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To the editorial board,

Thank you for considering our manuscript, “Effects of short-interval disturbances continue to accumulate, overwhelming variability in local resilience” for publication in Ecosphere. This is a revised submission transferred from Ecology, and we greatly appreciate the time and feedback provided by the reviewers during that initial review. We have addressed every comment individually from the reviewers and have highlighted the changes within the manuscript. The paper is stronger as a result.

The boreal forest is the largest terrestrial biome in the world, contains a massive amount of carbon in forest and soil stocks, and is experiencing rapid climate change. One of the most impactful is the rapid increase in fires and subsequent impacts on regeneration. Of key interest is short-interval reburns, which can result in ecosystem regime shifts, from coniferous forests with their associated permafrost and high C-stocks to deciduous forests, with lower soil C and faster cycling. While this rapid transformation after a short-interval fire is well described, no one to date has explored the consequences of short-interval fires in those emerging deciduous stands, nor the consequences of ongoing short-interval fires. Here we present the first look at this natural next step in an era of more frequent fires – what happens when areas are subject to continued and ongoing short-intervals between burns. Over 50 plots, we contrast the impacts of 1, 2, or 3 fires and reburns in the boreal.

We find that unlike model simulations of the boreal, deciduous forests can and do reburn after only short time periods, and these reburns continue to transform the landscape. Successional pathways differ and the effects are easily observable in unique forest compositional trajectories. Furthermore, we investigated whether topography mediated this reburn-triggered transformation (also a novel contribution) and find that while topography can partially offset the impacts of single reburning, continued short interval fires will transform even those resilient landscapes. Because of its unique perspective, this study should shape how we think about ongoing high frequency fire in the boreal and feed directly into models that will better incorporate ecosystem dynamics associated with high-frequency fire.

We appreciate the reviewer’s concerns regarding the statistical design and framing of the paper. It is certainly true that the mixed model design was complex, which resulted in some confusion about the results and implications of the study. We have reframed the statistical design to address the questions of the study more head-on and believe these revisions have substantially improved the clarity and impact of the paper.

Thank you again for your consideration. To our knowledge, this is the first observational investigation into the consequences of continued short-interval fires in the boreal forest, testing our assumptions of forest dynamics and model results. It will be of interest to a broad audience of ecologists, modelers, ecosystem scientists, and biologists. This study provides a unique look at what will likely be the reality throughout the north as fire frequency continues to rise under climate change.

Sincerely,

A picture containing animal

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Katherine Hayes

![A picture containing outdoor, animal, snow, water

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Brian Buma, PhD