



# United States Department of the Interior

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## Recommendations for Streamlined Selection of Bat Mitigation Parcels within Conservation Focal Areas in Indiana

This document identifies Conservation Focal Areas (CFAs) in Indiana for four bat species and offers recommendations for selecting compensatory mitigation parcels within them. The recommendations aim to enhance existing ecological value and streamline coordination with our office. They apply to the Indiana bat (IBat; *Myotis sodalis*), northern long-eared bat (NLEB; *M. septentrionalis*), little brown bat (LBB; *M. lucifugus*), and tricolored bat (TCB; *Perimyotis subflavus*), collectively referred to as the “covered species.”

### PURPOSE AND INTENT

The purpose of this document is to improve and expedite project reviews and to assist those interested in compensatory mitigation for the covered species in identifying priority areas for land protection. Parcels that contain suitable bat habitat<sup>1</sup> and overlap with the CFAs should support the covered species, therefore, eliminating the need for additional presence/absence surveys. Proposed mitigation properties will still need to be reviewed by our office, including, but not limited to, confirmation of suitable on-site habitat and ecological value to the covered species, proximity to established conservation areas, and evidence of a threat. Ultimately, these recommendations will guide compensatory mitigation to locations that enhance landscape resiliency for the covered species and support their long-term conservation and recovery.

### BACKGROUND FOR DETERMINING CFAs

Covered bat species often return to or remain near the same summer maternity areas each year (i.e., they exhibit philopatry; e.g., Kurta and Murray 2002). To ensure a mitigation parcel benefits a covered species, it generally must be where the species is already known to occur. We define “known” summer habitat as areas within species-specific distances from documented roosts or capture sites<sup>2</sup>.

Because Indiana’s forest and woodland habitats are often fragmented - particularly in agricultural

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<sup>1</sup> Definitions of “suitable habitat” for currently listed species are available in the Service’s range-wide bat survey guidelines available at <https://www.fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines> (see pages 11-13). LBB roosting habitat may also include some man-made structures, such as barns.

<sup>2</sup> For example, for IBat and LBB – a 2.5-mile radius around the center of documented roosts or within a 5-mile radius of capture sites when biologists have not documented a roost; for NLEB and TCB – a 1.5-mile radius around the center of documented roosts or within a 3-mile radius of capture sites when biologists have not documented a roost.

and developed areas - and tend to follow narrow riparian corridors, bats in these landscapes may forage over greater distances. As a result, we are using watershed-based mapping rather than circular buffers to designate CFAs. Since all covered species routinely use riparian areas for roosting, travel, and foraging (Carter 2006, Humphrey et al. 1977, Johnson et al. 2010, Menzel et al. 2005), we consider mitigation parcels within a HUC-12 watershed containing occurrence records of a covered species likely to be used by that species.

We used a two-pronged approach to identify Conservation Focal Areas (CFAs):

- For IBat and LBB, we compiled occurrence records and selected HUC-12 watersheds where both species have been documented.
- For NLEB and TCB, we used Area of Influence (AOI) maps<sup>3</sup> to identify likely occupied areas and selected HUC-12 watersheds overlapping both species' AOIs.

We retained only those HUC-12 watersheds that:

- Contain occurrence records for both IBat and LBB, and
- Overlap with likely occupied areas for both NLEB and TCB.

These watersheds are considered occupied by the covered species and constitute Indiana's CFAs (see Figure 1). Parcels located wholly or partially within a CFA that contain suitable habitat may be eligible for compensatory mitigation.

NOTE: Mitigation entities can propose mitigation sites outside of current CFAs; however, more substantial coordination and site-specific bat surveys are likely to be required.

## RECOMMENDATIONS

We recommend considering the following factors when selecting a mitigation parcel within a CFA as compensatory mitigation: 1) the parcel's existing ecological value to the covered species, 2) its proximity to other suitable habitat and/or established conservation areas, and 3) the presence of a demonstrable threat to the habitat.

First, all mitigation parcels must provide meaningful ecological value for the covered species. While individual mitigation parcels may not be large enough to support self-sustaining bat populations, they should contribute to and enhance larger habitat complexes already in use by the covered species. In particular, parcels that expand or reinforce habitat within or near established conservation areas will improve the overall size, connectivity, and resilience of these complexes. We recognize that some bat populations may decline or disappear in certain areas over time due to uncontrollable factors such as white-nose syndrome. However, by increasing the extent and integrity of protected habitats, we increase the likelihood of recolonization as populations recover. Therefore, parcels located within or near watersheds that include other protected lands are likely to provide greater ecological benefits.

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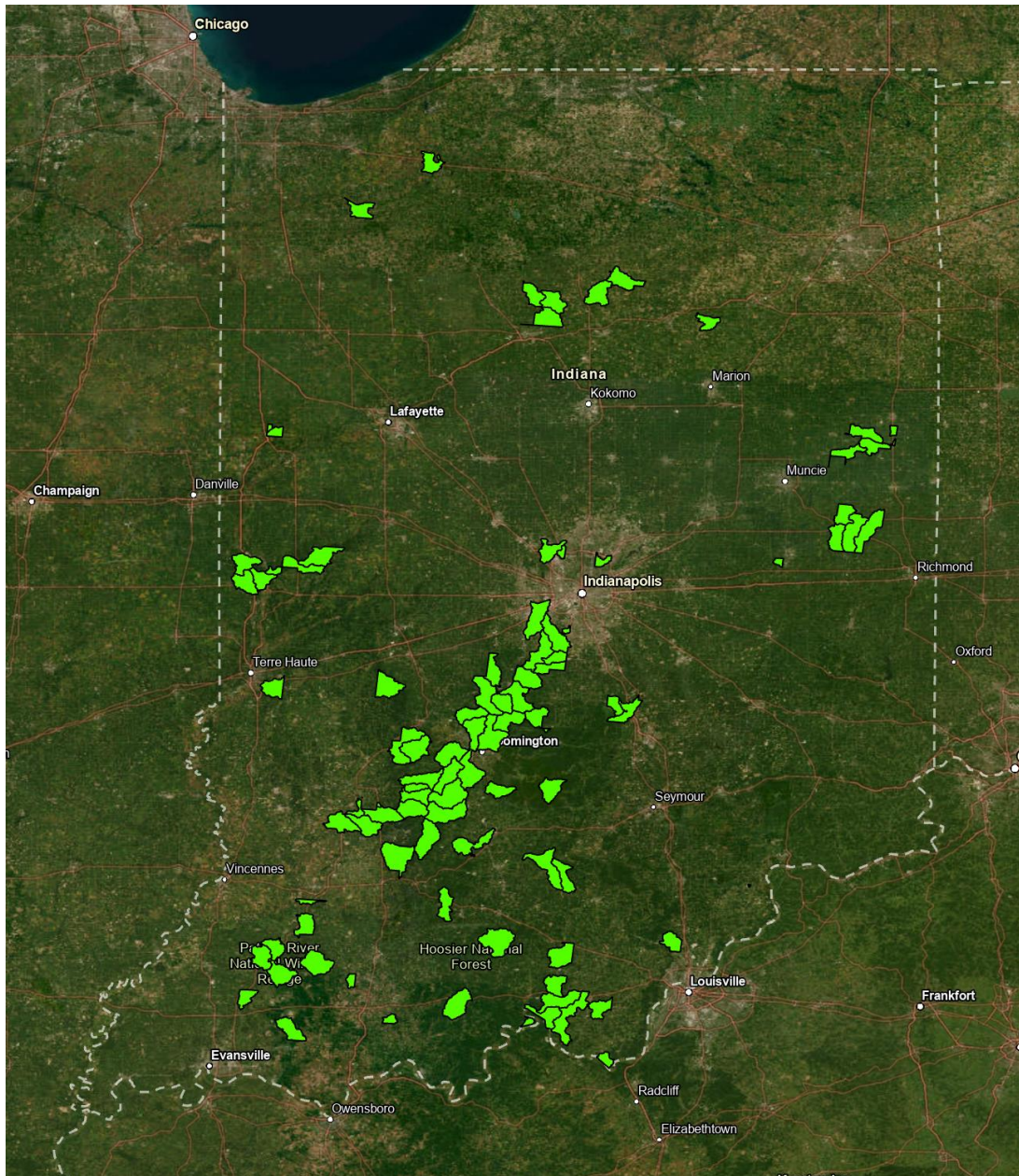
<sup>3</sup> <https://www.fws.gov/species/northern-long-eared-bat-myotis-septentrionalis/map>  
<https://www.fws.gov/species/tricolored-bat-perimyotis-subflavus/map>

Second, habitat connectivity is critical to ensure covered species can access and utilize mitigation areas effectively. To support functional connectivity, mitigation parcels should be directly adjacent or connected to other forested parcels. In some cases, the mitigation parcel itself may serve as a valuable corridor linking two larger habitat areas. If a direct connection does not currently exist, the mitigation parcel could help establish or enhance one (e.g., via tree planting) or ideally lie within 1,000 feet of existing suitable habitat to maximize the likelihood of bat use.

Third, selection of mitigation sites should prioritize habitat protection and restoration on parcels with a relatively high level of threat. The threat may be due to habitat scarcity or land-use conflicts. In the northern two-thirds of Indiana, summer habitat scarcity is common due to other land uses such as agriculture being more prevalent. In much of the southern third of Indiana, summer habitat is less scarce, but other land-use plans may create a conflict with bat use. Potential threats include land development, habitat conversion, surface mining, and large-scale clear-cut logging (e.g., >20 acres). In summary, when considering a potential parcel for mitigation, summer habitat for the covered species should be scarce or one or multiple credible threats should be documented.

### Literature Cited

- Kurta, A., & S.W. Murray. 2002. Philopatry and migration of banded Indiana bats (*Myotis sodalis*) and effects of radio transmitters. *Journal of Mammalogy* 83:585-589.
- Carter, T. C. 2006. Indiana Bats in the Midwest: The Importance of Hydric Habitats. *Journal of Wildlife Management* 70:1185–1190.
- Humphrey, S.R., A.R. Richter, and J.B. Cope . 1977. Summer habitat and ecology of the endangered Indiana bat, *Myotis sodalis*. *Journal of Mammalogy* 58:334–346.
- Johnson, J.B., W.M. Ford, J.W. Edwards, and M.A. Menzel. 2010. Bat community structure within riparian areas of northwestern Georgia, USA. *Folia Zoologica* 59:192–202.
- Menzel, J.M., W.M. Ford, M.A. Menzel, T.C. Carter, J.E. Gardner, J.D. Garner, and J.E. Hofmann. 2005. Summer Habitat use and Home-Range Analysis of the Endangered Indiana Bat. *The Journal of Wildlife Management* 69:430–436.



**FIGURE 1.** U.S. Fish and Wildlife Service’s Conservation Focal Areas (CFAs) for bat mitigation in Indiana (shaded in bright green). For bat mitigation purposes, the Service will assume presence of Indiana bat, northern long-eared bat, tricolored bat, and little brown bat within suitable habitats within these CFAs.

### ACCESS TO CFA MAPS

We maintain a shapefile of the current CFA boundaries in Indiana using ArcGIS Pro and share it with partners through ArcGIS Online (AGOL). To request access to the AGOL version (which requires an AGOL account), please email us at [IndianaFO@fws.gov](mailto:IndianaFO@fws.gov). If needed, partners may also request a static shapefile. However, this is not the preferred method, and the static version is only updated once per year.

To support project proponents in identifying suitable mitigation parcels, we have provided checklists outlining standard requirements and additional desirable attributes (Tables 1 and 2).

**TABLE 1.** Requirements to be considered for compensatory mitigation for bats in Indiana.

<b><i>Criterion 1. - ALL Mitigation Acres</i></b> (whether acres are being considered for preservation or restoration)	<b>MET</b>	<b>NOT MET</b>
Mitigation parcel is in a CFA or if not in a CFA a summer P/A survey needs to be conducted to demonstrate presence of all covered species.		
Mitigation parcel connects with other suitable habitat <sup>4</sup> by a shared border, a forested corridor, or is located within 1,000 feet of other suitable habitat. Habitat in parcel should support maternity roost habitat in areas where it is a limiting factor (i.e., northern IN).		
Mitigation parcel is unencumbered by existing conservation easement or comparable protective mechanism and has not previously received federal funding to protect it.		
<b><i>Criterion 2. - Preservation Acres</i></b>	<b>MET</b>	<b>NOT MET</b>
Parcel contains suitable habitat for all covered species.		
Parcel has a demonstrable threat to the integrity of the habitat from impacts such as large-scale clear-cut logging, mining, development, conversion, or other controllable factor that would result in a loss of value and suitability of the habitat for covered bat species.		
<b><i>Criterion 3. - Restoration Acres</i></b>	<b>MET</b>	<b>NOT MET</b>
Restoration parcel is connected to suitable habitat for all covered species. Or restoration parcel creates enough habitat to support maternity colonies of the target species.		
Restoration parcel is near a permanent water source.		
Restoration parcel contains severely degraded or cultivated habitat that has the potential to be restored to suitable forested habitat through intense management or planting.		
Restoration parcel will not involve the conversion of existing non-forested native or natural habitats, such as prairie or non-forested wetlands.		

*\*not required in 100% of properties but justification for not being met needs to be provided.*

**TABLE 1.** Additional desirable attributes for compensatory bat mitigation sites in Indiana.

<sup>4</sup> Definitions of “suitable habitat” for currently listed species are available in the Service’s range-wide bat survey guidelines available at <https://www.fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines> (see pages 11-13). LBB roosting habitat may also include some man-made structures, such as barns.

While not necessary, properties with these characteristics will be considered more valuable.

<b><i>ALL ACRES</i></b>	<b>YES</b>	<b>NO</b>	<b>NOTES</b>
Restoration parcel (or the restoration portion of a parcel) fills in suitable habitat gaps. In other words, the parcel reduces forested habitat fragmentation.			
Parcel fills in protected habitat gaps on the landscape. For example, parcel shares a border with protected lands or other protected lands exist within the watershed.			
Mitigation parcel is near other protected habitat such as State Park, Nature Preserve, other mitigation sites, etc.			
Parcel contains both suitable habitat and opportunities for new restoration.			
Parcel contains high-quality forested habitat. This may include a diverse tree species community, evidence of natural forest regeneration, and very low to no occurrence of invasive species.			
Parcel is expected to benefit multiple species of concern or species of greatest conservation need as designated by state, federal, or other conservation entity.			