2017 Indiana bat and northern long-eared bat Updated Programmatic Biological Opinion (PBO) – Technical Guidance

Literature Search:

Prior to doing field work, the consultant shall contact the United States Fish and Wildlife Service-Columbus Field Office (USFWS-COFO) to determine if the project is within a bat buffer. USFWS will not provide a distance to the actual capture or hibernacula, but they will inform the consultant if the project is within a buffer; and if so, which species and type of buffer (capture, swarming, or hibernacula). The request should be sent in an email exactly replicating the template shown below in Figure 1 - i.e., including the ODOT project name and PID in the subject line and the project location coordinates in the email, latitude and longitude in decimal degrees to five places. For non-linear projects such as bridge and culvert replacements, the latitude and longitude of the project centroid can be given. For linear projects, such as add-lanes, resurfacing with culvert replacements, connector roads, etc., give the coordinates for both endpoints of the project. The request must contain the following statement: “This project is a federal aid highway project, and will be coordinated with your office (if coordination is required) through the ODOT-OES Ecological MOA process and PBO. This is a request for bat buffer information only, and a technical guidance letter is not required”. The consultant will fill in the information in red. The USFWS will fill in the appropriate check box in the area in blue. Please send all requests to Karen Hallberg (at Karen_Hallberg@fws.gov) and Lindsey Korfel (Lindsey_Korfel@fws.gov). USFWS will reply to your email by checking the appropriate option. This information will be used to fill in the correct sections of the Indiana Bat and Northern Long-eared Bat Field Assessment Checklist (Field Checklist, see Appendix B) and the Federal Species table in the ESR. For all projects written by ODOT District environmental staff or OES staff, the data layer will be included in the Eco_Template for Arc GIS located on the O drive. The report author must check the data layer and include the information listed above in the Field Checklist and summarize the information in the ESR.

Figure 1: Federal Species Information Request USFWS email template.

TO:     Karen_Hallberg@fws.gov; Lindsey_Korfel@fws.gov
FROM:   Consultant@firm email
DATE:   Date
SUBJECT:  Bat buffer and eastern massasauga polygon request for ODOT project: County-Route-Section (PID XXXXXX)

This project is a federal aid highway project, and will be coordinated with your office (if coordination is required) through the ODOT-OES Ecological MOA process and PBO. This is a request for bat buffer and eastern massasauga polygon information only, and a technical guidance letter is not required.

Project Coordinates:
Lat:    XXXXXXX
Long:   XXXXXXX

This project is located within the following bat buffer:
  _____ BLUE (IBAT hibernaculum)
  _____ PURPLE (NLEB hibernaculum)
  _____ RED (IBAT swarming)
  _____ YELLOW (Acoustic IBAT detection)
  _____ GOLD (IBAT maternity colony)
  _____ BROWN (NLEB maternity colony)
  _____ GREEN (Mala/non-reproductive female IBAT)
  _____ Project not located in a bat buffer
The project is located within an eastern massasauga range polygon:
  _____ YES
  _____ NO

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1 The environmental review, consultation, and other actions required by applicable Federal environmental laws for this guidance are being, or have been, carried-out by ODOT pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated [December 11, 2015], and executed by FHWA and ODOT.
Data Collection:

Projects with tree removal:

1. Determine if Suitable Wooded Habitat (SWH) is present within the project area. (See Appendix A for definition).
   Please follow the guidance below to determine if the project area contains SWH.
   a. Trees that are located between the sidewalk and the roadway (or front yard trees very near the road if no sidewalks) in cities and areas of dense suburban development are not SWH, even if they have roosting characteristics. These should not be reported as SWH in the Ecological Survey Report (ESR).
   b. Small patches of trees (less than 0.5 acre) and single trees that do not contain roosting habitat are not SWH if they are not part of or connected to a larger woodlot (refer to definition of Travel Corridor in Appendix A). These trees should not be reported as SWH in the Ecological Survey Report (ESR).
   c. Single trees and small patches of trees (less than 0.5 acre) that do possess roosting characteristics may be considered SWH if they are within 1,000 feet of forested areas, or are connected to forested patches via travel corridors or a line of trees (see definition of Travel Corridor in Appendix A). In this situation, the trees should be reported as SWH, and OES will work with USFWS to confirm the determination.
   d. Any trees that are part of an area larger than 0.5 acre that meets the NLCD2 or Anderson3 definitions of a type of forest (upland forest, riparian forest, forested swamp) are all considered SWH and should be reported in the ESR. *See ii below if less than 0.10 acre of SWH will be impacted.
   e. If the surveyor making the determination is not sure an area qualifies as SWH, report the area as SWH and explain any issues in the “Additional Information” portion of the table.

2. Determine if all SWH to be removed is within 100 feet from the edge of pavement of the roadway.
   a. For all of the SWH that will be impacted within 100 feet of the edge of pavement:
      i. Record the acreage of SWH and take representative photos of the SWH within the project area. As with all photos in the ESR, the photos must be labeled with a caption describing the photo.
      ii. If 0.10 acre or less of SWH within 100 feet of EOP may be impacted, look at each tree and determine if roosting characteristics are present in any of the potentially impacted trees. Record observations as noted below. This step is not necessary if over 0.10 acre of SWH will be impacted by the project (or if the impacts are over 100 feet from EOP).
      iii. Fill out the appropriate portion of the Field Checklist (Appendix B). This checklist will be included in the ESR in the appendices, and the results will be summarized in the Federal Species table in the ESR form.
   b. For any SWH that will be impacted that is further than 100 feet from the edge of the pavement, additional information must be collected:
      i. Calculate the acreage of SWH within riparian corridors. These riparian corridor areas include any SWH within 50 feet of a stream with a drainage area of one square mile or greater at the location of the impacts. Only the SWH impact further than 100 feet from edge-of-pavement and along the riparian corridor should be reported as riparian corridor impact. Any SWH that is located in a riparian corridor and is within 100 feet of the edge of pavement will be included with the SWH acreage calculated in Step 2.a.(see Figure 2).
      ii. A separate calculation should be made for all SWH impacted beyond 100 feet from the edge of pavement, and outside of any riparian corridor SWH impacts calculated in step 2.b.i (See Figure 2).

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iii. If the project will remove SWH further than 300 feet from the EOP, record the amount of acreage that will be impacted outside 300 feet EOP separately. This will not change the effect call, but will be used in determining the mitigation ratio, if required.

iv. For projects where less than 3 acres of SWH are being removed further than 100 feet of the roadway, all potentially impacted Potential Maternity Roost Trees (PMRTs) further than 100 feet from the road must be located with GPS, photographed, and shown on the resource mapping. Fill out the PMRT checklist. Refer to Appendix A for definition of PMRT and Appendix B for the Field Guide for Potential Maternity Roost Tree Determinations.

v. For projects where 3 acres or more of SWH are being removed further than 100 feet of the roadway, record data and take photos of all PMRTs if 10 or fewer may be impacted. If more than 10 PMRTs may be impacted, estimate the number of PMRTs in the project area, take representative photos of at least 10 of the PMRTs, locate areas of high PMRT density on the map, and record data for the trees that were photographed on the PMRT checklist. To estimate PMRTs, count the number of PMRTs found within one acre of habitat, and multiply by the number of acres of SWH. Other methods may be more suitable depending on the project type and location. If another method is used, describe the estimation method in the ESR.

vi. After the information is collected, fill out all sections of the Field Checklist and the Potential Maternity Roost Tree Determination form (if PMRTs are present) (Appendix B). Both forms will be included in the ESR in the appendices, and the results will be summarized in the Federal Species table in the ESR form.

Figure 2. Example project area with bat habitat data collection
Bat Presence/Absence Surveys: In areas that are NOT in a known Indiana bat buffer, the project sponsor can choose to perform presence/absence (P/A) surveys for Indiana bat. This method may be recommended for large projects that may require mitigation and/or if the project sponsor wants to cut trees during the active season. Project sponsors can perform acoustic surveys in order to refine the effect call for the project. In the case where the acoustic survey does not show presence of these species, the project can be coordinated as “Not Likely to Affect” the species, and mitigation would not be required, however; seasonal clearing would still be required. If a mist net survey is conducted, and no Indiana bats are detected, the project can be coordinated through the batched process as a Not Likely to Affect. In this case, seasonal clearing is recommended, but is not required. Bat P/A surveys (both mist net and acoustic) should only be conducted when ODOT or the project sponsor requests the surveys, and the survey is part of the consultant’s scope. The consultant performing the bat survey (whether mist net or acoustic) will have received study plan approval from the USFWS prior to performing the survey work, and the survey results must be coordinated with USFWS. USFWS will not accept results of surveys for which a study plan was not approved by them in advance. These surveys must follow the most updated version of the USFWS Range-wide Indiana bat Summer Survey Guidelines:


Projects that will impact bridges over streams:

If the bridge is 20 feet in length or longer, a bridge inspection to determine if bats are using the bridge is required. This survey work should be done at the time of the ecological survey. For bridges that show signs of frequent flooding (flood debris trapped under the deck in the substructure, or if the underside of the bridge does not contain any areas that could be used for roosting, the results of the inspection will be “bridge does not provide roosting habitat”, and no further active season (April 1 to September 30) inspection will be required. If the bridge does contain suitable habitat, the underside of the structure will have to be inspected for bat usage during the active season. If ecological field work is to be conducted outside of the active season, other bridge inspection data from ODOT or county bridge inspectors may be available. Please contact the DEC to determine if other information is available for the structure. If previous inspection data is not available, the bridges will be inspected by ODOT staff or by a consultant under a separate contract during the active season. The bridge inspections are to be performed within one year of construction. Since many projects are coordinated more than one year prior to construction, ODOT or their consultant may have to inspect bridges that were already inspected during the ecological survey. If a consultant is contracted to do a bridge inspection outside of the ecological survey, the same guidance will be used, and the bridge inspection form will be coordinated with USFWS as a separate document. Contact OES for guidance in circumstances where the ecological survey is performed outside of the active season, or if the bridge cannot be fully inspected because of size, access, or height. Follow the FHWA/State DOT/FRA Bat Inspection Guidelines for Bridges/Structures (Appendix C), and include a copy of the inspection form for each structure that will be impacted by the project in the ESR.
Appendix A
Glossary of Terms

The following terms have been defined for use in this PC.

FORAGING AREAS
Foraging areas are defined as natural areas that approximate a natural area (e.g., a park, restored area) that provide a food supply (insects) for adult Indiana and northern long-eared bats and their young, and may serve as night roosts for resting and digesting meals. These areas may be within or on the edge of forested areas. Areas with an open sub-canopy provide the best foraging habitat. Foraging areas occur along streams, in floodplain forests, in and around forested wetlands and impoundments, and in and over forests. Streams without riparian corridors will not be considered foraging areas under this definition.

HIBERNACULUM
A hibernaculum is an area where bats hibernate during the winter. Hibernacula are typically caves or abandoned mines that provide cool, humid, stable conditions for hibernation.

POTENTIAL MATERNITY ROOST TREE (PMRT)
A PMRT is a tree that provides suitable summer roosting habitat for an Indiana bat or northern long-eared bat maternity colony\(^1\). Maternity roost trees have the following habitat characteristics:

- Live or standing dead trees or snags greater than 13-ft tall and at least 16-in dbh with exfoliating, peeling or lose bark, split trunks and/or branches, or cavities.
  - These characteristics must be plentiful enough (i.e., enough area in which the colony can roost) to allow the colony to change locations along the tree to aid in thermoregulation.
  - See photo gallery in Field Procedure for Determining PMRT (Appendix B).
- Any area(s) of habitat on a particular tree does not have to cover a large area, as a group of roosting bats can fit into a very small space.
- If the habitat characteristics are found only on the branches of the tree, the branches must be at least 8-in in diameter at the site of the habitat characteristics.
- These trees must have solar exposure and must be:
  - within 1,000 feet of SWH (see definition above) or
  - part of or connected to a Travel Corridor that is connected to either a) SWH that is 0.5 ac or larger or b) any wooded riparian corridor.

SOLAR EXPOSURE
Solar exposure is direct sunlight to the trunk or branches where suitable roosting habitat is found for all or part of the day. Maternity roosting trees require some solar exposure to provide thermoregulation to the young. This solar exposure can come from the tree being at the edge of a forested tract, at the edge of a distinct gap within a forested tract, or because the tree is a super canopy tree (much taller than the trees around it). See photo gallery of potential maternity roost trees in attached User’s Guide for examples of trees receiving adequate solar exposure.

\(^1\) A maternity colony consists of reproductive females and their young that may number 100 individuals or more.
**SUITABLE WOODED HABITAT (SWH)**

Any tree covered area that is ½ acre (ac) or larger, containing any potential roosts (i.e., live trees and/or snags that have exfoliating bark, cracks, crevices, and/or cavities) greater than 13-ft tall and at least 5-inch (in) dbh\(^2\) OR any patch of trees with these characteristics that is less than ½ acre in size but is within 1,000 feet of or connected by a travel corridor to a PMRT, ½-acre or larger stand of SWH, or any patch of wooded riparian buffer. *(It is important to note that the entire tree covered area – i.e., all trees, not just the trees with roost characteristics – are considered SWH if this definition is met.)*

**TRAVEL CORRIDOR**

A travel corridor is a contiguous linear wooded corridor that connects roosting and foraging areas, and may be used during migration. These corridors may be riparian areas along streams, wooded fence rows, small wooded roads and paths, open-understory forest, or wood lines in residential areas that are within 1,000 feet of SWH. Trees should be greater than 13 feet tall and at least 3-in dbh.
Appendix B
Field Procedure for Determining Potential Maternity Roost Trees Within an ODOT Project Area.
Field Procedure for Determining Potential Maternity Roost Trees within an ODOT Project Area.

Suggested Equipment: datasheet, pen, GPS, binoculars, measuring tape, tree field guide, study area map, camera.

1. Determine if any tree removal will occur further from 100 feet from the edge of pavement. If all tree removal is contained within 100 feet, no further survey work for PMRTs is required.
2. Walk the project area identifying and examining trees equal to or greater than 16” dbh with roosting habitat.
3. Once a potential tree is identified:
   a. Give the tree a unique ID number for this project (i.e. 1, 2, 3 etc)
   b. Record the species of tree.
   c. Take a photograph of the tree
   d. With a measuring tape measure record the diameter of the tree at breast height (dbh).
   e. Record if the tree is alive, dying, or dead.
   f. Examine the tree from the base to top using binoculars as needed. Search the entire tree for areas of potential roosting habitat (a covered space where an animal the size of a mouse could fit under or inside) such as loose bark, splits, or crevice. Walk around the tree and view the upper limbs, trunk and canopy from several observation points.
   g. Does the tree have crevice(es), split with a cavity, or a cavity? Yes/No
   h. Estimate and record the % areal coverage of loose bark on the tree.
      i. 0-5%
      ii. 5-25%
      iii. 25-50%
      iv. 50-75%
      v. 75-100%
   i. Is the potential roost habitat identified exposed to the sun during the day? Yes/No
   j. Record the position of the tree with a GPS.
   k. Determine if the tree is a Potential Maternity Roost:
      i. Is the tree 16 in or larger dbh?
      ii. Does the tree present loose bark, cavities, or crevices capable of hiding several bats?
      iii. Is the available roosting area described above in part ii exposed to the sun for a majority of a summer day?
      iv. If the answer to k.i., k.ii., and k.iii. are all yes, the tree is a potential maternity roost tree.
4. Incorporate the data form, photographs of the trees, and any additional comments regarding the project impacts to the species into the Ecological Survey Report (ESR).

Please see the attached PMRT field guide for more information and example photographs of confirmed PMRTs. Field data forms are included below.
**Indiana Bat and Northern Long-eared Bat Field Habitat Assessment Checklist**

### PROJECT INFORMATION

<table>
<thead>
<tr>
<th>CRS:</th>
<th>PID:</th>
<th>Date:</th>
</tr>
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</table>

### MANAGEMENT UNIT

<table>
<thead>
<tr>
<th>Eastern MU</th>
<th>☐</th>
</tr>
</thead>
<tbody>
<tr>
<td>Western MU</td>
<td>☐</td>
</tr>
</tbody>
</table>

### BAT RECORD SEARCH

<table>
<thead>
<tr>
<th>Is project in a known bat buffer?</th>
<th>Yes ☐</th>
<th>No ☐</th>
</tr>
</thead>
<tbody>
<tr>
<td>Record type(s) (color)?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additional Info including date of records request:</td>
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<td></td>
</tr>
</tbody>
</table>

### BRIDGE HABITAT ASSESSMENT

<table>
<thead>
<tr>
<th>Will Project Impact a Bridge over a stream?</th>
<th>Yes ☐</th>
<th>No ☐</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridge Inspection Conducted?</td>
<td>Yes ☐</td>
<td>No ☐</td>
</tr>
<tr>
<td>Results of Inspection including date:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### SUITABLE WOODED HABITAT ASSESSMENT

<table>
<thead>
<tr>
<th>Will Project Impact Suitable Wooded Habitat (SWH)?</th>
<th>Yes ☐</th>
<th>No ☐</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is all SWH to be impacted within 100 feet of the edge of pavement (EOP)? If yes, just fill out Line 1 (and Line 1a, if impacts &lt;0.10 ac). If no, fill out Lines 1, 2, 3 and 4.</td>
<td>Yes ☐</td>
<td>No ☐</td>
</tr>
<tr>
<td>Line 1. Acreage of SWH within 100 feet of EOP ac.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Line 1a. For SWH impacts &lt; 0.10 ac within 100 feet of EOP, do any of the trees contain roosting habitat?</td>
<td>Yes ☐</td>
<td>No ☐</td>
</tr>
<tr>
<td>Line 2. Acreage of impacted SWH within 50 feet of a perennial stream but outside 100 feet of EOP. ac.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Line 3. Acreage of impacted SWH between 100 feet and 300 feet of the EOP, and not located within 50 feet of a perennial stream. ac.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Line 4. Acreage of impacted SWH further than 300 feet of EOP ac.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Line 5. Number of impacted PMRTs further than 100 feet of the EOP. Fill out PMRT table if PMRTs will be impacted.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Potential Maternity Roost Tree Determination** - Please see the PMRT definition in the Glossary and example PMRT photos in this appendix.

**FIELD PROCEDURE**

PMRTs must be identified for all projects where SWH will be impacted further than 100 feet from the edge of the roadway. For projects where three acres or less of SWH is going to be impacted outside of 100 feet of the roadway, all PMRTs within the project area must be identified, located using GPS, and photographed. For projects where over three acres of SWH will be impacted beyond 100 feet of the roadway, note the approximate number of PMRTs in the project area, note any areas that contain a concentration of PMRTs in the text and mapping, and include representative photos in the ESR.

<table>
<thead>
<tr>
<th>Project CRS</th>
<th>Examiner</th>
<th>Date of Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Area (ac)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tree ID #</th>
<th>dbh in inches</th>
<th>Species</th>
<th>Condition</th>
<th>Crevice, split, or cavity present? Y/N</th>
<th>% loose bark</th>
<th>Approx. hours of solar exposure</th>
<th>Located with GPS Y/N</th>
</tr>
</thead>
</table>
PMRTs are trees that provide suitable summer roosting habitat for Indiana bat or northern long-eared bat maternity colonies. Maternity roost trees have the following habitat characteristics:

- Live or standing dead trees or snags greater than 13 feet tall and at least 16 inches dbh with exfoliating, peeling or loose bark, split trunks and/or branches, or cavities.
  - These characteristics must be plentiful enough (i.e., enough area in which the colony can roost) to allow the colony to change locations along the tree to aid in thermoregulation.
- Any area(s) of habitat on a particular tree does not have to cover a large area, as a group of roosting bats can fit into a very small space.
- If the habitat characteristics are found only on the branches of the tree, the branches must be at least 8 inches in diameter at the site of the habitat characteristics.
- Trees must have solar exposure and must be:
  - within 1,000 ft of SWH (see definition above) or
  - part of, or connected to a Travel Corridor that is connected to either a) SWH that is 0.5 ac or larger or b) any wooded riparian corridor.

Solar Exposure is direct sunlight to the trunk or branches where suitable roosting habitat is found for all or part of the day. Maternity roosting trees require some solar exposure to aid in thermoregulation of pregnant female bats and newborn pups. This solar exposure can come from the tree being at the edge of a forested tract, at the edge of a distinct gap within a forested tract, or because the tree is a super canopy tree (much taller than the trees around it).

The photos in this field guide are of field-verified maternity roost trees from various locations within Ohio. Photos were provided by USFWS, Ohio Field Office.
This large eastern cottonwood is located at the edge of a woodlot where it receives solar exposure for half the day. It has several areas of peeling bark that can shelter a maternity colony and allow the colony to move for better thermoregulation.
Close-up photos showing areas of habitat on the large cottonwood shown on the previous page.
Dead chestnut oak located in a woodlot. This tree receives solar exposure because it is a super-canopy tree. This tree has large areas of peeling bark scattered around the entire tree. This tree offers a great variety of both sunny and shady areas to aid in thermoregulation.
This dead oak tree is located at the edge of a woodlot. It offers solar exposure for at least half of the day, and possesses peeling bark, split limbs, and several cavities.
Large dead green ash located at the edge of a wetland. This tree gets several hours of solar exposure and contains many slabs of separated bark.
This trunk contains peeling bark and several large cavities. It is at the edge of an opening in the woods, so gets solar exposure.

Large dead trees at the edge of a wetland provide good solar exposure for thermoregulation. The largest tree has large areas of peeling bark and cavities for roosting.
Large super-canopy dead ash tree. The roosting habitat in this tree is not apparent until viewed from below. Looking at trees from all angles is important in determining the quality of the roosting habitat.
When roosting habitat is located only on the branches, the branches must be at least 8 inches in diameter at the location of the habitat. The blue arrows in the photo show areas that may offer maternity roosting habitat. The red arrows show areas of peeling bark that would most likely not be used because of the small diameter of the branch.
Two large super-canopy trees with numerous areas of peeling bark that could support a maternity colony located on larger limbs.
Example of another large dead ash super-canopy tree.
Large dying silver maple that offers several areas of peeling bark with varying levels of solar exposure.
Appendix C
Bat Assessment Guidelines for Bridges/Structures and ODOT Bridge Inspection Form
APPENDIX D: Bridge/Structure Assessment Guidance

Federal Transportation Agency/State Department of Transportation (DOT)
Preliminary Bat Assessment Guidelines for Bridges/Structures

DOT Environmental Division
Adapted from the Indiana Department of Transportation 2010 Bridge Inspection Manual and the Bernardin, Lochmueller and Associates 2007 document.

The guidelines in this document describe favorable characteristics of bridges/structures that may provide habitat for many bat species and preliminary indicators intended to determine if any bat species are using bridges/structures. Negative surveys are considered valid for two years.

Individuals conducting reviews for bats must use the Bridge Assessment Form and must include a copy of the completed form in their project file. Individuals assessing bridges/structures should employ appropriate safety measures in conducting these reviews and avoid touching any bats. Recommended equipment include a flashlight (preferably a headlamp), hard hat, binoculars or spotting scope, digital camera, check list and a fine- to medium-point permanent marker or pen. It is advisable that individuals also consider having a dust mask, cellular phone, and boots if access beneath structures is desired. Easily removed, protective coveralls may be advisable if access requires crawling.

Favorable Characteristics

Cracks in Concrete

Cracks in the concrete are used by bats as a foothold in roosting (Photo 1). In addition, some bats may be hidden from sight in wider cracks in the concrete and behind deteriorating concrete sections in the ceiling or walls. Look for cracking along support beams and inner walls especially below a fillet (a concrete filling between ceiling and vertical beam). During inspection, sounds may be heard coming from behind such cracks and/or expansion joints.

Expansion Joints (Bridges)

Expansion joints can provide protected cover for bats (Photos 2 and 5), but do not always provide habitat, depending upon whether they are obstructed by road debris or other blockages. If possible during the assessment, individuals should use a flashlight to look into expansion joints or cracks. Guano may be present under joints if being used by bats (Photos 7 and 8).

Cave-like Environment

While assessing bridges or structures, look for dark environments that mimic cave-like conditions such as under the deck in the case of a bridge (Photos 12 and 13) or an attic in the case of a structure. This may involve crawling under low areas so a hard hat is recommended. Such places (e.g., a concrete bunker secreted into a hillside with an open front) provide protection from wind, rain, sleet, hail and predators. Bats do not roost near the ground where predators (cats, raccoons, etc.) can reach them. Roosting is usually at least 4 ft. from the ground.

Last Revised May 4, 2017
Large Rivers in Wide Floodplains (Bridges)

Many concrete bridges that span larger rivers in wide floodplains offer excellent areas for roosting. These areas tend to have an ample food supply and may also serve as historic flyways for bats during migration (i.e., March-May and September-November). These bridges may also offer opportunities for mating in late fall.

Preliminary Indicators of Bat Presence

The four indicators presented here document physical observations that can easily be made for individual structures. Each of these indicators should be considered on its own merits and the presence of even one of these on a bridge is enough documentation to confirm bat usage. If questions arise regarding interpretation of these indicators, individuals should contact the District Environmental Manager for clarification or assistance. (NOTE: Some of these indicators, visual and sound, will not be present during normal hibernation periods, as bats do not usually hibernate under bridges. Hibernation usually occurs between September and May, but contact your local USFWS Field Office for exact dates.)

Visual

Day: Look for bats flying or roosting (hanging) during the assessment (Photo 1, 2, & 8). A flashlight or headlamp will be needed and binoculars may be necessary when viewing higher areas. If bats are present; record numbers as best as possible and their locations. Note any dead or injured bats. A sketch map would be helpful (use bridge plan sheet as base for sketch).

Night: Thermal infrared cameras or emergence surveys can also be used to document bat use. Use of presence/absence summer surveys (i.e., mist-netting or acoustics) may also be used if the following apply:

- A presence/absence summer survey is already necessary because there will be tree removal associated with the project. The results of the presence/absence summer survey for a nearby project is not sufficient. The survey should be specific for the project in question.
- Survey points over water/edge of water (if there is a small stream) should be incorporated in the study plan.
- Survey points should be identified based on the habitat on-site. If no point is within 0.25 miles of a bridge, an additional level-of-effort is necessary. Either add a survey point within 0.25 miles, or conduct one of the previous mentioned techniques (bridge inspection, emergence survey\(^1\), thermal infrared cameras).
- The Service Field Office will review and approve the survey scope of work.
- If the bridge is within a known maternity colony home range, a bridge assessment is required.

Sound

Listen for high pitched squeaking or chirping during the assessment and identify location(s) for later examination by DOT staff. This may be helpful in locating bats within deep cracks or open joints. A sketch map would be helpful.

\(^1\) The range-wide Indiana bat summer survey guidelines provide details on how to conduct an emergence survey.

Last Revised May 4, 2017
Droppings (Guano)

Bat droppings are small (mouse-like in appearance but less regular) brown or black pellets (Photos 6 - 8). Older droppings may be gray in color. These droppings will accumulate on the ground, floor of a covered bridge or on structural components below where bats roost. Droppings may also adhere to support beams and walls below roosts.

Note bat droppings and their location. Check under likely roosting spots such as cracks, cave-like areas, and expansion joints. If guano is present, the inspector may wish to wear a dust mask. Also, it is advisable to wear rubber boots to minimize tracking of any guano into vehicle(s) and other places.

Staining

Stains may appear wet and are usually found in dark places. Look for four to six inch wide dark stains located on concrete support beams and walls immediately below the ceiling of the bridge, and beneath joints (Photos 8 - 11).

Literature Cited


Images of Favorable Characteristics and Preliminary Indicators of Bat Presence

Photo 1: Bats hanging from cracks along support beams

Photo 2: Visible bats within an expansion joint

Photo 3: Example of open concrete joint used by bats

Photo 4: Guano deposits visible from bridge deck, on top of pier

Photo 5: Guano deposit on pier, obscuring structural features.

Photo 6: Bat Guano on Riprap

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Photo 7: Staining along longitudinal joint. Guano deposits on the ground.

Photo 8: Staining on underside of expansion joint from bat use.

Photo 9: Staining on sides of pier caps

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Photo 10: Guano staining on side of pier

Photo 11: Bats roosting & associated staining

Photo 12 and 13: Bridge design mimicking “cave-like” atmosphere

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Photo 14: NLEBs roosting under a timber decked bridge
### Project C-R-S: R

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<tr>
<th>ODOT PID:</th>
<th>Date of Inspection:</th>
<th>Waterbody:</th>
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<tbody>
<tr>
<td>Structure C-R-S:</td>
<td>Inspector(s):</td>
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#### Factors Affecting Habitat Suitability for Bats (Check all that apply)

- [ ] Bridge shows signs of frequent flooding (flood debris trapped under the deck in the substructure)
- [ ] Human disturbance or traffic under the bridge. Indicate Intensity:  
  - [ ] High
  - [ ] Medium
  - [ ] Low
- [ ] Lack of quality flight corridor upstream and downstream of bridge (densely vegetated, obstructed, or lacking any riparian corridor)
- [ ] Other (describe):

#### Areas Associated with the Bridge and Inspected (Check all that apply)

- [ ] The underside of the bridge does not contain any areas that could be used for roosting bats
- [ ] All vertical crevices sealed at the top, 0.5-1.25” wide, and ≥4” deep
- [ ] All crevices >12” deep & not sealed
- [ ] All guardrails
- [ ] All expansion joints
- [ ] Spaces between concrete end walls and the bridge deck
- [ ] Crevices, rough surfaces or imperfections in concrete
- [ ] Bird nests
- [ ] Other suitable areas (describe):

#### Results of Observations for Bats (Check all that apply)

- [ ] Bats visually observed - Bats flying or roosting.
- [ ] Sounds - High pitched squeaking or chirping. Note location.
- [ ] Droppings/Guano - Small (mouse-like in appearance but less regular) brown or black pellets (older droppings may be gray). Will accumulate on the ground, floor of a covered bridge or on structural components below where bats roost. Droppings may also adhere to support beams and walls below roosts.
- [ ] Staining from bat urine – Urine stains may appear wet and are usually found in dark places. Look for four to six inch wide dark stains located on concrete support beams and walls immediately below the ceiling of the bridge, and beneath joints. Do not include staining resulting from water and roadway runoff.
- [ ] Other evidence (describe):

#### Additional Notes (e.g., number & species of bats, if known):