

APPENDIX B: Bridge Inspection Guidance

FHWA/State DOT/FRA

Preliminary Bat Inspection 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.

Individuals conducting reviews for bats must use the Bridge Inspection Form and must include a copy of the completed form in their project file. Individuals inspecting 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 3), but do not always provide habitat, depending upon whether they are obstructed by road debris or other blockages to use. If possible during inspection, individuals should look into expansion joints or in other cracks with a flashlight. If joints are used by bats, often there will be guano under the joints (Photos 4-6), but not always, since the joint may be located over water.

Cave-like Environment

While inspecting 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 feet from the ground.

Large Rivers in Wide Floodplains (Bridges)

Many concrete bridges that span larger rivers in wide floodplains offer excellent areas for roosting, although bats are not restricted to using these sites. 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 hibernate under bridges. Hibernation usually occurs between September and May, but contact your local USFWS Field Office for exact dates.)

Visual

Look for bats flying or roosting (hanging) during inspection (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 (can use bridge plan sheet as base for sketch).

Sound

Listen for high pitched squeaking or chirping during inspection 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.

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).

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Literature Cited

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 Unpublished.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

Indiana Department of Transportation. 2012. INDOT Bridge Inspection Manual. Indiana. Available from: 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.

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Photos *



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. Note 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

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Photo 12 and 13: Bridge Design Mimicking “Cave-like” Atmosphere



Photo 14: NLEBs Roosting Under a Timber Decked Bridge

* Photos courtesy of Tom Cervone, Bernardin, Lochmueller and Associates, Jeff Gore, Florida Fish and Wildlife Conservation Commission, Rick Reynolds, Virginia Department of Game and Inland Fisheries, and Kraig McPeck, U.S. Fish & Wildlife Service.