

# **BAT SURVEY PROTOCOL<sup>1</sup>**

## **FOR ASSESSING USE OF POTENTIAL HIBERNACULA**

### **RATIONALE**

A typical cave or mine portal survey is an attempt to determine presence or probable absence of the species; it does not provide sufficient data to determine population size or structure. Following these guidelines will standardize procedures for bat surveys at caves and mine portals. Although the capture of Indiana bats confirms their presence, failure to catch Indiana bats does not absolutely confirm their absence. If one or more Indiana bats should be captured at a particular site, subsequent surveys may be necessary before one can confidently conclude the feature is being used as a hibernaculum.

### **ASSESSING SUITABILITY OF CAVES/ABANDONED MINES FOR BAT SURVEYS**

In general, a cave or portal opening can be dismissed from bat surveys (i.e., they are not suitable) if the following conditions apply:

- There is only one horizontal opening less than 6 inches in diameter and no or very little airflow is detectable,
- It is a vertical shaft <1 foot in diameter,
- A horizontal passage continues for <50 feet and terminates with no fissures that bats can access.
- The opening/passage shows evidence of frequent and/or complete flooding, has collapsed completely shut, or is otherwise inaccessible to bats.
- It is a “new” opening, which has occurred recently (less than 1 year old) due to subsidence.

### **SAMPLING DATES, TIMES AND TEMPERATURE CRITERIA**

- Spring sampling should be conducted from 1 April through 1 May (may vary geographically). Prior to the survey, check with the Service Field Office responsible for the State in which your project is located for any variations from these dates.
- Fall sampling should be conducted from 1 September through 15 October.
- The sampling period should begin ½ hour before sunset and continue for at least 5 hours.
- Weather must provide for:
  1. Temperatures  $\geq 50^{\circ}\text{F}$  ( $10^{\circ}\text{C}$ ) for at least the first 2 hours of sampling and must not fall below  $35^{\circ}\text{F}$  ( $1.7^{\circ}\text{C}$ ) before the end of the first 5 hours of sampling.
  2. At least 3 hours of the survey period must be free of heavy rain.
- Sampling will be conducted on two different evenings (does not have to be consecutive). If no bat captures (of any species) occur and no bat activity is noted with a bat detector on the first evening during acceptable weather conditions, sampling can be suspended for the site.
- The shining of lights, and noise will be kept to a minimum with no smoking around the sample site. The use of radios, campfires, running vehicles, punk sticks, citronella candles and other disturbances will not be permitted within 300 feet of site during surveys.
- Before conducting surveys, local residents and/or law enforcement agencies should be informed

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<sup>1</sup> Adapted from the protocol used by the Pennsylvania Game Commission

of the scheduled nighttime activities.

## **EQUIPMENT**

*No equipment, litter or other debris will be left unattended at site that could result in the capture or entanglement of any animals. Any equipment stored at site between sampling sessions should be clearly labeled with contact information.*

Harp Traps (first choice): Place in front of opening and block surrounding space with plastic sheeting or bird netting. Traps should be tended at least once per hour. When the catch rate is high (>25 bats per hour) or during inclement weather, traps should be tended more frequently.

Mist Nets (second choice): 50 denier, 38mm mesh. Place in front or around openings that can not be harp trapped. Nets need to be monitored closely and checked at least once every 10 minutes. At sites with a heavy bat swarm, the net should be monitored continuously.

Bat Detector: In addition to the harp trap or mist nets, an ultrasonic bat detector should be on site to periodically monitor general bat activity and to assess the general effectiveness of the harp trap or mist net placement.

Alternative Monitoring Techniques: In situations where cave/mine entrances can not be safely/effectively trapped or netted, bat detectors (e.g., heterodyne or AnaBat) and/or night-vision/infrared/thermal-imaging recording devices should be used to monitor and record bat activity to determine bat use of the site. Bat activity in or around the entrance can be monitored by counting bat passes with a bat detector, or night vision/infrared video tapes can be recorded to provide actual counts of bats entering and exiting the opening. As with trapping, monitoring should be conducted for 5 hours. Reporting format will be: Start and end time for 1-hour sample period and bat passes for that hour. If a bat detector is used to monitor a cave/mine entrance, the biologist should 1) manually operate a tunable detector to quantify the amount of bat activity (i.e., tally # of bat passes/hour for 5 hours) at the cave entrance, 2) write down the peak frequency associated with each bat pass, and 3) take field notes describing the bat activity throughout the 5-hour sampling period (e.g., are bats entering and/or exiting the entrance, just passing by etc...).

If alternative monitoring techniques are needed to complete a survey, these should be coordinated with the Service's Field Office in that state on a case-by-case basis prior to being employed.

## **CAPTURED BATS**

Standard measurements should be taken and recorded for all captured bat species. Photo documentation of Indiana bats is also encouraged.

Fecal Samples: Fecal samples should be collected from Indiana bats (and other species as time allows), clearly labeled, placed within separate Ziploc bags, and stored on ice or in a freezer.

Banding of *M.sodalis*: To identify recaptured bats, a single, uniquely numbered/embossed band (preferably celluloid/plastic) of a high-contrast color (e.g., white) should be placed on the right forearm of each male and the left forearm of each female Indiana bat. If many bats are captured at one time, it is acceptable to only band a subset of the individuals to avoid having to hold them for a long period of time. Please use your best professional judgment.