Project Design Guidelines for Federally Listed Bats in Michigan

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BACKGROUND INFORMATION

This guidance document is intended to assist both Federal and non-Federal projects with conservation planning for federally listed bats in Michigan. These guidelines complement online conservation planning tools available to Federal and non-Federal project proponents in Michigan, including the All Species Michigan Determination Key available through the U.S. Fish and Wildlife Service (Service) Information for Planning and Consultation (IPaC) web site (see Online Planning Tools below).

Projects that complete consultation or coordination through IPaC automatically adhere to the recommendations provided in this document and are not required to implement any additional conservation measures for listed bats. Although these guidelines include specific recommendations for wind energy developments, we strongly recommend that wind developers additionally follow the Service's Land-Based Wind Energy Guidelines (WEG) and coordinate with our office and the Michigan Department of Natural Resources early in project development.

Agencies or individuals that have received incidental take authorization for listed bats through an incidental take permit or certificate of inclusion or through formal section 7 consultation are advised to follow the specific conditions in their permit or consultation rather than these general recommendations.

RECOMMENDED INITIAL PROJECT SCREENING FOR All LISTED/PROPOSED BATS

Many projects may have no more than insignificant or discountable effects (i.e., no meaningful risk) to the bat species in Michigan that are listed as endangered (Indiana bat and northern long-eared bat) or proposed for listing as endangered (tricolored bat).

Projects without meaningful risk for listed/proposed bat species include those:

- In locations where listed bats are typically not present, such as in buildings or other structures with no signs of bat use.
- Incorporating basic protective measures that address potential risks. See the next section for **tree removal** measures that are adequate for all listed bat species at any Michigan location. Alternatively, see the more detailed recommendations for assessments using location information in Evaluating Potential Effects to Listed Bats below).
- In locations where habitat assessments conducted in accordance with Service Guidelines determine that the project area lacks suitable habitat and/or potential roost trees, or emergence surveys conducted in accordance with Service Guidelines demonstrate that the specific trees to be cut are not immediately occupied by roosting bats.
- In locations where presence/absence acoustic or mist net surveys (conducted in accordance with U.S. Fish and Wildlife Service Guidelines) have demonstrated the probable absence of listed/proposed species.

Tree Removal with No Meaningful Risk to Listed/Proposed Bats, Any Michigan Location

For this initial screening, we consider the following tree removal scenarios to have no meaningful risk to listed/proposed bat species in Michigan (i.e., no reasonable certainty of take and no potential for adverse effects) at any location. These scenarios apply to any projects in Michigan with the exception of those involving wind turbine construction/operation or potential effects to a bat hibernaculum entrance or interior. We recommend further assessment using this document or our Online Planning Tools if you are unsure of your project's proximity to known or potential hibernacula or if your project involves activities other than tree cutting/trimming that may affect bats; e.g., herbicide/pesticide application, bridge/culvert removal/modification, prescribed fire:

If cutting/trimming or removing trees, at least one ☑ of the following applies to all trees affected by the by project:

☑ Trees are not suitable for roosting listed bats:
- Trees are small (i.e. <3" dbh), OR
- Isolated from other suitable trees, tree lines, and/or forest by more than 1,000 ft, OR
- Located in highly developed urban areas (e.g., street trees in urban downtown areas).

☑ Trees are potentially suitable for roosting listed bats but tree cutting meets all of the following criteria:
- All trees will be cut when all listed/proposed Michigan bats are hibernating (October 31 through April 1), AND
- Cutting will not clear more than 10 contiguous acres of forest habitat, AND
- Cutting will not result in the loss of connectivity among other forest patches (e.g., remove trees or forest connecting otherwise isolated forest patches of at least 5 acres).

Important Note: Under these scenarios, your tree removal project is not likely to have adverse effects / reasonable certainty of take for any listed bat species regardless of the project location in Michigan. No further bat conservation measures are required for your project. If your project has federal funding, approval, authorization, etc., or if your project is not able to follow the above guidelines, please continue reading through the rest of this document for other ways to assess your project's impact to listed bats.

NEXT STEPS AND TOOLS FOR FURTHER PROJECT ASSESSMENT

For Federal projects (i.e., Federal funding, approvals, wetland permits, etc.) that fit one of the above tree removal scenarios, we strongly recommend also entering the project into our All Species Michigan Determination Key to evaluate the potential to affect other listed species and to obtain an automated concurrence from us on the listed bats. Non-Federal project planners may also want to use our Online Planning Tools to evaluate the potential to affect other listed species or to receive documentation of the project's Endangered Species Act compliance.

For other projects not fitting the above scenarios, additional site-specific information can assess risk more precisely. The information in this document and our All Species Michigan Determination Key allows one to use the location of the project to precisely assess potential risk. This more specific risk assessment may also ultimately indicate there is no meaningful risk from a project. Alternatively, it may indicate that a project may adversely affect a listed bat species. When projects do have meaningful risks to listed bats, there are a variety of ways for project proponents to meet the requirements under the U.S. Endangered Species Act and for the project to continue to move forward.

In this document, we provide additional guidance on tools and resources that can help refine the risk assessment and recommended next steps. If you are interested in evaluating a spatially large, but well-defined system (e.g., many hundreds of miles of utility corridors, large road networks, etc.), please contact our office to explore the possibility of a system-wide approach to recommendations.

FEDERALLY LISTED BATS

Michigan is home to two federally endangered bats. The Indiana bat was listed as endangered under the Endangered Species Act (ESA) in 1967 due to episodes of people disturbing hibernating bats in caves during winter, which resulted in the death of substantial numbers of bats. Indiana bats are vulnerable to disturbance because they hibernate in large numbers in only a few sites, with major hibernacula supporting 20,000 to 50,000 bats. Several threats are believed to have contributed to the Indiana bat's decline, including the commercialization of caves, loss and degradation of forested habitat, pesticides and other contaminants, and most recently, the disease white-nose syndrome (WNS). For more information on the Indiana bat, including life history information, designated critical habitat, draft recovery plan, and 5-year reviews, please visit the U.S. Fish and Wildlife Service (Service) Indiana bat page.

The northern long-eared bat is one of the species most impacted by WNS. Due to WNS-related declines, the Service listed the northern long-eared bat as threatened under the ESA on April 2, 2015, and published a rule under section 4(d) of the ESA defining take prohibitions for the species. Following continued WNS-related declines, the northern long-eared bat was reclassified from threatened to endangered effective March 31, 2023. The recent reclassification changed the northern long-eared bat's protections under the ESA, removing its 4(d) rule, as these can only be applied to threatened species. As with the Indiana bat, unpermitted take of northern long-eared bat occurring on or after March 31, 2023, is now prohibited by section 9 of the ESA. All new or ongoing federal actions that are likely to adversely affect northern long-eared bats and reasonably certain to result in incidental take must complete formal section 7 consultation via the rendering of a biological opinion and be exempted from section 9 prohibitions through the issuance of an incidental take statement (ITS) by the Service and compliance with the ITS terms and conditions.

To streamline the formal section 7 process for any projects that are completed by **April 1, 2024** and consistent with the previous 4(d) rule, the Service is providing an Interim Consultation Framework that provides take authorization for northern long-eared bat. The framework applies to a wide variety of ongoing projects with a federal nexus (federal permit or funding), such as timber harvest, prescribed fire, and infrastructure projects. For projects where take is likely to

occur that meet the requirements of the framework, agencies will fill out a template Biological Assessment form, and Field Offices will provide a completed template Biological Opinion and Incidental Take Statement in a timely manner.

During the Interim Consultation Framework period (March 31, 2023, through April 1, 2024), the Service is incorporating known northern long-eared bat locations into project reviews and IPaC assisted determination keys to help project proponents decide where take of northern long-eared bats is reasonably certain to occur. We have integrated the Interim Consultation Framework and known locations into this guidance for Michigan projects as well as our All Species Michigan Determination Key in IPaC (see Online Planning Tools). We will update this document and our IPaC tools again at the end of the Interim period. For more information on the northern long-eared bat, including the previous 4(d) rule, recent reclassification rule, and details on the Interim Consultation Framework, visit the Service's northern long-eared bat page.

Please also be aware that the tricolored bat was proposed for listing as endangered on September 13, 2022. In Michigan, the tricolored bat was rare pre-WNS and is exceedingly rare post-WNS. The species has been observed in 12 Michigan counties to date, largely during the fall or winter. With very few exceptions, the species has not been observed in Michigan in the summer months, and no maternity colonies have been found. During winter, tricolored bats hibernate in caves, abandoned mines, and abandoned tunnels. During the spring, summer and fall months, they roost primarily among leaf clusters of live or recently dead deciduous/hardwood trees. For more information on the tricolored bat, including the proposed rule, Species Status Assessment, and information on the species' ecology and life history, please visit the Service's tricolored bat page.

SUITABLE HABITAT

In summer, both Indiana and northern long-eared bats typically roost in trees from dawn to dusk and forage for insects nightly in and around forests. Suitable summer habitat consists of a wide variety of forested habitats where they roost, forage, and travel, including woodlots and linear features such as tree lines, fencerows, and riparian corridors. Foraging and commuting habitat may also include some non-forested habitats adjacent to or interspersed with wooded areas, such as emergent wetlands/water bodies, agricultural fields, old fields, and pastures. Although Indiana bats primarily use dead or dying trees for roosting, the Service defines potential Indiana bat roost trees as any live tree or standing snag ≥5 inches diameter at breast height (dbh) with exfoliating bark or cracks/crevices. Compared to Indiana bats, northern long-eared bats are more likely to roost in live trees with defects and in cavities/hollows, and they appear to be generally more flexible in their roosting preferences. The Service defines potential northern long-eared bat roost trees as any live tree or standing snag ≥3 inches dbh with exfoliating bark, cracks/crevices, and/or cavities/hollows. Very dense branches or vines that inhibit flight may make a tree unsuitable for bat roosting. Individual trees may be considered suitable habitat when they meet the definition of a potential roost tree and are within 1,000 feet of other wooded habitat.

While males and non-reproductive females tend to roost singly, reproductive female Indiana and northern long-eared bats form maternity colonies and roost communally with their young in networks of 10-20 roost trees, including one to three primary roosts for Indiana bats and numerous secondary roosts. Indiana bat maternity colonies typically consist of 60-80 females

and their young, while northern long-eared bat colonies tend to be slightly smaller, typically about 30-60 individuals. Infrequently, Indiana and northern long-eared bats are observed roosting in human-made structures, such as buildings, barns, bridges, and bat boxes. Suitable bridges and culverts for day-roosting Indiana and northern long-eared bats include those located below the third county tier of Michigan and within 1,000 feet of suitable forested habitat that contain suitable roosting spaces (e.g., expansion joints, cracks/crevices). Suitable culverts are at least 4 feet (1.2 meters) high and 50 feet (15 meters) long.

In the fall, Indiana and northern long-eared bats migrate varying distances to suitable hibernation sites, which include caves, mines, and similar structures with stable and cool but above-freezing conditions. Prior to entering hibernation torpor, Indiana and northern long-eared bats engage in fall swarming, which is characterized by large numbers of bats congregating near hibernacula and coincides with mating. During fall swarming, bats roost and forage near hibernacula in woodland habitats. Following emergence from hibernation, listed bats may engage in spring staging, temporarily roosting and foraging in the proximity of hibernacula before migrating to preferred summer habitats. Suitable spring staging/fall swarming habitat for listed bats consists of the same variety of forested/wooded habitats where they roost, forage, and travel in the summer, but is restricted to areas near hibernacula.

MICHIGAN HABITAT

Indiana Bat Range

Indiana bats have been documented at many sites in lower Michigan and are believed to range throughout the southern five county tiers, as well as parts of the thumb and the western coastal counties up to (and including) the Leelanau Peninsula (see Figure 1 below). Michigan is home to a single known Indiana bat hibernaculum: a hydroelectric dam in Manistee County (Tippy Dam). Although the dam supports about 20,000 hibernating bats, Indiana bats comprise less than 1% of the winter population. Research suggests that the majority of the Indiana bats that summer in Michigan migrate to hibernacula in adjacent states, such as Indiana, Ohio, and Kentucky.

Figure 1. Indiana bat range in Michigan

Northern Long-eared Bat Range

Prior to WNS, northern long-eared bats were documented in many Michigan counties and were believed to range throughout the state. However, the northern long-eared bat population in Michigan has declined dramatically as result of WNS. Although not nearly as common today, winter surveys document that the species continues to occur in Michigan in relatively low numbers.

Summer Habitat

Indiana and northern long-eared bats exhibit strong fidelity to their summer home ranges; however, we do not have knowledge of all these summering areas in Michigan. Therefore, unless presence/absence surveys conducted in accordance with the Service's Range-wide Indiana Bat & Northern Long-eared Bat Survey Guidelines indicate the probable absence of the species, listed bats are considered potentially present wherever suitable habitat exists within their respective ranges. However, to better characterize potential habitat and focus conservation efforts, the Michigan Ecological Services Field Office developed a habitat suitability model for Indiana and northern long-eared bats based on available summer occurrence data for Michigan. The model is available for download as a shapefile here. Additionally, the model has been integrated into our Information for Planning and Consultation (IPaC) web site, All Species Michigan Determination Key, and other Online Planning Tools.

Winter Habitat

Although Michigan is home to a single known Indiana bat hibernaculum (Tippy Dam in Manistee County), many northern long-eared bat hibernacula have been documented (mostly in the western Upper Peninsula). To protect these sensitive habitats, the locations of listed bat hibernacula are not publicly available. However, Michigan townships containing known hibernacula are depicted in Figure 2 of this document. The exact locations of known hibernacula and other relevant occurrence data in proximity to a project area can be referenced by using an available Online Planning Tool, including the All Species Michigan Determination Key, as these tools use hidden shapefiles to evaluate potential impacts and recommend appropriate conservation measures based on the project's location.

GENERAL CONSERVATION MEASURES

Conservation measures that generally benefit listed bats include protecting, creating, and enhancing mature forest, particularly hardwood/mixedwood stands containing standing snags, dying trees, midstory/understory flight space, and waterbodies such as streams, ponds, and forested wetlands. As Indiana and northern long-eared bats are known to avoid traversing large open areas outside of migration, preserving wooded corridors (such as tree lines and fencerows) can be extremely beneficial in connecting fragmented patches of suitable roosting/foraging habitat.

Conserving listed bat habitat likely benefits other native bat species, several of which are experiencing recent population declines as a result of WNS and/or other factors. As significant predators of nocturnal insects, including many crop and forest pests, bats are important to

Michigan's agriculture and forests. For example, Whitaker (1995) estimated that a single colony of 150 big brown bats (*Eptesicus fuscus*) would eat nearly 1.3 million pest insects each year. Boyles et al. (2011) noted the "loss of bats in North America could lead to agricultural losses estimated at more than $3.7 billion/year, and Maine and Boyles (2015) estimated that the suppression of herbivory by insectivorous bats is worth >1 billion USD globally on corn alone. In captive trials, northern long-eared bats were found to significantly reduce the egg-laying activity of mosquitoes, suggesting bats may also play an important role in controlling insect-borne disease (Reiskind and Wund 2009). Mosquitoes have also been found to be a consistent component of the diet of Indiana bats and are eaten most heavily during pregnancy (6.6%; Kurta and Whitaker 1998). Taking proactive steps to help protect bats may be very valuable to agricultural and forest product yields and pest management costs in and around a project area.

ENDANGERED SPECIES ACT GUIDANCE

Online Planning Tools

We strongly encourage project managers, including Federal agencies and their designated representatives as well as proponents of non-Federal projects, to use our online planning tools to evaluate potential effects of proposed activities on listed bats and other species in Michigan. Assisted Determination Keys (Dkeys), available through the Service's Information for Planning and Consultation (IPaC) web site, are logically structured sets of questions designed to assist users in determining if a project qualifies for a pre-determined consultation outcome based on existing programmatic consultations or internal standing analyses. Qualifying projects may generate Service concurrence letters instantly through IPaC. Dkeys provide consistent and transparent outcomes, and significantly reduce the time to complete consultation for qualifying projects.

Two Dkeys are currently available for evaluating the effects of Federal projects on listed bats in Michigan: the All Species Michigan Dkey and the FHWA, FRA, FTA Programmatic Consultation Dkey for Transportation Projects. For additional details on using Dkeys and other IPaC tools, see our IPaC instructions for MI projects and/or demo video.

Private Landowners/Non-Federal Projects

The Service does not require private landowners to conduct surveys for ESA-listed bats on their lands in Michigan. However, listed bats and the habitats where they occur are protected by the ESA. Under Section 9, it is unlawful for any person to "take" an endangered species. The term "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 to include "significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering."

When bats are not directly at risk, the questions used to evaluate if an action involving habitat modification is likely to result in take are: (1) is the modification of habitat significant? (see Tables 3 through 9 below for examples); (2) if so, does that modification also significantly impair an essential behavior pattern of a listed species? and (3) is the significant modification of habitat, with significant impairment of an essential behavior pattern, likely to result in the actual

killing or injury of the species? All three components of the definition are necessary to meet the regulatory definition of "harm" as a form of take through habitat modification. An ESA permit is only needed when an activity (or the results of the activity) is likely to result in the take of listed wildlife, and it is the potential applicant's decision whether to seek a permit. Further, it should be noted that habitat modification, in and of itself, does not constitute take unless all three components of the definition of "harm" are met.

For incidental take to potentially occur, an individual of the species must be affected by the activities at some point during the year. Since Indiana and northern long-eared bats use habitat seasonally, effects may still occur when bats are not immediately present but will return to and use the area during a different season. However, take under the ESA is not possible if the species does not use the habitat at any time of year.

The determination of how to proceed ultimately rests with the project proponent. Project proponents can take Service input into account about how to avoid or minimize risks to the species and proceed in several ways, based upon their own risk assessment. They may proceed (at their own risk) as planned without an ESA permit, modify their project and proceed without a permit, or prepare and submit an ESA permit application. The biological, legal, and economic risk assessment regarding whether to seek a permit belongs with the private party determining how to proceed. In this document, we have provided additional information and examples to assist project proponents with planning projects and evaluating potential effects to listed bats.

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

Please note that 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 specific distance buffers of known occurrences may conclude that take of northern long-eared bats is not reasonably certain. To determine how the provisions of the Interim Consultation Framework may apply to your project, please use 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 this guidance is only intended for the Interim Framework period and does not address potential effects to Indiana bat or other federally listed bats.

Continue through this document for additional guidance on evaluating potential effects to listed bats in Michigan independent of the Interim Consultation Framework. As stated above, we strongly encourage project managers, including proponents of non-Federal projects, use our Online Planning Tools to evaluate potential effects of proposed activities on the federally listed bats and other species in Michigan. For the Interim Consultation period, we have integrated the known occurrence buffers into our All Species Michigan Determination Key in IPaC, which uses more precise spatial information than provided in Table 1/Figure 2.

Federal Projects/Section 7 Consultation

Under the ESA, requirements for Federal projects (i.e., projects funded, authorized, permitted, or implemented by a Federal agency) are different than requirements for wholly private or otherwise non-Federal projects. The ESA mandates all Federal departments and agencies to conserve listed species and to utilize their authorities in furtherance of the purposes of the ESA. Section 7 of the ESA, called "Interagency Cooperation," is the mechanism by which Federal agencies ensure the actions they conduct, including those they fund or authorize, do not jeopardize the existence of any listed species.

Federal agencies must request a list of species and designated critical habitat that may be present in the project area from the Service via our IPaC website. Then they must determine whether their actions may affect those species or critical habitat. If a listed species or critical habitat may be affected, consultation with the Service is required. As stated above, we strongly encourage project managers, including Federal agencies and their designated representatives, to use our Online Planning Tools to evaluate potential effects of proposed activities on the federally listed bats and other species in Michigan. The Service developed IPaC and its tools to help streamline the ESA review process. IPaC and its Dkeys can assist users through the section 7 consultation process when a Federal agency authorizes, funds, permits, or carries out an action.

Please note that Section 7 obligations or similar requirements may also apply to State permits or authorizations that implement Federal laws or projects that are supported by Federal funds (e.g., Clean Water Act, transportation projects). For general guidance on Section 7(a)(2) obligations for Federal projects, see our Step-by-Step Instructions. Continue through this document for additional guidance on evaluating potential effects to listed bats.

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

Please note that 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. Please note: the known occurrence buffers only apply to the northern long-eared bat. They are not applicable to Indiana bat.

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.

Evaluating Potential Effects to Listed Bats

The Service offers guidance on the types of activities that may result in the take of listed species or that may otherwise adversely affect the species. This assessment can be challenging for listed bats because they use a wide variety of forested habitats, and while both species have declined substantially, potential habitat in Michigan remains abundant.

In general, if listed bats are present, activities that impact suitable habitat have the potential to result in take or to otherwise adversely affect the species. Projects that involve (1) cutting or trimming suitable roost trees; (2) prescribed burning; (3) pesticide (including insecticide and rodenticide) application; (4) aerial/nontargeted herbicide application in or near suitable habitat; and/or (5) removal or modification of a suitable bridge/culvert(s) are encouraged to schedule these activities at times of year when listed bats are unlikely to be present on the landscape (inactive season) and limit the clearing of contiguous, suitable forested habitat.

In addition to habitat assessments and presence/probable absence surveys following our Range-wide Survey Guidelines, bridge/culvert assessments can be conducted to determine whether a suitable bridge or culvert is occupied by bats. See these Bridge Assessment Guidelines for more information. If a bridge/culvert in the southern three tiers of Michigan counties has been inspected for signs of day-roosting bats (guano, urine staining, bat vocalizations, and/or bats) during the summer roosting season (May 15 through August 15), and no bats or signs of bats were observed, work on the bridge/structure can proceed at any time of year.

In Michigan, the inactive season dates for listed bats are defined based on location and distance from known hibernacula (see Table 1). There are two primary considerations in evaluating the potential for impacts to summer habitat: (1) the timing of when the habitat impacts will occur; and (2) the amount of habitat that will likely remain within a potential listed bat core roosting area or home range.

Listed Bat Conservation Planning Zones in Michigan

To help focus bat conservation planning in Michigan, we have divided the state into planning zones that allow for more targeted measures to help minimize or avoid risk to Indiana and northern long-eared bats (see Table 1 and Figure 2 below). The zones are based on proximity to known hibernacula, variations in seasonal activity (e.g., northern vs. southern Michigan), and a habitat suitability model developed using available summer occurrence data for listed bats in Michigan. It is important to note that while the suitability model helps narrow the scope of potential summer habitat for listed bats, modeled habitat does not predict occupancy. Based on current Indiana and northern long-eared bat population estimates, we anticipate that modeled acres greatly exceed occupied acres in Michigan. However, additional survey data are needed to identify which areas remain occupied. Site-specific surveys are not only valuable for confirming the presence or probable absence of listed bats within a project area, but also contribute to our broader, statewide effort to focus listed bat conservation on remaining occupied habitat.

The planning zones are available for download as a shapefile here, and more information on the development of the habitat suitability model can be found in Appendix I.

Please note that Zones 1 and 4 include Michigan townships containing known hibernacula and associated buffer areas. **The recommendations below for Zone 1 may in many cases be further refined or narrowed by using an Online Planning Tool,** including our IPaC web site and All Species Michigan Determination Key, as these tools use more precise buffers around hibernacula.

Table 1. Listed Bat Conservation Planning Zones in Michigan with general recommendations for avoiding risks to bats (see Tables 3 through 9 for additional action-specific recommendations)

Planning Zone	Description	Recommended Maximum Area of Contiguous Forest Clearing[1]	Recommended Dates to Avoid
Upper Peninsula (UP)			
Zone 1	UP high potential[2] swarming/staging/summer habitat for northern long-eared bat	10 acres	April 15 through October 14
Zone 2	UP high potential summer habitat for northern long-eared bat	20 acres	May 15 through August 31
Zone 3	UP low potential summer habitat for northern long-eared bat	No maximum	June 1 through July 31
Lower Peninsula (LP)			
Zone 4	LP high potential swarming/staging/summer habitat for listed bats	10 acres	April 1 through October 31
Zone 5	LP high potential summer habitat for both Indiana and northern long-eared bat	10 acres	April 15 through September 30
Zone 6	LP high potential summer habitat for northern long-eared bat only	20 acres	May 1 through August 31
Zone 7	LP low potential summer habitat for listed bats	No maximum	June 1 through July 31

[1] The Service defines "contiguous" forest habitat as that within 1,000 feet of other forest habitat, including tree lines, forested corridors, and individual trees. **Forest clearing thresholds are not applicable for wholly linear projects (e.g., roads/trails, pipelines, transmission lines) or management of monoculture pine or aspen stands (low suitability forest types for listed bats).**

[2] Note that "high potential habitat" predicts seasonal suitability, not occupancy. Based on current Indiana and northern long-eared bat population estimates, we anticipate that suitable habitat greatly exceeds occupied habitat in Michigan. Site-specific surveys can be used to confirm presence or probable absence of listed bats within a project area and help focus listed bat conservation on remaining occupied habitat.

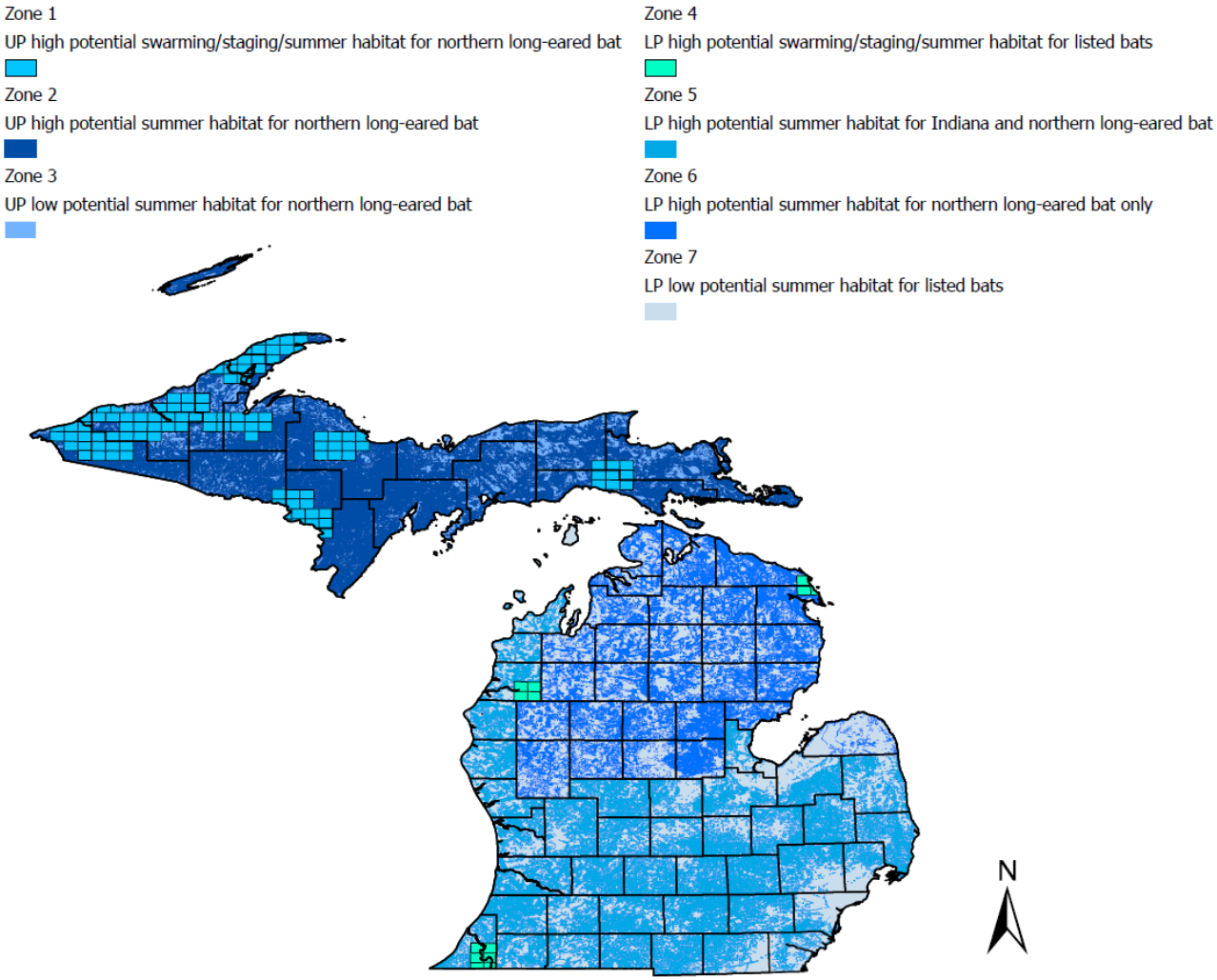

Figure 2. Listed Bat Conservation Planning Zones in Michigan[3]

[3] To view these zones at a finer resolution, shapefiles can be downloaded here. Additionally, available **Online Planning Tools**, including our IPaC web site and All Species Michigan Determination Key may provide more precise spatial information for potential projects.

Potential Impact Categories

In Tables 3-9 below, we provide examples of actions in three Potential Impact Categories: (1) actions not likely to adversely affect listed bats and where take is unlikely (i.e., it is reasonably certain that take will not occur); (2) actions that have minimal risk, but under conditions specified or by implementing key protective measures take is not likely; and (3) actions with increasing risks for the species and where a thorough project-specific review is recommended to determine if take is reasonably certain to occur.

The examples in Tables 3-9 are not exhaustive; there are many other potential examples for all three categories. In addition to this document and the online tools in our IPaC system, our Field Office (see Section VI below for details) is available to help project planners evaluate the potential effects of their actions on listed species.

In addition to these categories, project proponents have the option to rely on the northern long-eared bat Interim Consultation Framework for federal projects or Interim Guidance for non-federal projects (e.g., Forest Modification, Wind Energy Operation) during the period of March 31, 2023 - April 1, 2024 (see ESA Guidance). Table 1 and Figure 2 provide a list and map of areas in Michigan that include known northern long-eared bat occurrence buffers. During the Interim Consultation Period, projects outside of these townships may conclude that take of northern long-eared bats is not reasonably certain. However, the Consultation Framework and Standing Analysis do not consider any effects or incidental take resulting from the covered actions that may occur after April 1, 2024. Additionally, the Interim Consultation Framework and non-federal guidance documents do not apply to the Indiana bat or other federally listed bats.

Category 1. Actions not likely to adversely affect listed bats and where take is unlikely

In addition to the examples listed in Tables 3-9, Category 1 includes ***ANY PROJECT*** that qualifies in our IPaC Michigan All Species Determination Key to receive automated confirmation/validation that the project is consistent with a "No Effect" (NE) or "Not Likely to Adversely Affect" (NLAA) determination for listed bats.

Category 2. Actions with potential to adversely affect listed bats, but by implementing protective measures within a project-specific context, adverse effects and incidental take may be avoided

Because listed bats are rare in Michigan, many planned actions may have no actual overlap with the species' occurrence. However, when suitable habitat is present, conducting a survey (including presence/absence acoustic or mist net surveys, emergence surveys, and/or bridge/culvert assessments) is the only way to verify absence.

For some projects, implementing specific conservation measures when paired with an anticipated low likelihood of species occurrence (i.e., areas away from specific habitat features) may result a generally very low risk of affecting federally listed bats. Prior to taking action, project proponents should make their own assessment regarding the risk of adversely affecting listed species or habitats. Although Category 2 actions do not qualify to receive automated "No Effect" (NE) or "Not Likely to Adversely Affect" (NLAA) determinations through the IPaC Michigan

All Species Determination Key, the Service may be able to concur with NLAA outside the key following project-specific review.

Category 3. Actions with increasing risks to the species project specific review recommended (including projects where take of northern long-eared bat may be reasonably certain to occur after April 1, 2024)

The Service sees these actions as having a higher risk of taking listed bats in Michigan. Generally, these are activities are more likely to require some form of incidental take authorization pursuant to the ESA prior to proceeding. However, some projects in this category may qualify to receive an automated "Not Likely to Adversely Affect" (NLAA) determination for the northern long-eared bat through the IPaC Michigan All Species Determination Key or may otherwise conclude NLAA or that take of northern long-eared bat is not reasonably certain during the Interim Consultation period. If considering a project in this Category, we recommend first seeking project-specific technical assistance from our Field Office.

Effect Category Example Tables

- Table 2: Tree cutting that is not part of forest management (e.g., development, land-use changes, and other tree removal that will not begin immediate return to forest)
- Table 3: Tree cutting that is part of forest management (e.g. cutting/removing trees results in continued forest land-use)
- Table 4: Prescribed burning
- Table 6: Application of herbicide/fungicide
- Table 7: Application of pesticide (insecticide/rodenticide)
- Table 8: Removal/modification of an existing bridge or culvert
- Table 9: Actions to a human dwelling or building (including exclusion of bats from an occupied human structure)
- Table 10: Operation of wind turbines

Table 2. Effect categories for tree cutting that is NOT part of forest management, (e.g., development, land-use changes, and other tree removal that will not begin immediate return to forest)[4]

Category 1 Examples (No Effect or Not likely to Adversely Affect)	Category 2 Examples (Minimal Risk, but Incidental Take Is Unlikely)	Category 3 Examples (Increased Risk, Incidental Take Possible)
Example 1: Demonstrated probable absence of listed bats following the Service's Range-wide Survey Guidelines and in coordination with this Field Office, including emergence surveys of individual trees. **Example 2:** Occurs in any zone at any time of year but will only cut trees unsuitable for roosting Indiana/northern long-eared bats, including any of the following: • Trees <3" dbh • Trees of any size lacking suitable roosting spaces (e.g., peeling bark, cracks/crevices, or cavities) • Trees of any size/condition that are isolated from other suitable trees, tree lines, and/or forest by more 1,000 ft **Example 3:** Meets ALL of the following criteria: ✓ Occurs during the inactive season (see Table 1 for dates by Zone) ✓ Does not exceed clearing area threshold (see Table 1 for acres by Zone) OR exceeds threshold but demonstrates insignificant loss of habitat via a habitat assessment conducted in accordance with the Service's Range-wide Survey Guidelines and in coordination with this Field Office ✓ Does not result in the loss of connectivity among other forest patches (e.g., removing forested habitat connecting otherwise isolated forest patches of at least 5 acres) ✓ Will not affect a known or potential hibernaculum interior or entrance in any way (e.g., impede bat access, create increased potential for disturbance, impact drainage to or from hibernacula, etc.)	**Example 1:** Cuts potential roost trees in Zones 2, 5, or 6 (e.g., high potential summer habitat) but meets these standards: ✓ Occurs outside of the nonvolant pup season (outside June 1 through July 31) ✓ Will retain all snags and trees with cavities ✓ Will not affect a known or potential hibernaculum interior or entrance in any way (e.g., impede bat access, create increased potential for disturbance, impact drainage to or from hibernacula, etc.). **Example 2:** Removes trees from monoculture pine or aspen plantations (e.g., purely coniferous or purely aspen stands) in any zone at any time of year	**Example 1:** Removes potential roost trees in Zones 1, 2, 4, 5, or 6 (high potential habitat) during the nonvolant pup season (June 1 through July 31) **Example 2:** Exceeds clearing area threshold in Zone 1 or 4 (high potential swarming/staging/summer habitat; see Table 1 for acres by Zone) **Example 3:** Results in loss of connectivity among other forest patches (e.g., removes forested habitat connecting otherwise isolated forest patches that are at least 5 acres in size) **Example 4:** Will affect a known or potential hibernaculum interior or entrance in any way (e.g., impede bat access, create increased potential for disturbance, impact drainage to or from hibernacula, etc.)

[4] Note that although these recommendations are applicable to tree cutting associated with wind energy development, we additionally recommend that wind developers follow the Service's Land-Based Wind Energy Guidelines (WEG) and coordinate with our Field Office and the Michigan DNR.

Table 3. Effect categories for tree cutting that is part of forest management (e.g. cutting/removing trees results in continued forest land-use)

Category 1 Examples (No Effect or Not likely to Adversely Affect)	Category 2 Examples (Minimal Risk, but Incidental Take Is Unlikely)	Category 3 Examples (Increased Risk, Incidental Take Possible)
Example 1: Demonstrated probable absence of federally listed bats following the Service's Range-wide Survey Guidelines and in coordination with this Field Office, including emergence surveys of individual trees **Example 2:** Occurs in any zone at any time of year but will only cut trees unsuitable for roosting Indiana/northern long-eared bats, including any of the following: • Trees <3" dbh • Trees of any size lacking suitable roosting spaces (e.g., peeling bark, cracks/crevices, or cavities) • Trees of any size/condition that are isolated from other suitable trees, tree lines, and/or forest by more 1,000 ft **Example 3:** Meets ALL of the following criteria: ✓ Occurs during the inactive season (see Table 1 for location-specific dates) ✓ Clear-cutting (e.g., final harvests) does not exceed clearing area threshold (see Table 1 acres by Zone) ✓ Does not result in the loss of connectivity among other forest patches (e.g., removing forested habitat connecting otherwise isolated forest patches that are at least 5 acres in size) ✓ Will not affect a known or potential hibernaculum interior or entrance in any way (e.g., impede bat access, create increased potential for disturbance, impact drainage to or from hibernacula, etc.)	**Example 1:** Cuts potential roost trees in Zones 2, 5, or 6 (e.g., high potential summer habitat) but meets these standards: ✓ Occurs outside of the nonvolant pup season (outside June 1 through July 31) ✓ Will retain all snags and trees with cavities ✓ Will not affect a known or potential hibernaculum interior or entrance in any way (e.g., impede bat access, create increased potential for disturbance, impact drainage to or from hibernacula, etc.). **Example 2:** Cuts trees in monoculture pine or aspen plantations (e.g., purely coniferous or purely aspen stands) in any zone at any time of year	**Example 1:** Cuts potential roost trees in Zones 1, 2, 4, 5, or 6 (e.g., high potential habitat) during the nonvolant pup season (June 1 through July 31) **Example 2:** Clear-cutting of suitable forest (e.g., excludes immature forest, monoculture pine and aspen stands) exceeds clearing area threshold in Zone 1 or 4 (high potential swarming/staging/summer habitat; see Table 1 for acres by Zone) **Example 3:** Will affect a known or potential hibernaculum interior or entrance in any way (e.g., impede bat access, create increased potential for disturbance, impact drainage to or from hibernacula, etc.)

Table 4. Effect categories for prescribed burning

Category 1 Examples (No Effect or Not likely to Adversely Affect)	Category 2 Examples (Minimal Risk, but Incidental Take Is Unlikely)	Category 3 Examples (Increased Risk, Incidental Take Possible)
Example 1: Demonstrated probable absence of federally listed bats following the Service's Range-wide Survey Guidelines and in coordination with this Field Office, including emergence surveys of individual trees **Example 2:** Occurs in non-forested habitat or non-suitable forest (e.g., immature stands) during the inactive season (see Table 1 for dates by Zone) **Example 3:** Occurs in non-forested habitat or non-suitable forest (e.g., immature stands) during the active season and meets ALL of the following: ✓ Includes unburned buffer of at least 30 feet between any suitable adjacent forest ✓ Will not affect a known or potential hibernaculum interior or entrance in any way (e.g., impede bat access, create increased potential for disturbance, impact drainage to or from hibernacula, etc.) ✓ Smoke is kept to a minimum	**Example 1:** Occurs in suitable forest in Zone 3 or 7 (low potential summer habitat) during the nonvolant pup season (June 1 through July 31) but meets ALL of the following criteria: ✓ Includes unburned buffer of at least 200 feet between any adjacent high potential summer habitat (e.g., Zones 2, 5, or 6) ✓ Low heat intensity (≤20 BTU/feet/second) and slow moving (≤5.6 chains/hour) ✓ Flame length is ≤2 feet and tree scorching is predicted to be no more than a few feet above ground ✓ Smoke is kept to a minimum ✓ During preparation work, if hazard snags or potential roost trees within 20 feet of a line require felling, they will be felled in accordance with Table 3, above) ✓ During the burn, visibly burning trees are left standing unless they pose a threat to the crew or fire perimeter (if they cannot be extinguished or otherwise mitigated, they will be classified as a hazard and felled. As soon as safety conditions allow, staff will inspect felled trees/snags for signs of bats and report findings)	**Example 1:** Occurs in suitable forest habitat in Zone 2, 5, or 6 (e.g., high potential summer habitat) during the nonvolant pup season (June 1 through July 31) **Example 2:** Occurs in suitable forest habitat in Zone 1 or 4 (e.g., high potential swarming/staging/summer habitat) during the active season (see Table 1 for dates by Zone)

Table 5. Effect categories for prescribed burning *continued*

Category 1 Examples (No Effect or Not likely to Adversely Affect)	Category 2 Examples (Minimal Risk, but Incidental Take Is Unlikely)
Example 4: Occurs in suitable forest in Zone 3 or 7 (e.g., low potential summer habitat) and meets ALL of the following criteria: ✓ Occurs outside of the nonvolant pup season (outside June 1 through July 31) ✓ Includes an unburned buffer of at least 200 feet between any adjacent high potential habitat ✓ Does not result in the loss of connectivity among other forest patches (e.g., removing forested habitat connecting otherwise isolated forest patches that are at least 5 acres in size ✓ Will not affect a known or potential hibernaculum interior or entrance in any way (e.g., impede bat access, create increased potential for disturbance, impact drainage to or from hibernacula, etc.) **Example 5:** Occurs in suitable forest in any zone and meets ALL of the following criteria: ✓ Occurs during the inactive season (see Table 1 for dates by Zone) ✓ Does not exceed clearing area threshold (see Table 1 acres by Zone) ✓ Will not result in the loss of connectivity among other forest patches (e.g., removing forested habitat connecting otherwise isolated forest patches that are at least 5 acres in size) ✓ Will not affect a known or potential hibernaculum interior or entrance in any way (e.g., impede bat access, create increased potential for disturbance, impact drainage to or from hibernacula, etc.)	**Example 2:** Occurs in suitable forest in Zone 2, 5, or 6 (high potential summer habitat) and meets ALL of the following criteria: ✓ Occurs outside of the nonvolant pup season (outside June 1 through July 31) ✓ Low heat intensity (≤20 BTU/feet/second) and slow moving (≤5.6 chains/hour) ✓ Flame length is ≤2 feet and tree scorching is predicted to be no more than a few feet above ground ✓ Smoke is kept to a minimum ✓ During preparation work, if hazard snags or potential roost trees within 20 feet of a line require felling, they will be felled in accordance with Table 3, above) ✓ During the burn, visibly burning trees are left standing unless they pose a threat to the crew or fire perimeter (if they cannot be extinguished or otherwise mitigated, they will be classified as a hazard and felled. As soon as safety conditions allow, staff will inspect felled trees/snags for signs of bats and report findings) **Example 3:** Occurs in monoculture pine or aspen plantations (e.g., purely coniferous or purely aspen stands) in any zone at any time of year

Table 6. Effect categories for application of herbicide/fungicide

Category 1 Examples (No Effect or Not likely to Adversely Affect)	Category 2 Examples (Minimal Risk, but Incidental Take Is Unlikely)	Category 3 Examples (Increased Risk, Incidental Take Possible)
Example 1: Demonstrated probable absence of federally listed bats following the Service's Range-wide Survey Guidelines and in coordination with this Field Office **Example 2:** Ground application in any zone at any time of year that meets the following criteria: ✓ Follows the label ✓ Uses targeted application methods such spot-spraying, hack-and-squirt, basal bark injections, cut-stump, or foliar spraying on individual plants **Example 3:** Aerial application in any zone during the inactive season (see Table 1 for dates by Zone)	**Example 1:** Aerial application in Zone 3 or 7 (e.g., low potential summer habitat) during the active season (see Table 1 for dates by Zone)	**Example 1:** Aerial application in Zone 1, 2, 4, 5, or 6 (e.g., high potential habitat) during the active season (see Table 1 for dates by Zone)

Table 7. Effect categories for application of pesticide (insecticide/rodenticide)

Category 1 Examples (No Effect or Not likely to Adversely Affect)	Category 2 Examples (Minimal Risk, but Incidental Take Is Unlikely)	Category 3 Examples (Increased Risk, Incidental Take Possible)
Example 1: Demonstrated probable absence of federally listed bats following the Service's Range-wide Survey Guidelines and in coordination with this Field Office	**Example 1:** Targeted, ground application in any zone during the inactive season (see Table 1 for dates by Zone) **Example 2:** Targeted, ground application in Zones 3 or 7 (e.g., low potential summer habitat) during the active season **Example 2:** Targeted, ground application in Zone 1, 2, 4, 5, or 6 (e.g., high potential habitat) with project-specific risk assessment demonstrating minimal risks	**Example 1:** Aerial application in Zone 1, 2, 4, 5, or 6 (e.g., high potential habitat) during the active season (see Table 1 for dates by Zone)

Table 8. Effect categories for removal/modification of an existing bridge or culvert (for details on how to assess a bridge for roosting bats, please see these Guidelines)

Category 1 Examples (No Effect or Not likely to Adversely Affect)	Category 2 Examples (Minimal Risk, but Incidental Take Is Unlikely)	Category 3 Examples (Increased Risk, Incidental Take Possible)
Example 1: Actions to a bridge/culvert following a negative emergence survey or other presence/absence survey conducted in accordance with the Service's Range-wide Survey Guidelines and in coordination with this Field Office **Example 2:** Actions to a bridge/culvert following an assessment performed during the summer roosting period (May 15 through August 15) within 2 years of the action that does not observe bats or signs of bat use (e.g., urine staining, guano) **Example 3:** Actions to a culvert less than 4 feet (1.2 meters) high or 50 feet (15 meters) long **Example 4:** Actions to a bridge/culvert located above the third county tier of Michigan (i.e., does not provide suitable microclimates for day-roosting bats) **Example 5:** Actions to a bridge or culvert known to be occupied by night-roosting bats ONLY (listed or unknown species) that does not permanently remove or alter roosting spaces **Example 6:** Actions to a bridge/culvert that does not provide suitable roosting spaces for day-roosting Indiana/northern long-eared bats (e.g., expansion joints or other cracks/crevices) **Example 7:** Actions to a bridge or culvert suitable for day-roosting Indiana/northern long-eared bats with known/assumed presence of bats (of species) that does not permanently remove or alter potential roosting spaces and occurs during October 15 through April 14	**Example 1:** Actions to a bridge or culvert suitable for day-roosting Indiana/northern long-eared bats with known/assumed presence of bats (of unknown species) that permanently removes or alters potential roosting spaces, but occurs October 15 through April 14 **Example 2:** Actions to a bridge or culvert known to be occupied by night-roosting bats (listed or unknown species) ONLY that permanently removes or alters roosting spaces **Example 3:** Actions to a bridge or culvert known to be occupied by day-roosting bats (listed or unknown species) during April 15 through September 30 that is needed to address an imminent risk to human health/safety* *Please note that if listed bats must be harmed in order to protect human health or safety, this is allowed pursuant to ESA regulations; however, please contact our Field Office for more information regarding after-the-fact reporting requirements.	**Example 1:** Actions to a bridge or culvert known to be occupied by day-roosting Indiana and/or northern long-eared bats during April 15 through September 30 that is NOT needed to address an imminent risk to human health/safety

Table 9. Effect categories for removal/modification of a human dwelling or building (including exclusion of bats from an occupied human structure)

Category 1 Examples (No Effect or Not likely to Adversely Affect)	Category 2 Examples (Minimal Risk, but Incidental Take Is Unlikely)	Category 3 Examples (Increased Risk, Incidental Take Possible)
Example 1: Actions to building with no prior records of Indiana or northern long-eared bat use and no current signs of bat use **Example 2:** Actions to building occupied by unknown bat species that will not affect roosting spaces **Example 3:** Actions to buildings occupied by unknown bat species following humane exclusion performed outside the summer roosting period (i.e., outside May 15 through August 15)	**Example 1:** Actions to buildings occupied by unknown bat species that will affect roosting spaces following humane exclusion performed outside the nonvolant pup season (outside June 1 through July 31)* **Example 2:** Actions to buildings known to be occupied by listed bats that will affect roosting spaces following humane exclusion performed outside the summer roosting period (i.e., outside May 15 through August 15)* *Please note that if listed bats must be harmed in order to protect human health or safety, this is allowed pursuant to ESA regulations; however, please contact our Field Office for more information regarding after-the-fact reporting requirements.	**Example 1:** Actions to buildings known to be occupied by listed bats that will affect roosting spaces during the summer roosting period (i.e., May 15 through August 15) **Example 2:** Actions to buildings following non-humane exclusion (i.e., lethal exclusion or exclusion performed during the nonvolant pup season [June 1 through July 31]), which is NOT needed to address an imminent risk to human health or safety

Table 10. Effect categories for the operation of wind turbines[5]

Category 1 Examples (No Effect or Not likely to Adversely Affect)	Category 2 Examples (Minimal Risk, but Incidental Take Is Unlikely)	Category 3 Examples (Increased Risk, Incidental Take Possible)
Example 1: Operation of wind turbines in accordance with a Technical Assistance Letter from the Michigan Ecological Services Field Office	**Example 1:** Operation of wind turbines that meets ALL of the following criteria: ✓ Turbines are located wholly OUTSIDE the following counties: **Allegan * Barry * Benzie** **Berrien * Branch * Calhoun** **Cass * Clinton * Eaton** **Genesee * Hillsdale * Ingham** **Ionia * Jackson * Kalamazoo** **Kent * Lapeer * Leelanau** **Lenawee * Livingston** **Macomb * Manistee * Mason** **Monroe * Montcalm** **Muskegon * Oakland** **Oceana * Ottawa** **Shiawassee * St. Clair** **St. Joseph * Van Buren** **Washtenaw * Wayne** ✓ Turbines are located at least 60 miles from all known listed bat hibernacula ✓ Implements a feathering strategy for bats that is at least as protective as fully feathering the turbine blades (i.e., ensuring the slowest blade speed possible without the assistance of braking) below 5.0 m/s sunset-sunrise when ambient temperature is 50°F or above from April 1 through October 31 ✓ Feathers turbines below the manufacturer's cut-in speed from November 1 through March 31 ✓ Conducts at least one year of post-construction bird and bat fatality monitoring at a representative number of turbines and according to protocols developed in coordination with the Service	**Example 1:** Operation of wind turbines below 6.9 m/s sunset-sunrise when ambient temperature is 50°F or above from April 1 through October 31 that are: (1) within 60 miles of a known or suspected hibernaculum; (2) where presence/absence surveys have demonstrated presence of summering Indiana and/or northern long-eared bats; and/or (3) Indiana/northern long-eared bat fatality has been previously documented

[5] We additionally recommend that wind developers additionally follow the Service's Land-Based Wind Energy Guidelines (WEG) and coordinate with our Field Office and the Michigan DNR early in project development.

MICHIGAN ECOLOGICAL SERVICES FIELD OFFICE CONTACT INFORMATION

Please contact the Michigan Ecological Services Field Office for more information or assistance with any projects occurring in Michigan.

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