

**U.S. Fish and Wildlife Service
West Virginia Field Office**

**Guidance on Developing and
Implementing an Indiana Bat
Conservation Plan**

Introduction

Various land development and land use activities can cause the loss, degradation, and fragmentation of Indiana bat habitat. Significant habitat impacts can result in the death or injury of Indiana bats by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Within its legal authorities under the federal Endangered Species Act (ESA; 16 U.S.C. 1531-1543), the U.S. Fish and Wildlife Service (Service) is often in the position of providing technical assistance to project proponents to assist them in determining if potential adverse effects on Indiana bats are likely to occur and, if so, how they can avoid, minimize, and/or compensate for those adverse effects. In many cases, potential adverse effects can be avoided or greatly reduced by early project planning that incorporates the measures outlined below.

This guidance consolidates and memorializes technical advice currently provided on a project-by-project basis. Frequently, these project-by-project reviews include considerable explanation of Indiana bats needs and responses to habitat. To provide similar context for this document, Appendix A provides summary background information concerning Indiana bats.

Rationale for Plan Development

The unauthorized “take” of federally listed species is prohibited pursuant to section 9 of the ESA. “Take” is defined in the ESA as: to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct. “Harm” is further defined to include significant habitat modifications or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. “Harass” is further defined as actions that create the likelihood of injury to listed species to such an extent to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering.

Where there is a risk of take occurring (*e.g.*, due to effects caused by the proposed loss of forest habitat), this guidance details specific measures that can be taken to avoid, minimize, and compensate for potential adverse effects on the Indiana bat, and significantly reduce the likelihood that take will occur. In some cases, application of this guidance may be sufficient to determine that effects on Indiana bats are insignificant or discountable. In other cases, this determination may be met through different or greater measures built into project design. In any instance where project design and Indiana Bat Conservation Plan implementation successfully avoid potential adverse effects on Indiana bats, it would preclude the need for take exemption or authorization, and project proponents would be able to forego the lengthy regulatory process associated with seeking “take” authorization under the ESA.

The development and implementation of an Indiana Bat Conservation Plan does not itself confer incidental take exemption or authorization. Consequently, if implementation of a Plan is not sufficient to avoid potential adverse effects, incidental take would be exempted or authorized only via the issuance of biological opinions pursuant to Section 7 of the ESA, or incidental take permits pursuant to Section 10 of the ESA.

Plan Development and Implementation

To avoid or minimize potential adverse effects on Indiana bats, project proponents should develop and implement an Indiana Bat Conservation Plan when a project will affect forests, woodlots, forested fencerows, riparian areas, or trees within areas that are known or potential Indiana bat habitat. Known Indiana bat habitat includes habitat located 1) within 5 miles of an Indiana bat female (reproductive or non-reproductive) or juvenile capture record without an identified maternity roost tree; 2) within 2½ miles of an Indiana bat maternity roost or male bachelor colony record; and 3) within 10 miles of a priority 1 or 2 hibernaculum or 5 miles of a priority 3 or 4 Indiana bat hibernaculum.

Potential Indiana bat habitat includes all suitable foraging and roosting habitats and travel corridors where surveys have not been conducted to determine if bats are present, but presences is being assumed. The Plan should consider the various sources and types of effects on Indiana bats due to project development, and incorporate measures to avoid, minimize, and offset potential effects¹. It is important to note that “project” includes all project features, not just the portion of the project prompting the submittal of a permit application (*e.g.*, to WVDEP or the Corps). For example, a residential development would include all features of the development, including all forest or wooded areas to be affected or encroached upon by roads, utility lines, houses, driveways, septic areas, detention basins, stormwater basins, yards, lots, *etc.* An oil or gas project would include not only the well and well pad, but also the roads, staging areas, impoundments and holding pits, and oil and gas lines associated with the well or well field.

The Indiana Bat Conservation Plan becomes an integral part of the proposed project, and as such, is something the project proponent or applicant commits to implement. The Plan must be incorporated as a required condition in any permits or authorizations issued for the project. Prior to initiation of any project construction, send the Indiana Bat Conservation Plan to the Service for review². The Service will evaluate the proposed project, along with its Indiana Bat Conservation Plan, to determine whether or not the combined effects of the project and Plan will result in insignificant or discountable effects on the Indiana bat and its habitat, or whether further consultation and

¹ This approach is sequential, meaning all reasonable efforts should be taken first to avoid adverse effects on Indiana bats and their habitat. Then, minimization measures should be implemented to the maximum extent practicable. After both avoidance and minimization measures have been fully integrated into project design, include measures to offset or partially offset any remaining adverse effects on Indiana bats and their habitat.

² **Note that ALL tree removal within known Indiana bat habitat – regardless of the amount – is subject to the appropriate seasonal restriction.** We recommend that even projects with relatively small-scale forest impacts (*e.g.*, less than seventeen acres) consider developing and implementing an Indiana Bat Conservation Plan, because in doing so, the cumulative forest losses from a multitude of such projects would be reduced. Nevertheless, when total forest impacts are expected to be less than seventeen acres, the associated Indiana Bat Conservation Plan does not require Fish and Wildlife Service review and approval.

coordination would be necessary due to continued adverse impacts or the likelihood of take of Indiana bats.

Plan Content

Provide a detailed project description and map, including all project features. Include project name and company, area size (acres), acres and location of forest in the project area that would be removed and that would remain undisturbed, timing of forest removal, and any measures proposed to avoid, minimize or mitigate lost forest habitat or permanently protect forest habitat off-site for Indiana bats.

Provide a listing of all avoidance, minimization, and compensation measures that will be implemented, explaining how each measure will be implemented for the particular project. The plan at a minimum must include a description of how impacts have been avoided and minimized to the maximum extent practicable and must include seasonal clearing for all trees greater than 5 inches DBH that will be removed. Recommendations of potential conservation measures can be found in Appendix B.

An on-site assessment of the quality and quantity of suitable bat habitat present in the vicinity of the project should be performed by qualified biologists with knowledge and experience with Indiana bat habitat requirements, such as those listed in the List of Surveyors Qualified to Conduct Indiana Bat Surveys in West Virginia. This assessment should include a detailed analysis of potential roost trees that may be affected by the project as well as a description of potential foraging and commuting areas present within the project area. A table for recording potential roost trees is available in Appendix D.

Due to the large amount of tree clearing and overlapping projects occurring across the state of West Virginia, the Service is now requiring that you list past and future projects proposed by your agency/company in the last 5 years that have/will occur inside your buffer area (2-mile buffer from centerpoint of non-linear projects and ¼-mile buffer from centerline of linear projects) of your project. This data will help us to better conserve Indiana bat resources, evaluate cumulative impacts, and better implement recovery efforts for the Indiana bat. A table for recording past/future projects is available in Appendix E.

The number of acres existing within 2-miles from the centerpoint of non-linear projects, and within ¼-mile from the centerline of linear projects should be included. The number of forested acres in this buffer area (either 2-mile area or ¼-mile area) pre- and post-construction should also be included.

Additionally a cave and mine portal search within the vicinity of the project should be performed in accordance with the Phase I Cave/Mine Portal Survey Data Sheet should be completed for each opening found. This data sheet is enclosed and results should be compared against the criteria listed in the Draft Protocol for Assessing Abandoned Mines/Caves for Bat Use

A summary sheet of all of this information is included on the following page. This summary sheet should be included at the beginning of your submitted Indiana Bat Conservation Plan. Appendices A through F provide additional information and forms to aid in your submittal of your Indiana Bat Conservation Plan.

If you have further questions that have not been addressed within this document or its appendices, please check our Frequently Asked Questions document at the following link:

http://www.fws.gov/westvirginiafieldoffice/PDF/WVFO_FAQs.pdf

If your question was not answered through any of these methods, please contact our office at 304-636-6586.

Indiana Bat Summary Sheet for Option 1: Assumption of Presence

Project Name: _____

Project Location: _____

County: _____

Project type: linear / non-linear

(2-mile buffer from centerpoint for non-linear; ¼-mile buffer around centerline for linear)

acres within Limits-of-Disturbance (LOD): _____

acres forest in LOD prior to project construction: _____

acres forest in LOD following to project construction: _____

Total # acres in buffer area: _____

(2-mile buffer from centerpoint for non-linear; ¼-mile buffer around centerline for linear)

(2-mile buffer area is always 8,042 acres for non-linear projects)

forested acres in buffer area prior to project construction: _____

forested acres in buffer area after project construction: _____

Caves/mine portal presence? Yes / No

If yes, suitable habitat? Yes / No

Potential Primary Roost Trees within clearing limits: _____

Potential Primary Roost Trees to be avoided: _____

Potential Secondary Roost Trees within clearing limits: _____

Potential Secondary Roost Trees to be avoided: _____

Avoidance and Minimization Measures to be Applied on Project

- € Seasonal tree clearing (all trees greater than 5” DBH) **REQUIRED**
- € Avoid cutting potential roost trees
- € Minimize limits of disturbance (narrowed LOD or ROW)
- € Minimize impacts (clearing) around suitable swarming and summer habitat and wetland/riparian zones
- € 50-foot or greater forested buffer left along both sides of streams
- € Collocate project features with previously disturbed or cleared areas
- € Phase tree clearing over multiple years
- € Reforest disturbed areas
- € Restore or enhanced riparian/wetland areas
- € Strong erosion and sedimentation best management practices
- € Pollution control plan in place
- € Suitable habitat acreage permanently preserved within or adjacent to the project site
- € Other: _____
- € Other: _____
- € Other: _____
- € Other: _____

Compensation Measures to be Applied on Project

- € Girdling trees on a 1:1 ratio for each potential roost tree that is lost during project development
- € Erecting bat boxes, artificial bark, or other artificial roosting structures on a 1:1 ratio
- € A 2-year minimum monitoring plan of artificial structures
- € Preservation of suitable Indiana bat habitat off-site
- € Creation of watering areas, wetlands, or ponds
- € Other: _____
- € Other: _____
- € Other: _____

APPENDIX A *Indiana bat – Background and Overview*

The Indiana bat is listed as “endangered” under the federal Endangered Species Act. It is a migratory species that hibernates in caves and mines during the winter. During the summer months, Indiana bats use a variety of forest habitats for foraging, roosting, and raising their young. Summer habitat may range from a few miles to over 300 miles from their hibernacula. Potential summer habitat occurs throughout West Virginia, while winter habitat coincides with geographic areas having natural cave systems, abandoned coal mines, or abandoned limestone mines. Both males and females return to hibernacula in late summer or early fall to mate and store up fat reserves for hibernation, during which time they forage and roost in forest habitat near their hibernacula (swarming habitat). By mid-November, male and female Indiana bats have entered hibernation. They typically emerge in April, at which time they again migrate to summer habitat.

Reproductive females form maternity colonies (typically of 50-100 bats) and give birth to a single offspring annually. Their colonial roosting behavior is thought to provide thermoregulatory benefits that increase survival and reproductive success. Males and non-reproductive females may remain solitary during the summer or may also form colonies. Summering Indiana bats (males and females) roost in trees in riparian, bottomland, and upland forests, and they forage in the same types of habitat. Maternity roost trees generally have exfoliating bark which allows the bats to roost between the bark and bole of the tree. Cavities and crevices in trees also may be used for roosting.

The primary threats to Indiana bats in West Virginia are white-nose syndrome, and habitat losses due to a wide variety of land development and land use practices that remove forest. White-nose syndrome is causing significant mortality at numerous bat hibernacula, with Indiana bat mortality rates exceeding 60%. At the same time, forest habitat losses occur due to coal mining, wind power development, oil and gas development, commercial and residential development, and various forestry practices.

Forest habitat loss is of particular concern when it occurs in occupied swarming or summer habitat, because bats may be killed or injured when trees are felled. Habitat loss may also have adverse effects on Indiana bats even when they are not present at the time of tree removal. Indiana bats depend on swarming habitat in the vicinity of their hibernacula for foraging and roosting. The presence of these forests and their insect populations is essential to ensuring Indiana bats store up sufficient fat reserves before entering hibernation, so they are able to survive until the spring migration.

Indiana bats also depend upon and exhibit fidelity to their summer habitat, returning to the same foraging and roosting areas each year. Loss of summer habitat forces all displaced bats (including Indiana bats) to find other suitable habitat, and this may result in reduced survival and reproduction. It is not known how long or how far female Indiana bats will search to find new roosting or foraging habitat if their traditional habitat is lost or degraded. If they are required to search for new habitat in the spring, it is assumed that this effort places additional stress on pregnant females at a time when fat reserves are low or depleted and they are already stressed from the energy demands of migration and pregnancy. It is not known how long it takes for the colony to attain the same level of roosting cohesiveness that it experienced prior to the loss of a primary roost tree, but that roosting cohesiveness is critical to survival and reproductive success. Until the bats from the colony locate another desirable

primary roost tree and reunite, it is likely that individual members of the colony will be subject to increased stress resulting from 1) having to search for a replacement primary roost tree(s); 2) having to roost in alternate trees that are less effective in meeting thermoregulatory needs; and 3) having to roost singly, rather than together, which decreases the likelihood of meeting thermoregulatory needs, thereby reducing reproductive success.

APPENDIX B .

Recommendations for Avoidance and Minimization Measures

All projects must include seasonal clearing

- Avoid impacts to potential roost trees (e.g., avoid cutting these trees).
- To minimize impacts on foraging and roosting Indiana bats, avoid or minimize impacts on forests, woodlands, and forested fence rows. Configure projects to avoid and/or minimize impacts on suitable summer and swarming habitat, particularly in and around wetlands and riparian areas.
- Minimize the right-of-way (ROW) by narrowing or rerouting the ROW around high quality Indiana bat summer habitat.
- Retain at least a 50-foot forested buffer (but preferably a 100-150 foot buffer) on each side of streams and around wetlands.
- Co-locate project features (e.g., roads and utility lines) and cluster project features (e.g., houses) to reduce forest clearing.
- Phase tree clearing over multiple years, if applicable to the project. Indicate the rate at which forest will be cleared, as well as the total duration of this effect (e.g., 5 acres/year for 10 years).
- Reforest temporarily cleared areas with tree species preferred by Indiana bats, in accordance with Appendix C. Ensure soils are segregated during earth disturbance activities and ensure soils are not compacted, to allow for successful tree establishment.
- Restore or enhance degraded riparian areas or wetlands by planting native trees and shrubs.
- Avoid use of invasive, exotic plant species when re-foresting and when stabilizing soils.
- Develop and implement stringent erosion and sedimentation controls to protect water quality and the Indiana bat prey base in streams and wetlands.
- Develop and implement a pollution prevention plan with strong erosion and sedimentation best management practices to ensure hazardous materials and storm runoff do not contaminate soils, wetlands, or waterways.
- Set aside protected suitable habitat within or adjacent to the project area to ensure that undisturbed bat habitat will remain on the landscape.

Recommendations for Compensation Measures When Impacts are Unavoidable

- Girdling trees on a 1:1 ratio for each potential roost tree that is lost during project development
- Erecting bat boxes, artificial bark, or other artificial roosting structures and monitoring these structures, or combination of structures, for a minimum of two years.
- Preserve suitable Indiana bat habitat off-site permanently.
- Create watering areas for bats such as wetlands or ponds.

APPENDIX C.
Preferred Tree Species

Planting plans should include at least six of the tree species listed below, one of which must be shagbark hickory. To promote diversity, do not include more than 15 percent of any one tree species in planting plans.

<i>Acer rubrum</i>	red maple
<i>Acer saccharum</i>	sugar maple
<i>Carya cordiformis</i>	bitternut hickory
<i>Carya glabra</i>	pignut hickory
<i>Carya laciniosa</i>	shellbark hickory
<i>Carya ovata</i>	shagbark hickory
<i>Carya tomentosa</i>	mockernut hickory
<i>Fraxinus americana</i>	white ash
<i>Fraxinus nigra</i>	black ash
<i>Fraxinus pennsylvanica</i>	green ash
<i>Platanus occidentalis</i>	sycamore
<i>Populus deltoides</i>	eastern cottonwood
<i>Quercus alba</i>	white oak
<i>Quercus coccinea</i>	scarlet oak
<i>Quercus prinus</i>	chestnut oak
<i>Quercus rubra</i>	northern red oak
<i>Quercus velutina</i>	black oak
<i>Robinia pseudoacacia</i>	black locust
<i>Sassafras albidum</i>	sassafras
<i>Ulmus americana</i>	American elm
<i>Ulmus rubra</i>	slippery elm