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**Behaviour and Activity Budgeting of Reproductive Kiwi in a Fenced Population**

**A thesis presented in partial fulfilment of the requirements of the degree of**

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## **Abstract**

North Island brown kiwi (*Apteryx mantelli*) are flightless, nocturnal, usually solitary, and secretive birds, so knowledge of their behaviour is limited. In this study, I endeavoured to obtain a more detailed understanding of adult kiwi behaviour within two pest fenced areas focusing around the breeding season at the 3363 ha Maungatautari Scenic Reserve in Waikato, New Zealand. Within Maungatautari's pest free enclosures, I attempted to determine male and female activity patterns over 24-hours from activity transmitter data; document diurnal and nocturnal behaviours of kiwi using video cameras; determine size and distribution of home ranges; and establish patterns of selection of daytime shelter types. Male kiwi were fitted with Wild Tech "chick timer" transmitters which recorded activity for the previous seven days. Incubating males spent significantly less time active than non incubating males with some activity occurring during the daytime. Non-incubating male activity duration decreased but activity as a proportion of night length increased with decreasing night length. Less active incubating males, suggesting more time caring for eggs, had more successful clutches. Female activity was recorded using an Osprey receiver/datalogger and 30x60x90 pulse activity transmitters. Proportional activity was not correlated with night length and some female kiwi had extensive activity during the day which likely involved leaving their shelters. The occurrence of post-dawn activity was highly likely due to prior knowledge of feeding conditions. Efforts to obtain video footage of kiwi were only possible during daytime in shelters. Kiwi mostly slept during the day but they also scratched, stretched, preened, excavated, defecated, yawned, fed and sniffed. When a mate was present kiwi overall slept less. Mate preening was recorded for the first time. Significant differences in home range sizes were found between all male and female kiwi in both enclosures, and males and females in the southern enclosure. Home range overlap occurred only between females and unpaired birds. Shelter proximity to streams was significant, and reproductive status and water availability may be strong drivers determining home range

location for Maungatautari enclosure kiwi. Dead vegetation matter and then underground cavities were the broad shelter types most used by kiwi and at a more detailed level, Windrows. Exploited Root Systems, Downed Logs, and Downed Masses were selected. Shelters were rarely re-used most likely due to an abundance of available shelters. Access to permanent water courses should be considered when considering habitat options for new kiwi populations as it helps ensure food availability. As well, the presence of abundant coarse woody debris creates high quality habitat for sheltering. Kiwi did not appear to be negatively impacted by the size of the enclosures at Maungatautari, and the population was healthy there during the course of this study.

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