APPENDIX II
Projects that may cause indirect adverse effects/harm to ESA-listed bats

Indiana bats and northern long-eared bats are forest dependent and require a network of forested tracts for roosting, commuting, and foraging. The Service defines suitable roosting habitat for Indiana bats as forest patches containing trees of 5 inches diameter at breast height (DBH) or larger, and suitable roosting habitat for the northern long-eared bat as forest patches containing trees of 3 inches DBH or larger. However, early successional habitat with small diameter trees may also be used as important foraging and/or commuting habitat by listed bats.

Indiana and northern long-eared bat exhibit high interannual site fidelity, with maternity colonies roosting together in the same area over multiple years (USFWS 2007, Foster and Kurta 1999, Johnson et al. 2009, Silvis et al. 2015). Because their roosts (typically dead/dying trees) are naturally ephemeral, listed bats are expected to be adapted to some amount of roost loss. However, largescale loss or degradation of occupied habitat could lead to maternity colony fragmentation and/or reproductive failure if a substantial number of roost trees (particularly primary maternity roosts) are removed or if a sufficient amount of suitable roosting, foraging, swarming/staging, and/or commuting habitat will no longer be available, even if the clearing takes place during times of the year when bats are not present on the landscape (inactive season).

Although project specifics (e.g., timing, availability of nearby habitat, quality of remaining habitat, etc.) can modify a risk assessment, the Michigan Ecological Services Field Office generally views the following project activities as having potential to cause adverse effects and/or harm to federally listed bats if they are present (or when assuming potential presence without survey data[1]) without further considerations. In other words, projects involving the following activities are not eligible to receive automated concurrence through our All Species Michigan Dkey:

1. Clearing >10 contiguous[2] acres of forest within 5 miles of a known listed bat hibernaculum;
2. Clearing >10 contiguous[3] acres of modeled bat habitat in the Indiana bat range;
3. Clearing >20 contiguous[4] acres of modeled bat habitat outside the Indiana bat range;
4. Fragmenting[5] a connective corridor (e.g., tree line) between two or more forest patches of at least 5 acres

Acreage Thresholds

To better characterize potential habitat and focus conservation efforts, the Michigan Ecological

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[1]Surveys conducted in accordance with the Service's Range-wide Indiana bat and Northern Long-eared Bat Survey Guidelines may be used to demonstrate presence or probable absence of listed bats within a project area. Lacking presence/absence survey data, presence is assumed in suitable habitat.
[2]Connected by 1,000 feet or less
[3]Connected by 1,000 feet or less
[4]Connected by 1,000 feet or less
[5]Creating a gap of 1,000 feet or more between previously connected forest

Services Field Office developed a habitat suitability model for listed bats in Michigan. Potentially suitable habitat for listed bats may occur outside of modeled areas, but occupancy of such areas is expected to be less likely.

As listed bat maternity home ranges contain multiple primary and secondary roost trees, it is extremely unlikely that loss of up to 10 contiguous acres of habitat would eliminate all primary roost trees within a maternity roosting area anywhere in Michigan. Available literature suggests that northern long-eared bat maternity colonies can tolerate loss of a single primary roost or up to 20% of available secondary roosts in the inactive season before abandoning roosting areas or substantially altering roosting behaviors (Silvis et al. 2014, 2015), and Indiana bats are expected to respond similarly. Loss of up to 10 contiguous acres of habitat is also unlikely to noticeably degrade the quality of an occupied roosting or foraging area or render a travel corridor unsuitable anywhere in Michigan. For these reasons, the Michigan Ecological Services Field Office believes it is extremely unlikely that loss of up to 10 contiguous acres during the inactive season would lead to detectable adverse effects/harm, even where listed bats are most likely present (e.g., within 5 miles of known hibernacula) and forest habitat is most limited/fragmented (e.g., modeled habitat within the Indiana bat range). Because of the abundance of forest habitat outside the Indiana bat's range in Michigan (e.g,, northern Lower Peninsula and Upper Peninsula), we believe that removal of up to 20 contiguous acres of modeled habitat during the inactive season is unlikely to cause adverse effects/harm. Finally, because of the low probability of occupancy, we do not believe that any amount of inactive season tree removal outside modeled habitat and >5 mi from known hibernacula is likely to cause harm or adverse effects to listed bats.

Michigan projects that will clear >10 contiguous acres within 5 mi of a known listed bat hibernaculum, >10 acres of modeled habitat in the Indiana bat range, and/or >20 contiguous acres of modeled habitat outside the Indiana bat range or that will fragment a connective corridor between two or more forest patches of at least 5 acres may warrant further project-specific consideration or coordination with the Service in order to evaluate and minimize potential impacts.

Minimum Patch Size

Based on life history information and available literature for Indiana bats (e.g., average foraging distances and occupied forest patch sizes), the Service believes that it is unlikely that an isolated forest stand of 10 acres or less would provide sufficient resources for an Indiana bat. However, available data indicate that Indiana bats may infrequently use isolated forest patches as small as 5.6 acres (Keith Lott, personal communication). The Michigan Ecological Services Field Office believes a conservative minimum patch size of 5 acres is appropriate for both Indiana and northern long-eared bats. Although listed bats rarely traverse non-forested areas of 1,000 feet or more, they are frequently observed using vegetated corridors, such as tree lines, to travel among suitable forest patches. Because they may connect important foraging and roosting habitats, removal of forested corridors (regardless of size/area of corridor) could severely fragment available habitat and result in adverse effects or indirect take of listed bats. Therefore, projects that remove connective corridors between forest patches warrant project-specific consideration and coordination with the Service.

Northern Long-eared Bat Interim Consultation Period (March 31, 2023 - April 1, 2024)

During the Interim Consultation period, the Service does not consider take of northern long-eared bats to be reasonably certain except within the specified distance buffers of known occurrences. During the Interim Consultation period, projects outside of these buffers may conclude that take of northern long-eared bats is not reasonably certain and that adverse effects are unlikely. During the Interim Consultation period, this framework has been integrated into the Michigan All Species Determination Key. Additionally, to assist private landowners and stakeholders with non-Federal actions, the Service has published range-wide Interim Voluntary Guidance for Forest Habitat Modification and Wind Energy Operation.

However, please note that the Interim Consultation Framework and associated Standing Analysis only consider and address the effects of covered actions that are expected to occur from March 31, 2023, until April 1, 2024. In other words, the Standing Analysis and Interim Consultation Framework do not consider any effects or incidental take resulting from the covered actions that may occur after April 1, 2024. Additionally, they do not consider effects to or take of Indiana bats or other federally listed bats. After April 1, 2024, any action agency that was issued an individual BO that relied on the Interim Consultation Framework will need to reinitiate consultation if its continuing, discretionary action is expected to affect the northern long-eared bat (i.e., cause incidental take). If the action agency fails to reinitiate consultation on or before April 1, 2024, its individual BO will no longer be based on the best available information, which means the action agency's section 7 compliance and incidental take exemptions provided by section 7(o)(2) may lapse. Please see the USFWS northern long-eared bat page for more information.

Supporting Documents

The following Service web pages provide further information and background on the potential for indirect adverse effects via habitat loss or fragmentation.

- Section 7 Technical Assistance, Summary of Indiana Bat Ecology
- Indiana Bat Section 7 and Section 10 Guidance for Wind Energy Projects
- Range-wide Indiana bat and Northern Long-eared Bat Survey Guidelines
- Standing Analysis and Implementation Plan for the Rangewide Northern Long-eared Bat Assisted Determination Key

Literature Cited

Foster, R.W. and A. Kurta. 1999. Roosting ecology of the northern bat (*Myotis septentrionalis*) and comparisons with the endangered Indiana bat (*Myotis sodalis*). Journal of Mammalogy 80: 659-672.

Johnson, J.B., J.W. Edwards, W.M. Ford, and J.E. Gates. 2009. Roost tree selection by northern myotis (*Myotis septentrionalis*) maternity colonies following prescribed fire in a Central Appalachian Mountains hardwood forest. Forest Ecology and Management 258:233-242.

Silvis, A., W.M. Ford, E.R. Britzke, and J.B. Johnson. 2014. Association, roost use and simulated disruption of *Myotis septentrionalis* maternity colonies. Behavioural Processes 103:283-290.

Silvis, A., W.M. Ford, and E.R. Britzke. 2015. Effects of Hierarchical Roost Removal on Northern Long-Eared Bat (*Myotis septentrionalis*) Maternity Colonies. PLoS ONE 10(1):e0116356.

U.S. Fish and Wildlife Service (USFWS). 2007. Indiana Bat (*Myotis sodalis*) Draft Recovery Plan: First Revision. U.S. Fish and Wildlife FWS, Fort Snelling, MN. 258 pp.