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**THE ECOLOGICAL REQUIREMENTS OF THE
NEW ZEALAND FALCON (*Falco novaeseelandiae*)
IN PLANTATION FORESTRY**

A thesis presented in partial fulfilment of the requirements
for the degree of Doctor of Philosophy in Zoology at Massey
University, Palmerston North, New Zealand

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Adult female New Zealand falcon. D. Stewart 2003.

“The hawks, eagles and falcons have been an inspiration to people of all races and creeds since the dawn of civilisation. We cannot afford to lose any species of the birds of prey without an effort commensurate with the inspiration of courage, integrity and nobility that they have given humanity...If we fail on this point, we fail in the basic philosophy of feeling a part of our universe and all that goes with it.”

Morley Nelson, 2002.

ABSTRACT

Commercial pine plantations made up of exotic tree species are increasingly recognised as habitats that can contribute significantly to the conservation of indigenous biodiversity in New Zealand. Encouraging this biodiversity by employing sympathetic forestry management techniques not only offers benefits for indigenous flora and fauna but can also be economically advantageous for the forestry industry. The New Zealand falcon (*Falco novaeseelandiae*) or Karearea, is a threatened species, endemic to the islands of New Zealand, that has recently been discovered breeding in pine plantations. This research determines the ecological requirements of New Zealand falcons in this habitat, enabling recommendations for sympathetic forestry management to be made.

Plantation forests that create a mosaic of pine stand ages across a plantation, offer suitable habitat for breeding New Zealand falcons by providing abundant nest sites, promoting high abundances of avian prey and creating favourable conditions for hunting. The diet of falcons within pine forests consisted primarily of birds, of which the majority were exotic passerines. Prey abundances were highest along pine stand edges. Both sexes preferentially hunted along pine stand edges between stands less than four years old and stands more than 20 years old. Pairs also preferentially nested along these borders, particularly within and along the edges of pine stands less than two years old. Within pine stands, nest sites were always located on the ground. Introduced predators and some forestry operations negatively affected breeding success. Nevertheless, productivity was higher than recorded for other habitats and female falcons were recorded successfully breeding in their first year for the first time. High prey densities and availabilities are suggested as the primary explanation for this. The extent of juvenile dispersal strongly suggests that pine plantations supplement populations in surrounding areas where falcons are in decline. This research demonstrates that changes to the existing forestry operational practices can influence the success of the breeding population.

This research establishes that if commercial pine plantations are suitably managed, they can support extremely high falcon densities. Plantation forests therefore have a significant role to play in the future conservation of this species.

To my four parents
who have always encouraged me
to chase my dreams.
Thank you.

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