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Impact of Mass Dieback of Tanoak and Madrone on Forest Structure

Species-specific dieback in forest ecosystems creates gaps in the structure of the forest canopy. Regeneration in canopy gaps can lead to major shifts in community composition. Mass dieback is occurring in *Arbutus menziesii* and *Notholithocarpus densiflorus* in mixed evergreen forests in Santa Cruz, California, and may trigger transitions in forest community structure as regeneration within gaps unfolds. The objective of this study is to project consequences of mortality of the focal species on the canopy structure in the forest. By developing allometric relationships between crown area and trunk diameter (DBH), the direct influence of the focal species on canopy structure could be explored. The influence of dieback of each focal species was found to differ significantly due to the growth form and position each species filled in the vertically stratified canopy. A typical *A. menziesii* occupies 5-fold larger area of canopy than does an individual of *N. densiflorus*. While the stem abundance of *N. densiflorus* is 9.4-fold greater than that of *A. menziesii*, the greater stature of *A. menziesii* means that complete loss of *N. densiflorus* would represent only twice the impact on forest structure as would loss of *A. menziesii*. Complete mortality of both focal species would represent an increase in canopy openness by 26.59%, with plot-wide relative stem abundance of overstory species declining by 37.10%. Future researchers can use these findings to explore how the ecosystem reacts to such monumental loss in species abundance and canopy cover as regeneration occurs.