

Ecosystem responses to escalating drivers: linking species interactions and resilience

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The overall objective of my proposed research is to improve our current understanding of ecosystem responses to global change drivers and their cumulative impacts. In particular, I will study the role that species interactions have in determining ecosystem resilience—the amount of disturbance a community can withstand without changing its function and structure—to biotic invasions and defaunation. These two drivers, as well as the model system I will employ, have global relevance but are particularly important for New Zealand. Specifically, I will focus on mutualistic interactions (like those between plant and pollinators or between coral and photosynthetic algae), which are of tremendous importance for the maintenance of biodiversity in worldwide ecosystems. I will use a complex network approach—building upon tools from statistical physics and the social sciences—in combination with empirical data and high performance computer simulations to predict, prevent and manage undesirable ecosystem transformations.