

## **Using Acoustic Surveys to Monitor Population Trends in Bats**

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Bat populations are potentially being impacted by 2 relatively recent sources of mortality: White Nose Syndrome (WNS) and wind energy development. While it is often easy for us to document the mortality of these 2 factors at a particular site, the impact of these sources of mortality on bat populations is currently unknown. For example, a large number of bats are dying from WNS at affected hibernacula, but it is unknown if some bats are leaving the hibernacula and dying in the surrounding landscape or if the bats are relocating to other sites and surviving until typical emergence. Additionally, since researchers are not aware of all bat hibernacula we cannot assess the impacts to all hibernating bats from a population perspective. In the case of wind turbine mortality, we can estimate the number of bats killed but we have, at best, a poor idea of population size and the ability of these populations to sustain this rate of mortality. Therefore, in addition to hibernacula surveys and post construction mortality surveys at wind-power sites, we need a supporting method to assess the impacts to multiple species on a broad geographic scale.

Several techniques can provide useful data on bats during the maternity season. Exit counts at maternity roosts can provide information on local level and assessment of reproductive conditions of bats can determine the impacts on reproductive rate. However, these techniques are focused on sites that can be effectively counted or on species that can be captured at roost sites.

Recording of echolocation calls of bats as the researcher moves along a transect has been commonly used in Europe to monitor bat populations. Ultrasonic detectors are a cost effective method for monitoring multiple bat species at large spatial scales. A framework for the use of this technique includes the following points:

1. The transect (an example map is attached)
  - a. should be ~ 30 miles long along a path that minimizes sampling the same stretches of road (1 way straight line movement).
  - b. should be safe to drive the transect at 20 mph
  - c. should pass through common habitat types of the area
  - d. should minimize the amount of time spent driving on roads with small forested corridors.
  - e. should be easily sampled in successive years
  - f. These are simply guidelines. If you cannot come up with a transect that is 30 miles long then use a shorter version.
2. Sampling
  - a. Any type of bat detector that allows for recording of echolocation calls can be used (except time expansion systems). The important thing is that the same type of detector is used whenever a transect is sampled.
  - b. Sampling should be done during the time when bats are on their maternity range. To exclude most of the migrants, the period of June 1 to July 15 is probably a pretty good guide.
  - c. Monitoring should only be conducted on nights that are suitable for bat activity (low wind, no rain/fog, suitable temperatures for bat activity)

- d. The bat detector should be placed on the roof of the vehicle pointed straight up.
- e. Sampling should be initiated 30 minutes after sunset
- f. The transect should be sampled a minimum of 1 – 3 times throughout the summer. If you are going to sample a site multiple times then it is best to spread out sampling throughout the maternity season
- g. If possible, it is advisable to use a computer attached to a GPS unit to mark the location when the recording is being conducted. Alternatively, you can mark the transect with a GPS when you are not sampling. Each transect should be marked with a GPS point for the start and end points and an associated map with the route marked. Basically, we need to have some record of the route.
- h. An example datasheet is attached.
- i. Sensitivity of the detector should be ~ 7 for Anabat. If possible it is always a good idea to calibrate the equipment to make sure that it is functioning properly.

This document was written for people that are already familiar with their acoustic equipment. People that are not familiar with the technology should seek guidance from knowledgeable people in their area.

We are also looking for people interested in coordinating this project in their state. If you would like to help organize the effort in your state, please let me know.

Data can then be downloaded and sent to me at:

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**ACOUSTIC TRANSECT DATASHEET**

**Investigator Name(s):** \_\_\_\_\_

**County:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Anabat ZCAIM #** \_\_\_\_\_ **Transect Code or #**  
 (ex. KY-Scott Co.-1) \_\_\_\_\_

**Start lat/long (decimal degrees):**       N   \_\_\_\_\_   E   \_\_\_\_\_

**End lat/long (decimal degrees):**       N   \_\_\_\_\_   E   \_\_\_\_\_

	<b>Time</b>	<b>Temp. (F)</b>	<b>Wind Speed</b>	<b>Moon Visible?</b>	<b>% Cloud Cover</b>	<b>Moon Phase</b>		
<b>Start Survey:</b>						<b>new</b>		<b>3/4</b>
<b>End Survey:</b>						<b>1/4</b>		<b>full</b>
						<b>1/2</b>		

**Comments (ex. high insect noise, lots of traffic, break in sampling, etc):**

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**Please attach map with any corrections/additions/comments**

## Example transect route

