The invertebrate fauna of Mangarakau Swamp

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1 Introduction

Wetlands provide specialised habitats for a variety of fauna, including birds, fish, and invertebrates. Although the invertebrate fauna of New Zealand wetlands is known to be relatively depauperate (Watts & Patrick 2001; Watts 2006), there has been a paucity of entomological research. Terrestrial invertebrates within Mangarakau Swamp were sampled in February 2006 as part of a national survey to characterise the terrestrial invertebrate fauna of wetlands.

2 Sampling methods:

Invertebrates were sampled using a three collection methods, including sweep net samples, pitfall traps, and hand collecting. Six vegetation types (see Table 1) within Mangarakau Swamp were selected for study (Fig. 1).

Table 1. Vegetation types at Mangarakau Swamp chosen for invertebrate fauna survey.

Plot	Vegetation type	Dominant plant species	Other notes
1	Sedgeland 1	*Baumea arthrophylla* (70%)	
2	Reedland	*Typha orientalis* (80%)	Water depth – 1.1 m
3	Sedgeland 2	*Baumea arthrophylla* (75%) *Typha orientalis* (20%)	
4	Sedgeland 3	*Lepidosperma australe* (50%) *Baumea arthrophylla* (45%)	Recently burnt
5	Fernland	*Gleichenia dicarpa* (50%) *Phormium tenax* (30%)	Recently burnt
6	Flaxland	*Phormium tenax* (40%) *Coprosma tenuicaulis* (25%) *Baumea arthrophylla* (20%)	

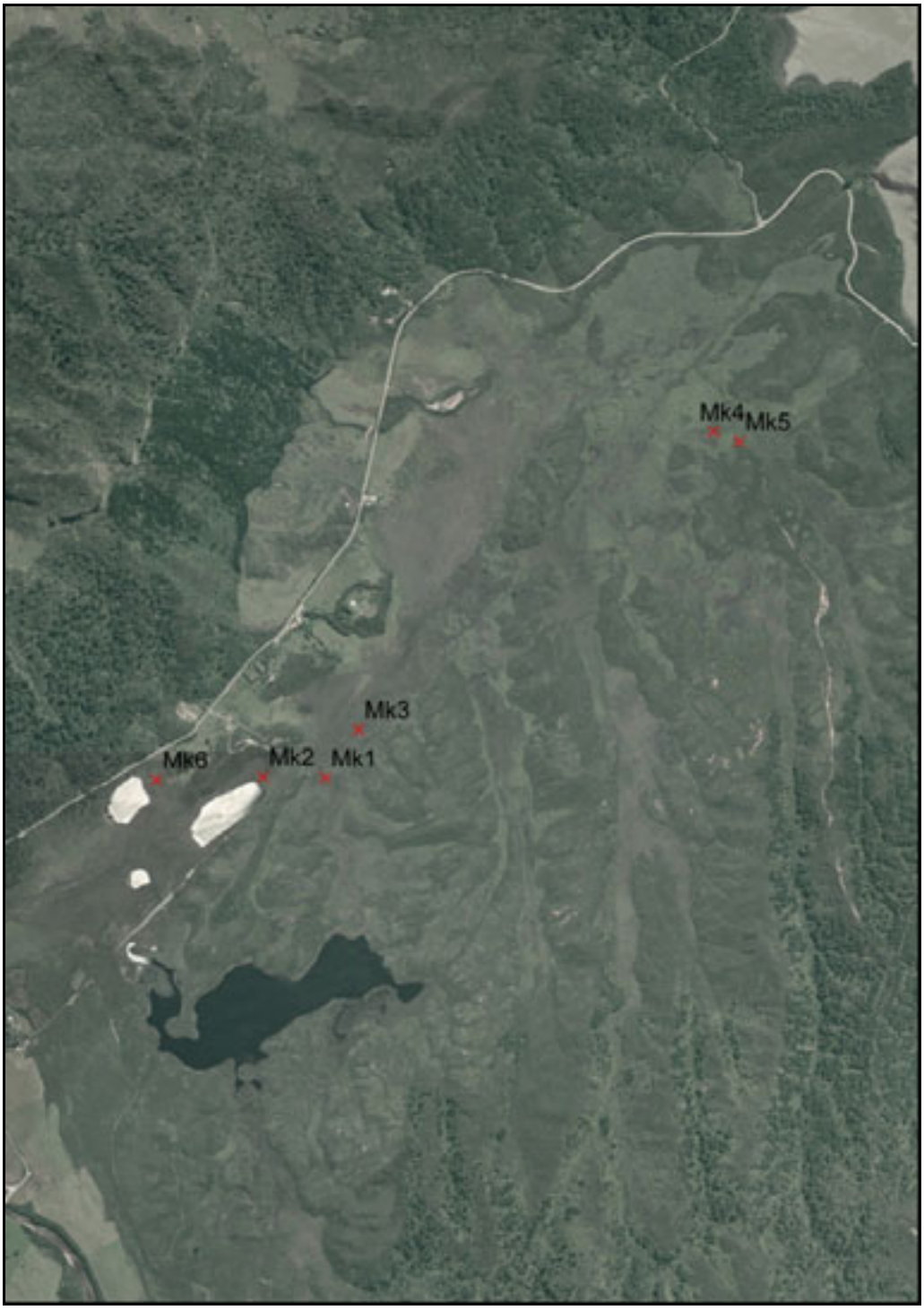

Fig. 1. Location of the six invertebrate plot locations within Mangarakau Swamp (from Basher – Soils and Hydrology at Mangarakau Swamp).

A pitfall trap consisted of a 100-mm-deep plastic cup (105-mm diameter) containing 100 ml of monopropylene glycol, which was dug into the ground so the cup lip was flush with the surface of the ground. The trap was protected by a cover that prevented rain and debris falling into the trap. Five pitfall traps were placed at 2-m intervals along a 10-m transect bearing northward from the centre of each plot.

Pitfall traps were set between 14 February and 22 March 2006. All invertebrates were preserved in 70% ethanol. Coleoptera (beetles) were the only Order collected in any significant numbers so were selected for identification and recording of abundance. Specimens were first sorted on the basis of external morphology to morphospecies or recognised taxonomic units (RTUs) and then, where possible, given generic and species-level identifications by a taxonomic expert (Stephen Thorpe, University of Auckland). RTUs will be referred to as species hereafter. Specimens were lodged at the New Zealand Arthropod Collection (NZAC), Landcare Research, Tamaki, Auckland.

A list of invertebrates seen within the six vegetation types at Mangarakau Swamp was compiled from sweep net samples and some minimal hand collecting completed in February 2006.

3 Results

Unfortunately, during the month that the pitfall traps were set within Mangarakau Swamp another fire occurred within the sedgeland 3 and fernland (vegetation plots 4 and 5), both these sites had recently been burnt and were regenerating. Only two pitfall traps at each site survived the fire. These samples were collected 6 days after the fire had occurred.

Due to the high water depth (1.1 m) within the reedland at the time of sampling, no pitfall traps were used to sample the invertebrate fauna within the vegetation type. Any sweep net samples and hand collecting occurred.

3.1 Beetle fauna of Mangarakau Swamp

A total of 71 beetles from 16 species were sampled using pitfall traps (Appendix 1). Only five introduced species were caught, including *Anomotarus illawarrae* (Carabidae), *Sitona lepidus* (Curculioidae) and *Aridius costatus* (Latridiidae) with less than six specimens of each species being recorded. Carabidae (ground beetles) were the most common family sampled with 6 species caught. The most frequent species caught was the undescribed species – *Notagonum* sp. (Carabidae). The pitfall trap samples were dominated by ground-dwelling, flightless beetle species.

Comparable species richness (9–11) and abundance (15–19) of beetles were recorded from pitfall traps within the sedgeland 1, sedgeland 2 and flaxland. From the pitfall traps that survived the fire, a total of 9 and 10 beetles from 6 and 7 species were collected from sedgeland 3 and fernland, respectively.

3.2 General invertebrate fauna of Mangarakau Swamp

Another 21 species of invertebrates were recorded from Mangarakau Swamp during the sampling period (Appendix 1). These included 3 species of Araneae (spiders; *Dolomedes minor, Trite planiceps* and Lycosidae sp. 1), 1 species of Blattodea (cockroaches; *Celatoblatta undulivitta*), and 6 species of Orthoptera (weta, crickets and grasshoppers; *Hemiandrus* sp. and *Gymnoplectron* sp.). While multiple RTUs in the Orders Gastropoda (snails and slugs), Opiliones (harvestman) and Collembola (springtails) were found they were recorded as one group due to a lack of taxonomic

knowledge to identify them further. Only three species were introduced, including 2 species of hymenoptera (wasps, ants and bees; *Apis melifera* and *Bombus terrestris*) and 1 species of moth (*Chloroclystis filata*).

4 Conclusions

A number of 'wetland generalists' were found within Mangarakau Swamp, such as the nurseryweb spider (*Dolomedes minor*; Araneae) and ground beetle (*Notagonum* sp.; Coleoptera) as these species prefer living in 'wet' habitats (Forster & Forster 1999; Klimaszewski & Watt 1997).

The introduced species found at Mangarakau Swamp are widespread and common in New Zealand and are considered not to pose a biosecurity threat. For example, *C. filata* is an Australian looper moth now distributed widely throughout New Zealand; larvae have been found in New Zealand on gorse (*Ulex europaeus*), but they are probably polyphagous.

The most widespread and common beetles species caught at Mangarakau Swamp was *Notagonum* sp. (Carabidae). This predacious ground beetle lives in the leaf litter in wet habitats, including lowland fens, marshes and flaxlands (Larochelle & Lariviere 2001). It is nocturnal and thought to be gregarious. Another carabid that was common at Mangarakau Swamp was *Cicindela tuberculata* (tiger beetle). It is an endemic diurnal beetle found throughout the North Island and northern South Island (Larochelle & Lariviere 2001). Tiger beetles are ground-dwelling, preferring open habitats where they can hunt other invertebrates, particularly spiders. The introduced clover weevil, *Sitona lepidus*, is abundant throughout New Zealand, where the larvae feed on white clover roots. The adult weevils sampled from Mangarakau Swamp would have originated from adjacent pasture.

A total of 37 invertebrate species, including 16 beetle species, were collected from Mangarakau Swamp over one month of sampling. While the present study was limited, the trends observed in the invertebrate community indicate that Mangarakau Swamp is an excellent example of a lowland sedge-dominated swamp. For example, Watts et al. (2008) surveyed 28 wetland throughout New Zealand and found the average number of taxa found in swamps (n = 15) was 15 and the average number of beetle species found per swamp was 3. In addition, the number of introduced species collected was particularly low.

The data presented here are a synopsis of the invertebrate fauna with Mangarakau Swamp and only begin to summarise the trends apparent from the very limited dataset. In the future, additional entomological studies are required to obtain extra information regarding the composition, abundance and distribution of invertebrates at Mangarakau Swamp.

Appendix 1: Complete list of invertebrate species found at Mangarakau Swamp.

Order	Family	Species	Status
Amphipoda			native
Araneae	Lycosidae	Lycosidae sp. 1	native
Araneae	Pisauridae	*Dolomedes minor*	native
Araneae	Salticidae	*Trite planiceps*	native
Blattodea	Blattidae	*Celatoblatta undulivitta*	native
Chilopoda			native
Coleoptera	Anthicidae	*Sapintus pellucidipes*	native
Coleoptera	Carabidae	*Anomotarus illawarrae*	introduced
Coleoptera	Carabidae	*Cicindela tuberculata*	native
Coleoptera	Carabidae	*Holcaspis* nr. *oedicnema*	native
Coleoptera	Carabidae	*Mecyclothorax rotundithorax*	native
Coleoptera	Carabidae	*Neoferonia* sp.	native
Coleoptera	Carabidae	*Notagonum* sp.	native
Coleoptera	Curculionidae	*Sitona lepidus*	introduced
Coleoptera	Curculionidae	*Steriphus ascitus*	native
Coleoptera	Curculionidae	*Steriphus diversipes lineatus*	introduced
Coleoptera	Elateridae	*Agrypnus variabilis*	introduced
Coleoptera	Latridiidae	*Aridius costatus*	introduced
Coleoptera	Mordellidae	*Stenomordellaria neglecta*	native
Coleoptera	Staphylinidae	Aleocharinae sp.1	native
Coleoptera	Staphylinidae	*Eupines* sp.	native
Coleoptera	Staphylinidae	Paederinae sp. 1	native
Collembola			native
Gastropoda			native
Hymenoptera	Apidae	*Apis melifera*	introduced
Hymenoptera	Apidae	*Bombus terrestris*	introduced
Lepidoptera	Batrachedridae	*Batrachedra* sp.	native
Lepidoptera	Geometridae	*Chloroclystis filata*	introduced
Odonata	Lestidae	*Austrolestes colensonis*	native
Odonata	Lestidae	*Xanthocnemis zealandica*	native
Opiliones			native
Orthoptera	Gryllidae	*Bobilla* sp.	native
Orthoptera	Anostostomatidae	*Hemiandrus* sp.	native
Orthoptera	Gryllidae	*Teleogryllus commodus*	native
Orthoptera	Rhaphidophoridae	*Gymnoplectron* sp.	native
Orthoptera	Tettigoniidae	*Caedicia simplex*	native
Orthoptera	Tettigoniidae	*Conocephalus* sp.	native