



Indiana Bat, FW3 <indiana\_bat@fws.gov>

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## comments for draft Indiana bat protocol

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**Cori Lausen** <corilausen@birchdalebc.ca>

Mon, Mar 11, 2013 at 5:32 PM

To: indiana\_bat@fws.gov

Please find attached my comments for the Draft Indiana bat protocol.

Thank you.

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**Indiana Bat protocol response Lausen.pdf**

313K

Re: Response to 'Draft Revised Rangewide Indiana Bat Summer Survey Guidelines'

From: Dr. Cori Lausen, Birchdale Ecological Ltd.; [info@batsRus.ca](mailto:info@batsRus.ca)

Comments:

Many of my broader scale comments have been incorporated into a document already submitted by Virgil Brack, but this review provides a more detailed response that will hopefully aid in the production of a more effective protocol.

Details of Review:

**Page 11.** Re: "directional microphones". Please note that a directional microphone, by its very nature tends to be placed against an 'edge'. In this way it points out towards an opening/clearing where bats may fly ("fly-way"). However, such a placement means that the best quality (strong) recordings are from bats that are closest to the detector, and by default are closest to the edge habitat. It is well known that bats near a vegetative edge such as a treeline produce high clutter types of calls, calls that make species identification extremely difficult; eg. in the case of *M. sodalis* vs *M. lucifugus*, both species will produce the same shape and frequency of pulses in high clutter situations. With a directional microphone placed along an edge, the weakest bat calls recorded are those the furthest from the microphone, which could be in the middle of the flyway where the low clutter environment exists.

Omnidirectional microphones on the other hand, allow placement of the microphone in the middle of the flyway/clearing (and often boosted well off of the ground, increasing the overall 3 volume of detection). As with any bat detector, the strongest calls (ie. best quality) will generally be those from bats that pass closest to the microphone; but these will be from bats flying down the centre of the flyway, where they are further from edge habitat and more likely to be producing low clutter pulse shapes. It is well known that low clutter calls have a higher likelihood of being identifiable to species. E.g. *M. lucifugus* tends to produce low-sloped pulses in low clutter situations, a pulse shape that *M. sodalis* does not have in its repertoire, even in low clutter situations. With an omnidirectional microphone, the weakest calls recorded will be those furthest from the microphone, which are likely to be those along the edge of the flyway, where bats are near edge and reacting to the vegetation with high clutter calls; calls that even if recorded in high quality (ie. Loud), would often not enable species identification.

One concern that I'd address at this time has to do with the belief that the placement of a microphone in the middle of a flyway on a tall pole may be seen as a novel object that can cause a bat to produce high clutter calls during its investigation of the object. While this is occasionally seen, generally the openness of the recording environment allows the capture of the low clutter calls of the species prior to this investigation, and often as the bat leaves the object as well. Those low clutter calls increase the likelihood of species differentiation, even with automated ID, provided that the automated identification program is sufficiently trained to recognize such a 'search, approach, search' pattern and

use search phase calls for identification. The alternative placement for a microphone would be to place it against or amongst clutter, but such a placement increases the likelihood that high clutter calls are produced by bats.

**Page 12.** Re: verifying proper functioning of equipment. While a finger rub will enable this verification on Anabats, SM2BAT detectors need to be verified using their calibrator. This is necessary because a finger rub cannot easily be heard, in many cases is not recorded depending on filters employed and format of recording, nor is this a guarantee that the microphone is functioning *well*.

Just because an Anabat started off working (with a finger rub) does not guarantee that it continued to work. However, SD2 detectors include a Log folder and status file of everything that happens to a detector including the pushing of any buttons, any timer functions, recording events, power downs, etc. It would be a good idea to encourage folks to be sure to save these Log folders (not done automatically in earlier versions of CFCread), and of course to not delete the status file. One can then determine that the detector was functioning. The finger rub will ensure that the mic was attached to the detector at the start of the session and that it was capable of recording sound. On an Sm2Bat however, the approach is different. A calibrator should be used to determine the mic is attached to the detector and that the mic is in fact working well (within specs). There is a Sensor file produced by the Sm2BAT that should be saved as it can provide proof that the detector was running during the entire recording period. If there was down time, such as loss of power, this sensor file will show the 'down periods'.

To make your protocol more robust for use with detectors other than Anabats, this section on verification should be expanded.

**Page 12.** Last paragraph. It is critical that you define your definition of "call". Here it is not clear if you mean "pass" where the word "call" has been used. Because of the confusion that often exists between 'call' vs 'pass' (likely due to the word *call* meaning something different to bat vs. bird biologists), a definition here would be important to making sure your recommendations are understood.

**Page 12.** Last paragraph. Requiring a blanket 40% of all recorded bat 'calls' (passes?) be identified to species level could be problematic. Site specific issues will dictate when ID to species level is possible or even advised. In a low clutter recording scenario, it is reasonable to assume species differentiation among myotis, but not so in a high clutter recording scenario. Unfortunately, the autoID program does not know in what level of clutter you were recording. As such, you will be forcing it to do species identification, and many myotis could be identified as long-eared myotis, or of course, *M. lucifugus* could be called *M. sodalis*. Ideally, an automated identification programs would allow a level of clutter to be entered as a 'covariate', such that in the highest levels of clutter these software restricted identifications to "Myotis", but for low clutter recordings an attempt would be made to differentiate Myotis species. The automated identification program recommended in this protocol does not have this ability, and will in all cases of good quality recordings (ie. Loud; bat passed close enough to detector) attempt species identification. High quality (ie. Loud) recordings of *M. lucifugus* may very well be identified as *M. sodalis* if the clutter was high. This would be considered within the 40% of the passes being identified to species and thus could be deemed as a suitable spot. My main point here is that

high clutter sites that result in difficult species identification do not necessarily produce poor quality recordings (keeping a certain distance from reflective surfaces as outlined in the protocol will of course minimize echoes) and will thus likely receive some form of species label in autoidentification; whether this species label is accurate, however, is a completely different question. If acoustics is a tool that this protocol wishes to employ to tell two species apart who can only be acoustically differentiated in low clutter recording situations, then it will require an autoID program that can be made 'clutter-aware' to make wiser decisions about when to attempt species differentiation and when to pool species together.

**Page 15.** First sentence, a rewording is highly recommended (in italics): "If acoustic surveys *produce no recordings that could be* Indiana bats...".

**Page 17.** Re: personnel. I suggest rewording: "Enough personnel must be on site to ensure all nets can be checked every 10 min", rather than implying a single biologist is to be able to make these rounds among the nets.

**Page 17.** Equipment. I would like to point out an error: the finest mist net on the market is single ply, not 2 ply: e.g. [http://www.avinet.com/avi\\_order.taf?function=view&ct\\_id=19](http://www.avinet.com/avi_order.taf?function=view&ct_id=19) these nets are made by from Ecotone.

**Page 18.** Because bats will learn that mistnets are deployed in an area continuing to net in subsequent nights has shown diminishing capture returns. As such, all effort should be made to deploy many nets at once with the appropriate number of personnel to manage them in an area. Returning to that area each time from that point on is likely to yield diminishing returns, and this should be clearly noted in this protocol so that appropriate decisions can be made.

**Page 21.** 3<sup>rd</sup> sentence of Checking nets section. I highly recommend the insertion of the following (in italics): "monitoring the net set-up continuously with a bat detector (*using ear phones to avoid alerting bats*) can be beneficial".

**Page 22.** 5<sup>th</sup> paragraph. "Several species of bats from the genus....". This sentence is absolutely critical to understanding the role that acoustics can/should play in this protocol. This statement should appear additionally in the Acoustics Section of this protocol!

**Page 22.** Wildlife Genetics International in Nelson, BC asks folks to lightly rub a toothpick over a bat guano pellet, then place it in an envelope. This has allowed many bats and roosts to be identified to species. If there is concern about the identification of these bats in hand, seems like it might be wise to require folks to conduct this process on a suspected *M. sodalis*. The small price to have this sample genetically sequenced to species should be irrelevant to the entire cost of the mistnetting survey itself. A lab in Alberta also has preliminary results to suggest that rubbing swabs across the wings with enough pressure to acquire epithelial cells works to identify species through sequencing also. One of these non-invasive genetic sampling techniques seems like it should be part of this protocol. Even if there is some failure rate in being able to amplify enough DNA from some samples, depending on how they have been stored, it is a low budget item (e.g. toothpick and coin envelope) and takes only a few seconds of time to acquire.

**Page 22 and 27.** I would like to go on record of being concerned that you are forcing biologists to place radiotransmitters onto bats before their real body weight is known. This will require that you guess at the weight. Keeping a bat in a cloth bag for an additional 30 minutes in my opinion is far less detrimental to an animal than overestimating its weight and forcing it to forage and avoid predation for several weeks with a transmitter that is heavier than what has been recommended. I am also concerned that the protocol states a maximum of 10% of the bat's body mass for transmitter weight. Kurta and Murray (2002) is the reference provided here, and the transmitters they use were a mean of 8%, which is already 3% higher than has been tested (e.g. Hickey 1992, Neubaum et al. 2005). I would strongly discourage this leap to allowing up to 10% in a protocol, as the impact of using this weight of transmitter has not been formally tested. By sticking to the 5% rule, it is likely that some will exceed this, especially because the real mass of the bat will likely be unknown (due to using too short of holding times), but at least the calculations and estimations will be aiming for 5%. If one has the leeway to use up to 10%, then there is a greater chance that this maximum will be exceeded unknowingly.

**Page 23.** Age of animal is being assessed, but only Adult vs Juvenile it seems. I propose that you consider a scale for toothwear so that relative age can be deduced. E.g. Such a scale is being used in western Canada with canine teeth worn to less than  $2/3^{\text{rd}}$  of the tooth remaining as the 'oldest category' on a scale of 1 – 7. It seems to me that with a long lived mammal we should want to know more about the age structure of our populations than just Adults vs Juveniles. It takes just a few seconds with a magnifying loupe in front of the bat's mouth to do this.