**Response to Reviewer Comments**

Thanks so much for your detailed reviews and for the opportunity to revise the draft of the Final Report. Minor comments (e.g. typos) were directly addressed/fixed within the text and not here. Responses to more detailed comments are as follows:

**Comments by Richard Bostwick**

Request to restructure the narrative to directly follow the project Tasks, which we have done. We had chosen the initial format based on the formatting of previous NETC reports and based on the traditional structure of many reports and papers (Introduction, Methods, Results, and Discussion). In the process of restructuring, we removed the section numbering because the headers became confusing, e.g. Task 1 was part of section 2.

**Page 5. 2.5 Effects of Roads.**

**This section is written slightly differently than the topic objective. The topic is “Use of Forested Habitat adjacent to Highways by Northern Long-eared Bats”. This section deals with the mostly negative effects of roads. Given that most readers will get their information out of Sections 2, 3, and 5, these are important sections. There is some overlap- direct mortality, movement barrier, and chemical pollution do not speak to the use of adjacent habitat by bats. Being a movement barrier does not indicate how the adjacent habitat is used. Do they fly parallel to the highway and not over it? Does that indicate a high use of adjacent habitat by NLEB? Noise and light affects would be an indicator of adverse effects a highway would have that may affect the use of adjacent habitats by bats, NLEB in particular. I don’t deny that there are effects from roads, I don’t think it was the objective.**

We respectfully disagree. While we note the emphasis here on the word "adjacent" and that the overall objective of the project wasn't directly about roads but rather forested habitat *adjacent* to roads, this distinction is incredibly hard to disentangle. Moreover, there is exceedingly little information that focuses solely on bats and forested habitat adjacent to highways. Rather than narrowly focusing on one aspect of roads, we took a broad approach and summarized all available literature that we could find on roads and bats. Roads themselves can have direct or indirect effects on bats and nearly all related bat research has focused on road effects and not other factors such as adjacent habitat use. We appreciate your larger concern of all this emphasis on roads negatively affecting bats. As we mention below, without detailed studies on NLEBs specifically, it is exceedingly difficult to make conclusions about the direct or indirect effects of roads on their behaviors or distributions. We have now added this caveat and have also added text about how roads may be beneficial to bats. Much of this information about road effects is simply unknown; current data do not allow for strong conclusions about how roads are affecting bats although some data are suggestive as to potential effects. We know of no study that focused on habitat *adjacent* to highways so this section would be quite short without these findings from broader studies.

**Page 8 Table 1. Should DOTs be data sources as well?**

We regretfully omitted some of the DOT contributors of detection data. DOT contributors have now been added to the table.

**Page 8 Figure 5. Explain level of highway classifications used.**

The following text was added to Figure 5: “Highway data were downloaded from the U.S. Department of Transportation. Of the National Highway GIS dataset, the roads included in analysis (per USDOT descriptors) were interstates, principal arterials (freeways and other), minor arterials, major collectors, and minor collectors.”

**The summary uses the data in section 2, but not easy to go back and forth with Sect 2. Last sentence in first paragraph does state the objective of the proposed research. I think the way it is organized; the report and summary do not speak fully to the objective as strong conclusions are drawn from 2 but section 2 is not always definitive. An example: It was not clear where the statement that ‘highways with heavy traffic and noise are rarely used by bats.” It was a strong statement I didn’t feel was really supported. That could be a key finding for the objective.**

We agree that the statement above is not well supported by the data and have removed it. We didn’t find other examples of strong conclusions drawn from section 2 however. Much of the wording in the summary is couched with words such as “may” and “can” because without detailed studies on NLEBs specifically, it is exceedingly difficult to make conclusions about the direct or indirect effects of roads on their distributions. As this is a Summary, we limited our use of references that had already been cited previously in the text.

**It could use some definition of stressors. For instance, there was no indication of what heavy traffic is defined by. Heavy traffic is not a term of art and may vary as urbanized areas may have 10,000 to 40, 000+ VPD, which would be rare in a rural state like Maine.**

Sentence removed.

**Maybe imbedded in the overall summary is that there is still not enough known to predict if adjacent habitat and right of ways are used any differently by NLEB. There is some evidence that noise and traffic ware limiting factors. When this was put together, the goal was to see if the habitat next to highways was disturbed or altered enough so that NLEB were not likely to be use the habitat and not likely to be affected. This is suggesting that there is not a lot of cohesive research on habitat use and stressor tolerance, as there is still not enough data available in the literature to be able to answer this question. There were recommendations more data is needed to better get a handle on this that is a good recommendation to state.**

Good suggestion, we have added text that includes recommendations about future research that is needed. We had recommended “Experimental or observational studies of NLEB behavior near roads” but your phrasing is more explicit and helpful. At the same time, it seems likely to us that these recommendations are more likely to be applied to research on other bat species than NLEBs due to their exceedingly small population sizes in New England.

**Comments from Amanda Saul and MA DOT**

The Department of Transpiration typo for Amanda’s affiliation is among the funniest I've seen in a long while.

**Amanda Saul comment on Figure 3. Assuming that these show the landuse/water/roads in relation to the known NLEB hits, would it make sense to overlay the presence data on these?**

We tried the format you suggested but it was hard to see the details so in the end we kept these as features on separate maps.

**MA DOT comment on Figure 7. Out of curiosity, who (what company/agency) reported NLEB being present in the Worcester area?**

That NLEB detection was part of a larger data set given to us by Susi von Oettingen (USFWS) from a Massachusetts Department of Transportation acoustic study from VHB consulting. The call was relatively poor quality and thus could be disputed but satisfied the qualifications for a presence for our study.

**Amanda Saul comment on Figure 8. I understand this is based on a grid, but is there some note that can be added to explain the data points out in the water?**

We agree that points in the water appears to be a glitch. Bat occupancy was estimated at the spatial knots and the grid for the knots needed to be larger than the study to avoid edge-effects in the spatial model. The only option to avoid edge effects is for some knots to be in the ocean. The visual is odd but the occupancy at the knot does not take into account the landscape directly beneath the knot, but rather the landscape features at our data and distances from our data to the knots. We now note this in the text.

**Amanda Saul comment on page 19 referring to our sentence on "Highest occupancy rates occurred in northeastern Maine..." with the question "Is there any correlation between occupancy and sampling effort? Is there a way to normalize it, thinking that some states sampled more than others?"**

The model already accounts for uneven sampling, such that areas with many samples will be weighted more than those with few samples. That is precisely why the northeast Maine predictions are high -- about half of the sampled sites had MYSE detections. Whereas, southeast Maine had much lower predictions of occupancy because a ton of sites were surveyed and only a few had detections.

**Comments by Glenn Gingras**

**Page 1. “Would an executive summary be helpful to readers?”**

We feel that the first two sections of the Introduction, Project Context and Project Objectives and Overview serve the purpose of an Executive Summary.

**Page 19. "Is the model that you used going to be distributed so that it can be used? Is it used in standard ARC GIS platforms?"**

This model will be fully detailed in our manuscript that will be submitted for publication shortly. Due to issues with MOU restrictions with some of the data, we cannot provide the full dataset. Also because of its formatting and computational needs, the model is not suitable for ArcGIS platforms. However, in the folder entitled NETC\_Share\_Raster we provide model outputs that are directly viewable in ArcGIS.