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Abstract

Environmental characteristics of mountain pine beetle infestation hot spots

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A combination of favourable temperatures and abundant host trees has resulted in a mountain pine beetle (*Dendroctonus ponderosae* Hopkins) epidemic over the majority of the lodgepole pine forests of British Columbia, Canada. Understanding temporal trends in the interactions between mountain pine beetle infestations and landscape characteristics can improve our understanding of beetle biology, inform modelling of future impacts, and support management. In this paper, we demonstrate a practical technique for characterizing spatial interactions between beetles and the environment. The locations with the highest-intensity infestations (hot spots) were identified using point data derived from annual helicopter-based surveys of beetle-infested pine, and a kernel density estimator. By examining the environmental characteristics associated with hot spots through time, an increased understanding of how the mountain pine beetle utilizes resources over large areas is generated. The effect of treatment on the persistence of hot spots is also explored. Results indicate that beetles intensely infest mature trees with a shift to younger trees over time. Hot-spot locations are most commonly associated with stands composed of 30–80% pine and almost always occur at elevations between 800 m and 1000 m. In the early years of an infestation, hot spots are typically found on warmer (south and west) aspects. As well, relative to non-treatment, any type of treatment reduces the persistence of hot spots the following year.

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