

# Biodiversity responses to the Christchurch earthquakes and their aftermath

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The devastating Christchurch earthquakes of 2010/11 irrevocably damaged buildings and infrastructure across parts of the city, especially the central business district and eastern suburbs. The subsequent clearance of buildings created a 443 hectare "residential red zone" along the Avon River without houses and cars and largely devoid of people and pets. We surveyed bird, mammal, plant, and invertebrate responses to these changes. During the 1–2 years following the earthquakes, when damaged buildings were abandoned but not demolished, we found a diversity of woody seedlings regenerating. The majority of these were indigenous species, in contrast to exotic dominance of the pre-quake planted gardens. The extent of this initial regeneration was dramatically curtailed after the buildings and areas of wild vegetation were removed and the land graded, sown with grass, and mown monthly, retaining only a selection of pre-quake trees and shrubs. We compared these areas with nearby occupied suburbia. There was little change in mammals (although our detection probability was low for cats and mustelids). Bird numbers increased, but only naturalised and open-country birds. Native forest birds common in the forest reserves of the Christchurch Port Hills remained rare or absent. For butterflies, there was a decrease in monarchs and yellow admirals, no change in cabbage whites, and a large unexpected increase in southern blues. Coppers (*Lycaena* spp.) remained absent and we saw only one red admiral/kahukura, despite these species making up the majority of butterflies in the Port Hills forests. These findings highlight the need for increased native forest cover and more ecologically-informed management of habitats and pests in Christchurch city if native wildlife is to return in abundance. The city currently has a rare opportunity to make this happen and citizen initiatives to achieve this are being promoted.