

ABSTRACT

Short-term response of vegetation to fire in grasslands is predictable despite long-term community change, Lake Ōhau

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Wildfire activity is increasing globally due to effects of climate change, including in ecosystems where fires were previously rare. Ecological and evolutionary dynamics of many ecosystems are influenced/shaped by wildfires, including changes in plant community structure (species diversity, composition, and traits) (Avolio et al., 2015; Shinneman et al., 2021). Therefore, it is crucial to understand plant community responses to wildfire disturbance. In this study, I aimed to investigate plant community resilience to fire in tussock grasslands in the South Island, Aotearoa New Zealand, in terms of ability to recover to pre-wildfire community structure. I used a data set of regularly measured permanent vegetation transects at Lake Ōhau (n = 3, est. 1983) burned in October 2020 and three times re-measured data after fire (1, 5, and 15 months). I compared plant community structure (composition, relative abundance, richness, gains, and losses), including species' traits (community flammability weighted mean) across time to determine long-term dynamics and short-term responses to wildfire. Results showed that, although these grassland communities are relatively dynamic on decadal timescales, changes in community structure caused by wildfire were significant. Vegetation recovered to pre-fire community structure over a relatively short timescale (15 months). Native plant species were more diverse than exotics and had a relatively stronger negative response to fire. Community flammability, (from individual shoot-level estimates), was strongly related to species' morphological traits and changed significantly over time, where flammability increased immediately after fire and then decreased over time. Exotic species in these tussock grasslands appear to be more resilient than native species to wildfire disturbance. My study suggests that plant communities in these tussock grasslands are relatively resilient and able to recover rapidly. However, increased fire activity may lead to increases in exotic species because of their high resilience; which may negatively impact tussock grasslands.

References

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