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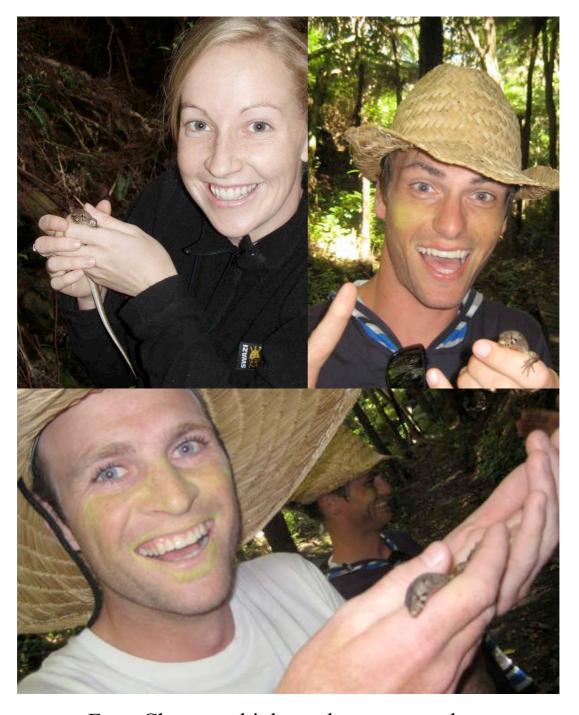
# Spatial ecology, habitat use, and the impacts of rats on chevron skinks (*Oligosoma homalonotum*) on Great Barrier Island

A thesis submitted in partial fulfillment of the requirements for the degree of

Master of Science in Conservation Biology

Massey University, Auckland, New Zealand

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Fact: Chevron skinks make everyone happy

#### **Abstract**

The chevron skink (*Oligosoma homalonotum*) is one of the largest, yet least observed skink species in New Zealand. The species was thought to have once been widespread in Northern New Zealand, however currently it is only found on Great Barrier and Little Barrier Islands. Great Barrier Island is the apparent stronghold for the species although it appears to be in decline there, despite a net increase in habitat. Recent studies have increased the understanding of the general ecology of the species, however little is known about the threats to the survival of this species.

This study had two main objectives; the first was to establish if rats are a threat to chevron skinks, and the second was to increase current knowledge of the species ecology. The research was undertaken in an area of extensive rodent control (Glenfern Sanctuary) and an adjacent unmanaged reserve in Port Fitzroy, on Great Barrier Island in 2008. The first objective of this study involved confirming that rat densities in the treatment (Glenfern Sanctuary) were sufficiently different to allow meaningful comparisons of chevron skink population characteristics between sites. achieved by determining absolute rat densities using Zippin's removal method at four sites, and correlating these with a relative abundance measure (tracking rates) to give confidence in the observed trends. Rat densities were high (1.94 - 3.00 rats ha<sup>-1</sup>) in the control, and low (0.00 and 0.06 rats ha<sup>-1</sup>) in the treatment sites, and these correlated well with tracking rates. In light of these clear differences between the treatment and control, the population structure and condition of chevron skinks were compared between sites. The population structure showed erosion of juvenile and sub-adult size categories, which indicated differences in vulnerabilities between size categories. Physical evidence of failed rat predation was also observed in adult skinks in the unmanaged control, which confirmed that rats were interacting with chevron skinks. Although the adults survived the attacks they suffered injuries including eye damage, punctures, cuts and tail loss. Smaller skinks would be unlikely to survive such attacks due to the severity and scale of the injuries, supporting the assertions of the population structure that smaller skinks may be more vulnerable than adults. The extent of tail loss was converted to a condition index to determine if failed rat predation was more widespread in the population, than was observed by conspicuous injuries. This condition index (body-tail condition index) was stable through all size categories in the treatment, but significantly reduced in adults in the unmanaged sites. That there was no reduction in the condition of smaller skinks in the unmanaged control sites despite high rat densities suggests that interactions between rats and smaller skinks are fatal, and thus not represented in the data.

Nine chevron skinks were radio-tracked to determine habitat use, home range and ranging behaviour. Habitat use of chevron skinks was similar to a previous study and demonstrated that trees, crevices and logs were important refuge sites. Chevron skinks were more likely to be found at sites with trees, crevices and debris dams. Chevron skink home ranges indicated that adults moved further away from streams than previously anticipated at this time of year, and skinks demonstrated site fidelity. There was also overlap in home ranges between individuals, and skinks with overlapping home ranges shared common refuges. During flooding events, chevron skinks exhibited an arboreal response that appears to be a behaviour specific to stream associated animals, which allows them to avoid being taken by floodwaters.

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