likely be managed in the foreseeable future.

The following Indiana forest trends were highlighted within the North Central Research Station's 2005 report, "Indiana Forests: 1999-2003, Part A". Trends that we believe may be of a net benefit to NLEB have been *italicized* below:

- Apart from the loss of ash trees (*Fraxinus* spp.) due to emerald ash borers, *there are no major tree die-offs anywhere in the state; natural tree mortality appears evenly across the state.*
- *The ratio of harvested tree volume to tree volume growth indicates sustainable management.*

- *Diverse and abundant forest habitat (snags, coarse woody debris, forest cover and edges) support healthy wildlife populations across the state.*
- *Indiana possesses a diversity of standing dead tree wildlife habitat with an abundance of recently acquired snags to replenish fully decayed snags as Indiana's forests mature.*
- Indiana's oak species continue to grow slower than other hardwood species.
- The average private forest landholding dropped from 22-acres in 1993 to 16-acres in 2003, indicating a continued "parcelization" of Indiana forests.
- Introduced or invasive plant species inhabit a majority of inventories plots.
- The amount of forest edge doubled from 1992 to 2001, indicating smaller forest plots.
- Due to land use history and natural factors, the forest soils of southern Indiana are generally below-average in quality.
- Although Indiana's overall forested land mass is increasing, the rate of increase has slowed over the past decade.
- *Indiana's forests continue to mature in terms of the number and size of trees within forest stands.*
- Increases in total volumes of oak species are less than those for most other hardwood species.
- The advanced ages and inadequate regeneration of Indiana's oak forests may signal a successional shift from an oak/hickory-dominated landscape to one where other hardwood species, such as maples, occupy more forested areas.
- Indiana's hardwood saw-timber resource continues to be at risk due to maturing of hardwood stands, loss of timberland to development and new pests (gypsy moth, emerald ash-borer, sudden oak death, beech-bark disease, and more).
- Ownerships of Indiana forests have changed in the past decade, resulting in more parcelization and fragmentation.

While the data shows there has been loss of continuous forest in Indiana, resulting in smaller, fragmented stands, there is also an overall increase in quantity and quality/maturation of forested land across the state. Because the Action Areas are in rural, remote and relatively rugged terrain and primarily under federal ownership there is likely to be very little development pressure that would result in large-scale habitat loss for NLEB and thus cumulative effects to NLEBs are likely to be very limited in size and scope.

In short, we anticipate some limited decline in currently existing bat habitat may occur outside of HNF's boundaries, although we are not aware of specific non-federal development plans in known bat habitat at this time. Specific non-federal projects and activities not exempted from take under the NLEB 4(d) rule, may be addressed through the incidental take permit process, if appropriate.

VI. CONCLUSION

After reviewing the current status of the NLEB, the environmental baseline for the Action Area, the aggregate effects of the Proposed Action, and the cumulative effects, it is the Service's biological opinion that the ongoing and future training, planned development, and land management activities for the 3 ongoing LAA projects on the HNF (i.e., Buffalo Pike Project, Uniontown South Restoration Project and Oriole Restoration Project), are not likely to jeopardize the continued existence of the NLEB.

Our basis for this conclusion follows:

- The potential 17 NLEB maternity colonies in the Action Area are estimated to represent 8% of the estimated 192 NLEB maternity colonies on the HNF and approximately 0.02% of the estimated range-wide number of NLEB maternity colonies (7.3 million bats estimated pre-WNS). In theory, even if proposed actions at HNF were to completely eliminate one or more of the maternity colonies (which under no reasonable scenarios is likely), it would not likely constitute an appreciable reduction in the species' numbers (0.02% of presumed extant colonies) nor cause an appreciable reduction in the species' range. Furthermore, no appreciable reduction in the species' overall reproductive rate is anticipated; only a short-term reproductive loss within some subset of the 17 maternity colonies is likely to occur at any point in time.
- The total amount of timber harvest/alteration associated with the Proposed Action will be insignificant for most of the extant maternity colonies at HNF. Individual members of one or more maternity colonies, inhabiting the Action Areas, may be taken, but this will be a one-time event over the life of the proposed projects. If any maternity colony(ies) are adversely affected, they are expected to only have a temporary reduction in reproduction and no long-term adverse impacts. Furthermore, sustainable forest management practices practiced by the HNF will continue to support and help compensate for any short-term loss of individual bats over time.
- We estimated the maximum overall amount of incidental take of NLEBs within the Action Areas to be approximately 34 bats (approx. 13 females, 13 juveniles and 8 males) spread over an approximate 5 to 10-year long period. So on an annual basis, this equates to about 3 to 7 bats being taken per year, which is approximately 0.3% of the bats that presumably occupy the Action Areas each summer (34/2,295 bats).
- The Proposed Action will directly or indirectly take or otherwise reduce the fitness of a relatively small number of bats and will have minimal, short-term effects on these bats' respective maternity colonies and associated hibernating populations. The estimated total amount of take (34 bats) will have no adverse effect on the viability of other maternity colonies on HNF-managed lands in southern Indiana and will not have a measurable effect at the state, regional or range-wide scale. Likewise, loss of these relatively small number of bats is not likely at a magnitude to adversely impact any hibernating populations to which these individuals belong. So again, the Proposed Action in combination with relatively small amounts of any cumulative impacts/take is not reasonably expected, directly or indirectly, to cause an appreciable reduction in the reproduction, numbers or distribution of the NLEB as a species.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. 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 Act provided that such taking is in compliance with the 4(d) rule excepting take of NLEB for specific activities.

The interim 4(d) rule issued with the listing decision for the NLEB adopted the take prohibitions at 50 CFR §17.31 and §17.32 for this species with certain exceptions. These exceptions include all activities in areas as yet unaffected by the white-nose syndrome (WNS) disease, which is the primary factor contributing to the species' decline. The range of the NLEB within the Action Areas of this consultation in Indiana is entirely within the current WNS "buffer zone." Within this zone, activities excepted from the take prohibitions are specifically defined. Those relevant to the Action include:

- forest management;
- routine maintenance and limited expansion of existing rights-of-way and transmission corridors;
- prairie management;
- projects resulting in minimal tree removal; and
- hazardous tree removal.

Take resulting from these activities is excepted from the take prohibitions provided that the activities:

- occur more than 0.25 mile (0.4 kilometer) from a known, occupied hibernacula;
- avoid cutting or destroying known, occupied maternity roost trees during the pup season (June 1 – July 31); and
- avoid clearcuts (and similar harvest methods, e.g., seed tree, shelterwood, and coppice) within 0.25 mile of known, occupied maternity roost trees during the pup season (June 1– July 31).

The incidental take that is carried out in compliance with the interim 4(d) rule does not require additional exemption in this Incidental Take Statement. Accordingly, there are no reasonable and prudent measures or terms and conditions that are necessary and appropriate for these actions because all incidental take has already been exempted. The activities that are covered by the interim 4(d) are as follows : timber management, prescribed fire, hazard tree removal and the removal of individual trees for road construction or decommissioning.

Proposed activities addressed in this BO are excepted under the interim 4(d) rule and may rely upon the findings of this BO to document its compliance with section 7(a)(2) of the ESA with respect to the NLEB.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation Recommendations (CRs) are discretionary agency activities to minimize or avoid adverse effects of a proposed action/program on listed species or critical habitat, to help implement recovery plans, or to develop information. CRs generally do not focus on a specific project, but rather on an agency's overall program.

The Service provides the following CRs for the HNF's consideration; these activities may be conducted at the discretion of HNF staff as time and funding allow:

1. Assist with WNS investigations, by:
 - a. Monitoring the status/health of known colonies; and
 - b. Collecting samples for ongoing or future studies.

2. Monitor the pre- and post-WNS distribution of NLEB on the Forests, by:
 - a. Searching for hibernacula;
 - b. Conducting bat inventory surveys;
 - c. Conducting radio telemetry studies to locate NLEB colonies and their maternity roost trees;
 - d. Continuing to participate in the North American Bat Monitoring Program (NABat; a national effort to monitor and track bats) through submission of survey data; and
 - e. Analyzing acoustic survey data, both previously collected and not as yet collected, to determine when and where NLEB occur on the Forests.

3. Encourage research on the summer habitat requirements of NLEB on the Forests that:
 - a. Investigate habitat characteristics of the forest in areas where pre- and post-WNS NLEB occurrences are documented (acoustically or in the hand) (e.g. forest type, cover, distance to water); and
 - 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 for minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

This concludes formal consultation with the USDA Forest Service on the on the federally threatened northern long-eared bat (*Myotis septentrionalis*) for these 3 ongoing projects on the Hoosier National Forest. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of (non-4(d) rule exempted) incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion (e.g., a significant increase in scope or addition of any activities not exempted under the interim 4(d) rule); or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of non-4(d) rule-exempted incidental take is exceeded, any operations causing such take must cease pending reinitiation.

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FIGURES

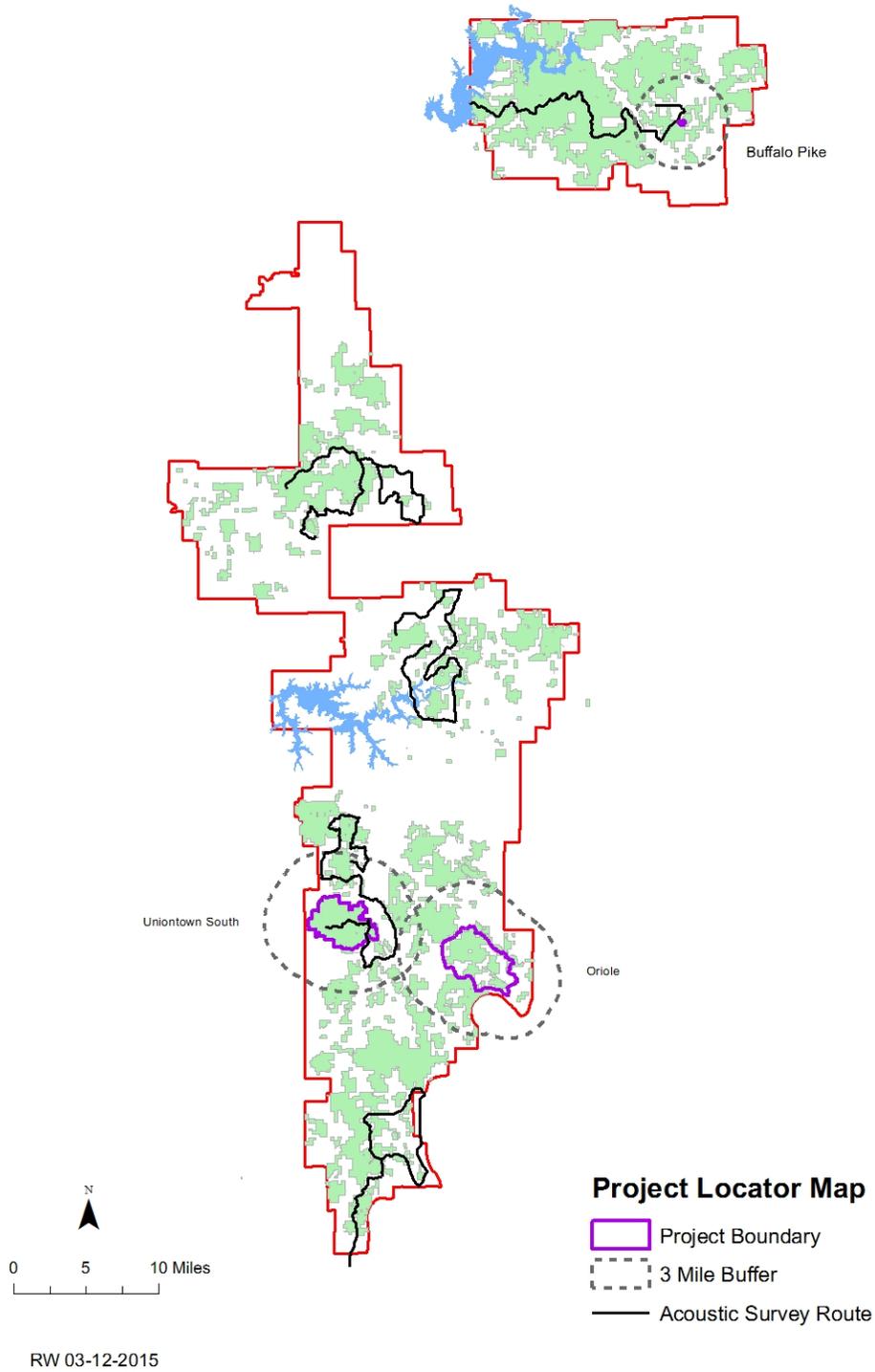


FIGURE 1. Locations of three project areas with ongoing activities that are likely to adversely affect NLEBs (from BA Appendix B).

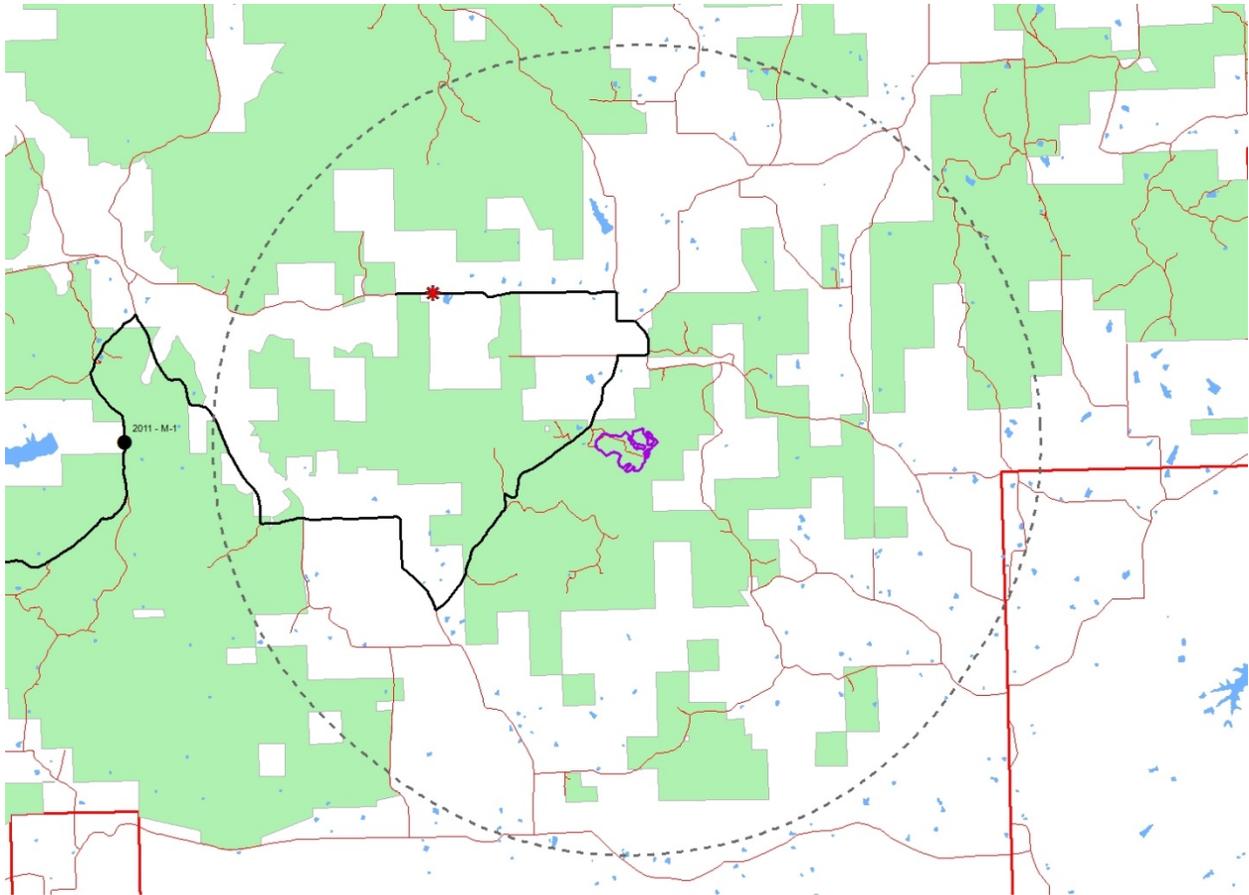


FIGURE 2. Buffalo Pike Project Area. Project boundaries are outlined in purple with a 3-mile dashed buffer. HNF acoustic bat survey route (solid black line) with NLEB acoustic detection location (red asterisk)(from BA Appendix C).

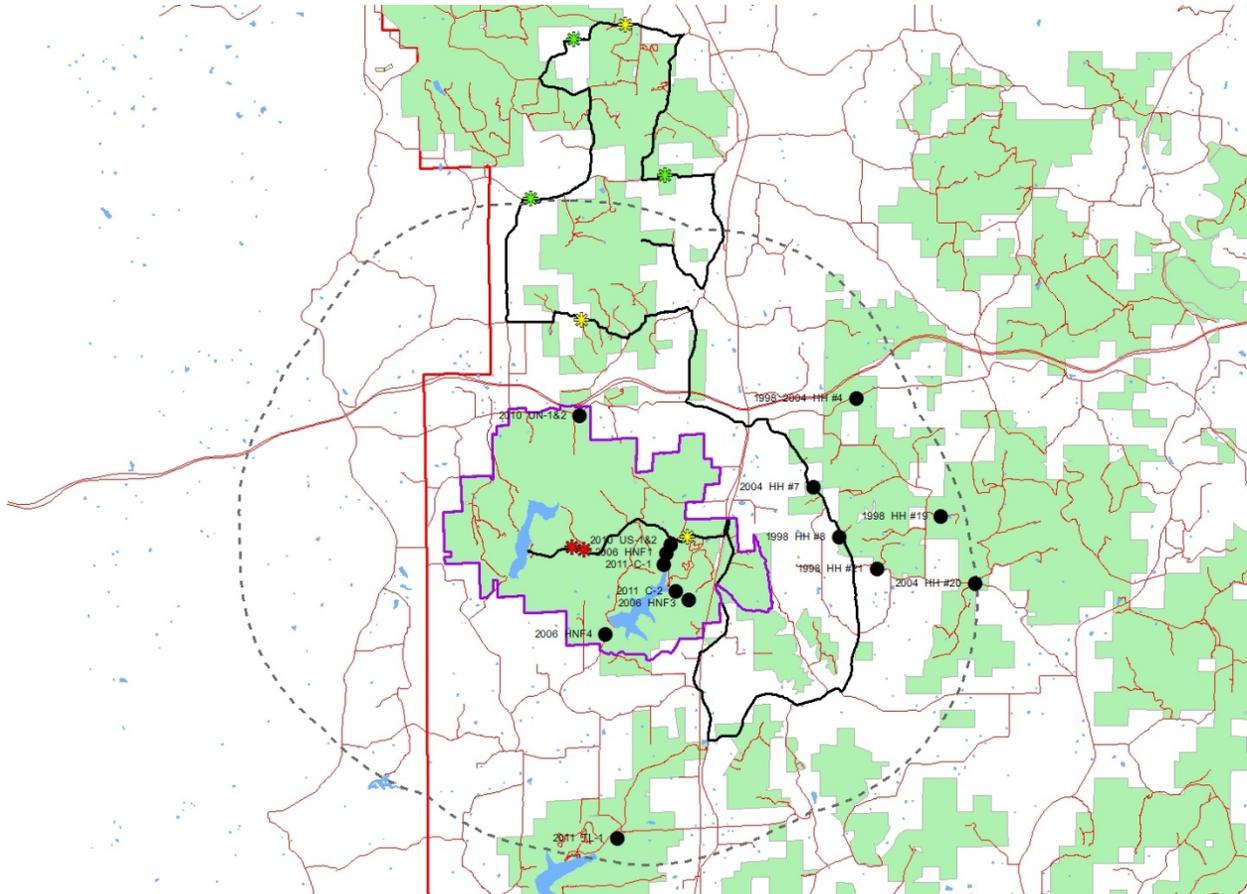


FIGURE 3. Uniontown South Project Area. Project boundaries are outlined in purple with a 3-mile dashed buffer. HNF acoustic bat survey route (solid black line) with NLEB acoustic detection location (red asterisk = 2012 detections, yellow asterisk=2013, green=2014). Black dots are previous NLEB mist net capture locations (from BA Appendix D).

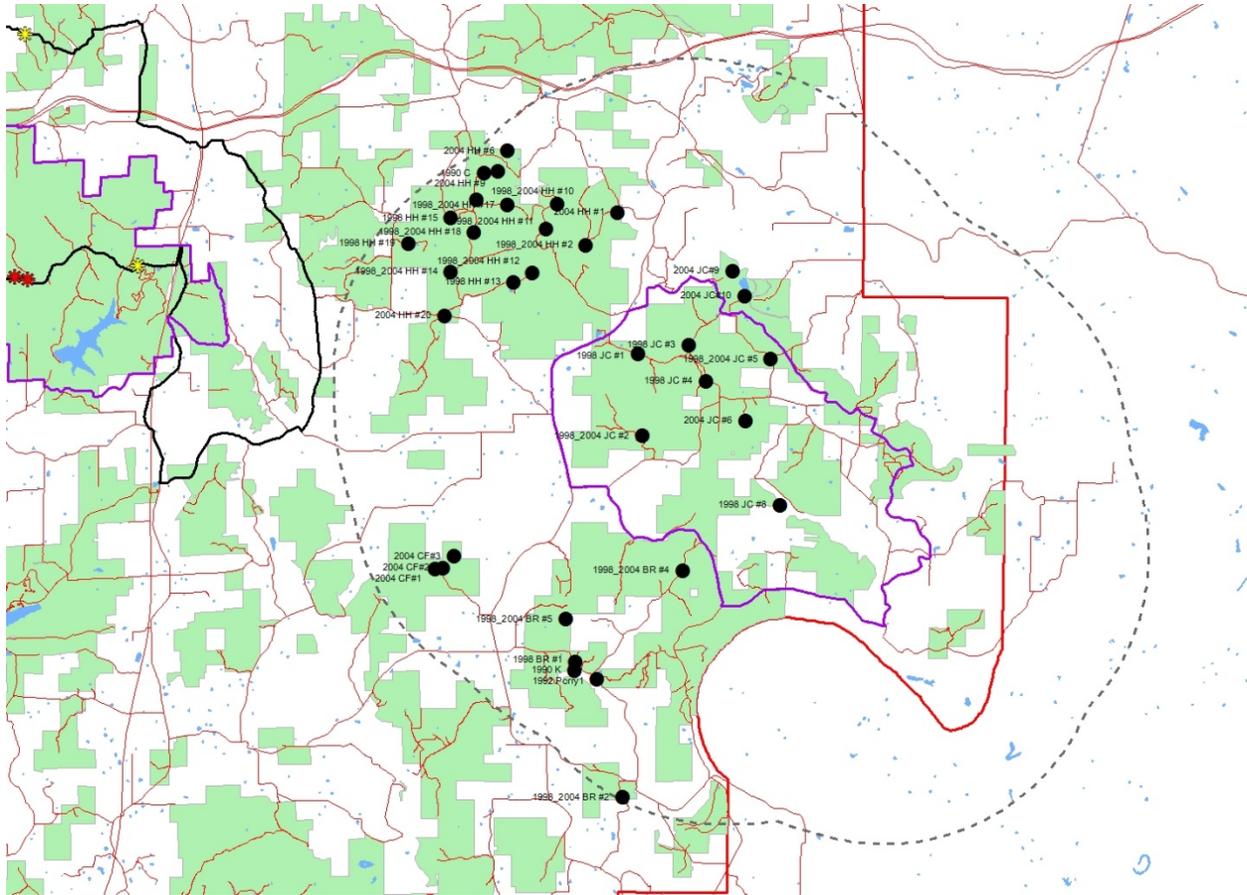


FIGURE 4. Oriole Project Area. Project boundaries are outlined in purple with a 3-mile dashed buffer. HNF acoustic bat survey route (solid black line) with NLEB acoustic detection locations (asterisks) lie to the west of the buffered Oriole Project Area. Black dots are previous NLEB mist net capture locations (from BA Appendix D).