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Ecology and Conservation Status of the northern Spot-tailed Quoll, *Dasyurus maculatus*

with reference to
the Future of Australia's Marsupial Carnivores

Thesis submitted by

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BSc Hons (JCUNQ)**

10th December 2001

**For the degree of Doctor of Philosophy
In the School of Tropical Environment Studies and Geography
James Cook University of North Queensland**

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Abstract

The Spot-tailed quoll *Dasyurus maculatus* is a member of the carnivorous marsupial family, Dasyuridae, and is the largest marsupial carnivore on the Australian mainland. *D. maculatus* occurs in Tasmania and along the eastern seaboard of Australia as far north as south-east Queensland with a disjunct population in the Wet Tropics World Heritage Area in north Queensland.

Despite being one of the very first Australian mammals to be encountered by Europeans, the ecology of *D. maculatus* is very poorly known. This dearth of knowledge is worrying given the documented reduction in its geographic range and its listing as threatened or endangered in all mainland states in which it occurs. This study was thus undertaken with the intention of (a), documenting the species' ecology and (b), using this data to elucidate the reasons behind its endangered status and to chart a course for the species recovery.

Fieldwork was conducted between 1992 and 1994 inclusive, solely within the Wet Tropics Area of north Queensland. However, the results are relevant throughout the species' range. The ecology of *D. maculatus* was studied using capture-mark-recapture, radio-telemetry, mapping of latrine sites, scat analysis and quantification of the prey community. The distribution and abundance of the species within north Queensland was documented by accessing sighting records from a range of unpublished sources including Government Departments, local naturalists and from the community at large, and by field survey. The conservation status of the species was assessed by, (a) conducting Population Viability Analysis, (b) noting changes in the species distribution and abundance, (c) identifying weaknesses in the species life-history strategy and, (d) identification of those phylogenetic, behavioural and environmental factors which expose the species to extinction within the short and long term.

Twenty-four female and 26 male *D. maculatus* were captured a total of 186 times during this study. The species was found to occur at low densities (approx. 1 individual of each sex per 3km²). Mating occurred during the winter months (June- September) and the average litter size was 5.2. No female was known to breed in more than two successive seasons. Spot-tailed quolls specialised on mammalian prey but showed very

little preference for any of the available mammalian prey. The species is highly mobile; one male travelled over six kilometres in 24hr and one female travelled 1km in 3hr. Five radio-collared females occupied discrete and non-overlapping home ranges of up to 1km². Quolls use roads as latrine sites, and densities of scats of up to 30 km⁻¹ of road were not uncommon. Historically, *D. maculatus* was found throughout the latitudinal range of the Wet Tropics area, however, it appears to have become extinct in the southern Wet Tropics in the 1940's. It is currently known from eight isolated populations on mountaintops or tablelands in the Wet Tropics and is apparently restricted to rainforest above 700m asl. The total population of the species in the Wet Tropics Area is estimated to be less than 1000 individuals.

I propose that the endangerment of *D. maculatus* throughout its mainland Australian range can be attributed to its life-history strategy and population ecology which render populations susceptible to extinction through relatively low increases of extrinsic mortality, and its behaviour which exposes individual quolls to the agents of extrinsic mortality. The short-term recovery of quoll populations is thus dependent upon reducing that extrinsic mortality. This can be achieved through education, revised wild dog baiting guidelines and in some instances control of Eutherian carnivore populations. Risk analysis shows that Eutherian carnivores can contribute to the extinction of Quoll populations through predation and competition. This effect is further exacerbated by life-history differences between Quolls and Eutherian carnivores which mean that populations of the Eutherians are intrinsically more persistent under conditions of low recruitment or elevated extrinsic mortality, than those of the Spot-tailed Quoll. In the longer term, I suggest that the survival of Quolls, and the radiation of Australian marsupial carnivores in general, is severely threatened by Australia's Eutherian carnivore fauna.

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STATEMENT OF SOURCES

DECLARATION

I declare that this thesis is my own work and has not been submitted in any form for another degree or diploma at any university or other institution of tertiary education.

Information derived from the published or unpublished work of others has been acknowledged in the text and a list of references is given.

Signature

12/4/2002

Date