

# Biodiversity Congress 2018: Biodiversity of Manukau mangroves; what's really in there?

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## Abstract

**Introduction:** How we perceive and interact with the natural world will govern our future in times of great environmental change. In New Zealand, the indigenous mangrove species *Avicennia marina* (subsp.) *australasica* has expanded within estuaries in the North Island at a rapid rate over the past few decades. This has led to polarity in public perceptions and attitudes towards mangrove preservation and removal. Although protected, removal of huge areas of mangroves has occurred and continues to require place. This thesis investigates the social-ecological trade-offs between removing and preserving mangroves in New Zealand. The research approach employs a mixed methods Holistic Mangrove Framework, which explores gaps within the social-ecological monitoring of mangroves both nationwide and specifically at four sites of removal in the Manukau Harbour, Auckland. Chapter two's review of the literature on mangrove social-ecology showed that prominent knowledge gaps remain in ecological monitoring of mammals, reptiles, insects and spiders, which is also true globally. In a social context, little is known about the cultural value of mangroves (manawa) to

Māori or the intrinsic value of this ecosystem. Chapter three showed the creation of a completely unique framework to research the creeping environmental problem of mangrove expansion in New Zealand. This framework has the capacity to be applied to any social-ecological system for a holistic understanding of interactions between humans and nature. Chapter five's integrated biodiversity assessments revealed that there is much heterogeneity in habitat complexity, species richness and abundance among sites. The study site adjacent to the largest mangrove removal area possesses the greatest abundance of bird species, and richness and abundance of arboreal arthropods compared to all other study sites. This highlights that a siteby-site management approach is required and generalisations about the ii habitat value of mangroves for wildlife cannot be made in the New Zealand context. Chapter six's exploration into perceptions and attitudes towards mangrove preservation and removal revealed significant disparity in attitude between community groups and conservation organisations. Sediment and nutrient retention properties of mangroves are the highest rated ecosystem services. The desire for reversion of estuaries to a

pre-urban state is that the greatest issue affecting mangroves. Iwi recommend monitoring of water quality and contaminants in mangrove soils. Based on the findings of this study, it is recommended to look beyond mangroves as an ecosystem which has expanded and replaced other adjacent habitats and start thinking about managing our coastal landscapes in a holistic manner. Embracing connectivity and complexity of coastal landscapes and addressing wider land-based issues of sedimentation and nutrient run-off is a necessity. It is advisable for us to work with and be part of our natural environment in order to create a more sustainable future in Aotearoa New Zealand. This is true for interactions with social-ecological systems globally. This study has added to baseline data on social and ecological information on New Zealand's mangroves and contributes to the international body of work on this coastal ecosystem using a mixed methods approach.

**Aim:** to research what biodiversity of species exists at fragmented mangrove sites in Auckland.

Research objectives of the study are as follows:

1. To review the literature on social and ecological studies in New Zealand mangroves in order to identify gaps in social-ecological information regarding

mangroves

2. To create a mixed methods framework based on social-ecological systems in order to address the overall research aim

3. To investigate secondary social-ecological data from council resource consents to compile background knowledge on a) the ecological assessments and b) the demographics and opinions towards specific removals of community stakeholders at selected sites

4. To understand the perceptions and attitudes towards mangrove removal and preservation through interviewing local community stakeholders

5. To conduct integrated biodiversity assessments at the selected sites to provide baseline data for lesser known species occupying mangrove habitats

6. To evaluate trade-offs in order to recommend future courses of action with mangrove removal/management in New Zealand

**Methods:** a variety of various non-invasive techniques were employed to record presence/absence data of reptiles, mammals, fish and birds utilizing mangroves. Insects and spiders were captured and preserved for identification and future research.

**Results:** All groups of organisms were found with the exception of reptiles; skink was observed at the marsh-mangrove edges. The most fragmented patch of

mangrove had the foremost species in terms of insects and spiders and bird species. The threatened bird the Banded Rail was present at 50% of the sites. There were significant differences between the sites potentially driven by the proximity and connectivity to nearby forested habitats.

**Conclusion:** Sites differ in terms of biodiversity then each site must be monitored long-term before any removal. The highly fragmented site should be preserved and guarded thanks to its healthy and high ecological functioning, including habitat for shortfinned eels and juvenile yellow-eyed mullet. The results of those assessments have the potential to be implemented in policy for mangrove biodiversity monitoring which can be applied across New Zealand and to mangroves internationally.

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