

# Modeling Biotic Interactions Under Climate Change Scenarios: Predicting northern bettong (*Bettongia tropica*) Distribution

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Correlative species distribution models are commonly used in an attempt to predict the future distribution of a species. Such models often ignore biotic interactions, assuming the abiotic environment is limiting the species potential distribution. Integrating biotic interactions into such models, particularly those that are directly tied to the abiotic environment and drive current species distributions, allow for a more reliable prediction under a varying climate scenario. The northern bettong (*Bettongia tropica*) is an endangered rat-kangaroo restricted to Queensland's Wet Tropics Bioregion, an area that previous research indicates many species will be sensitive to climate change. There is a need to understand what constitutes suitable habitat of the northern bettong, in particular the role that climate and biotic interactions have on its current distribution to allow for future predictions under climate change scenarios. Current potential distribution models for the species, modeled using the abiotic correlates of occurrences and including biotic interactions reveal a small realized distribution where the species coexists with cockatoo grass (*Alloteropsis semialata*) and truffle species. With rainfall predicted to become more seasonal in the Wet Tropics, it is anticipated that truffle species distributions will contract towards the rainforest, tracking rainfall, and potentially prevent its co-occurrence with cockatoo grass. As it is essential that habitat contain both truffles and cockatoo grass to maintain *B. tropica* populations throughout the year, modeling will allow us to predict which areas will remain suitable under future climate scenarios. We used several modeling algorithms under varying climate change scenarios to integrate predicted distribution models of the northern bettong and these species. Such an integrated model will allow for a more reliable prediction on what impact climate change may have on this species, and will aid managers in its conservation.