

## **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<sup>1</sup>, 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.

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<sup>1</sup> 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**

Bernardin, Lochmueller, and Associates, Inc. 2007. Bridge Inspection Checklist for Bats. Unpublished. Evansville, Indiana.

Indiana Department of Transportation (INDOT). 2012. INDOT Bridge Inspection Manual. Indiana. Available at:  
[http://www.in.gov/dot/div/contracts/standards/bridge/inspector\\_manual/index.htm](http://www.in.gov/dot/div/contracts/standards/bridge/inspector_manual/index.htm).

Keeley, Brian W. and Merlin D. Tuttle. 1999. Bats in American Bridges. Bat Conservation International, Inc., Austin, TX. Resource Publication No. 4, 41 pp.

## 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

Last Revised May 4, 2017



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



Photo 10: Guano staining on side of pier



Photo 11: Bats roosting & associated staining



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

Last Revised May 4, 2017



Photo 14: NLEBs roosting under a timber decked bridge