Review of: "Listening to the Bats of Carajás: Applied Bioacoustics for Species Inventory and Environmental Use in a Mosaic of Forests, Savannas, and Industrial Mining in the Brazilian Amazonia"

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Potential competing interests: No potential competing interests to declare.

General Comments

Abstract:

The abstract does a good job summarizing the study, its goals, and key outcomes. However, it could be even stronger by mentioning the significance of finding "11 new species," which would highlight the study's novelty. Adding a sentence about how bioacoustics can be used in broader environmental monitoring would also increase its overall impact.

Introduction:

The introduction is well-structured and clearly explains the importance of bats in ecosystems, their role as indicators of environmental health, and how bioacoustics can be used for species monitoring. It also lays out the challenges in areas like Carajás, where biodiversity and mining pressures coexist.

What's great:

The use of bioacoustics is backed by strong prior research.

The reasoning for focusing on Carajás is well-justified and compelling.

What could be improved:

The introduction would be more impactful if it talked about how the findings could apply to other mining regions or areas facing similar environmental pressures earlier on.

A clearer research question or hypothesis would give the study more direction. Right now, it feels more exploratory, and explicitly stating a hypothesis would help focus the study.

Methods:

The methods section is detailed, particularly in explaining how the bat echolocation recordings were collected using Audiomoths and analyzed. It's great that statistical techniques like discriminant function analysis and species richness estimators were used.

What's great:

The multi-year sampling across several campaigns gives the study solid depth.

The use of statistical models and discriminant analysis adds rigor to the findings.

What could be improved:

While Audiomoths are a good choice, explaining why they were chosen over other devices would add more depth, especially considering the pros and cons of using them in various environments.

The study could benefit from discussing external environmental factors (like weather or noise) that may have influenced the recordings, ensuring the results are more robust.

Results:

The results section does a good job of presenting the richness of species found, acoustic analysis, and environmental comparisons. The identification of 43 sonotypes, including 11 new ones, is impressive and well-supported by the data.

What's great:

The use of species richness maps and statistical models like GLMM (Generalized Linear Mixed Models) makes the findings clear and credible.

The way species responses to different mining environments are presented is well done.

What could be improved:

The results could dive deeper into the observed "post-mining recovery" in some species. Was this recovery expected? How do these findings align with what other studies in mining regions have shown?

More details about species that were hard to identify could be helpful, such as what percentage of the species richness might still be unaccounted for.

Discussion:

The discussion section effectively connects the results to the bigger picture of ecological studies and bioacoustic applications. The discovery of new species in Carajás is a solid argument for using non-invasive bioacoustic methods.

What's great:

The potential use of these findings in improving mining licensing processes is well-explained.

The comparison to other bat inventories in the Amazon and elsewhere helps position the study within the broader scientific field.

What could be improved:

The discussion could explore more about why certain species are resilient in post-mining areas. Are there specific traits that help them recover or persist?

A stronger final statement would help drive home the practical implications beyond Carajás. For instance, how could these findings be applied to global conservation efforts in mining regions?

Figures and Tables:

The figures, like the species richness maps and rarefaction curves, are clear and easy to follow. They work well with the text.

References:

The references are appropriate and extensive, covering the subject area adequately.

Specific concerns

My specific concerns are embedded in the PDF attached.