

## **Where are the last strongholds of spot-tailed quolls in south-east Queensland?**

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### Background and rationale

The south-east mainland spot-tailed quoll *Dasyurus maculatus maculatus* is listed as Endangered federally and Vulnerable in Queensland. Globally, the species as a whole is listed as Near-Threatened and declining by the IUCN Red List of Threatened Species. The spot-tailed quoll also survives in Tasmania. On the mainland, it recently occurred in fragmented populations in forests of eastern Australia, from Victoria to south-east Queensland. At the Australian Mammal Society conference in July 2019, we heard new information that very extensive camera-trapping by the Arthur Rylah Institute has now concluded that this species has disappeared from Victoria, except for an area of the Snowy Mountains National Park near the NSW border. In New South Wales, six years of camera trapping by the Office of Environment and Heritage WildCount programme has revealed that spot tailed quolls are persisting, but are sparse in National Parks, and concentrated in the Snowy Mountains and parts of north-east NSW. A study in press by Scott Burnett's group (USC) estimates that in north Queensland the subspecies *D. maculatus gracilis* is sparse, declining, and has a population of ~1000. We do not have information on its current distribution in south-east Queensland. Given that parts of north-eastern NSW are important refuges for mainland spot-tailed quolls, and south-east Queensland has some contiguous mountain ranges with north-eastern NSW and similar forest types, it is possible that locations in south-east Queensland are crucial last mainland strongholds for the species. It is also possible that the species' range is contracting from this northern-most part of its distribution, where cane toad populations and forest clearing and fragmentation are high, and climatic conditions may be becoming unsuitable. This project aims to find the current distribution of spot-tailed quolls in south-east Queensland. We will test if particular habitats and topographical features are associated with quoll persistence versus disappearance, and use this information to form hypotheses to explain why they have disappeared from certain locations. We will identify the current most important places for conservation management of spot-tailed quolls in south-east Queensland, and recommend any indicated changes in state listings of this species in Queensland.

### Approach

We have a database of historical records of locations of spot-tailed quolls in south east Queensland, which has been collected during the last decade using the state Wildnet database, museum records, the GBIF spatial database, scientific publications, grey literature and the records and contacts of scholars at the University, plus landholders, researchers, QPWS staff, and citizen scientists. We will first determine which locations are still forested at a landscape scale (versus now cleared or urban) by GIS mapping. We will use two methods to assess whether or not spot-tailed quolls are now present:

- 1) a questionnaire posted / given to landholders and given to QPWS staff at the key sites (asking if they have seen spot-tailed quolls in the last two years or not, explaining that the purpose is solely to map their distribution in Queensland, with a link to an online form);
- 2) in a subset of locations suspected to be strongholds of the spot-tailed quoll in south-east Queensland including the Little Liverpool Range, the border region near Sundown National Park, Main Range and the Scenic Rim, we will use camera trapping to assess whether or not spot-tailed quolls are present. This will involve leaving a Reconyx camera trap with a proven quoll-attracting bait (e.g. Kentucky fried chicken) in a large canister for

three weeks in each forest fragment, as close to historical record locations as possible. We can do this using 40-60 camera traps simultaneously, to cover as many sites as possible over 18 months. We will record canopy, understorey and ground plant layer density, tree size metrics, rock outcrop and fallen timber density, leaf litter depth, dominant tree species and elevation at each site. We will also use precise GPS locations to match sites with available GIS data layers. We will map the current distribution of spot-tailed quolls, and map the probability of site occupancy in relation to broad habitat and topography, using our habitat data and MaxEnt models with climate, rock and vegetation layers. We will also assess past distribution for comparison.

### Budget and requirements

This project will be part of the PhD project of a student at the UQ School of Biological Sciences. We need funding for travel to field sites, to place and retrieve camera traps.

Item	Cost	Justification
UQ Vehicle Hire	\$5,000	One trip a month to sites in south east Qld (sites are 130-300 km from Brisbane, mean 450 km per trip, 17 trips) = 7600 km @ \$0.65 per km (University vehicle hire fee).

### Project Environment and applicants

The University of Queensland's School of Biological Sciences (BIOL) is ranked very highly (in the top ten) in Global assessments in the fields of Environment, Biodiversity & Sustainability, Ecology and Conservation, and Spatial & Quantitative Ecology. UQ is a major node in the federally funded National Environmental Science Programme (NESP) Threatened Species Hub. The project supervisor has expertise in threatened mammal conservation, spatial and population ecology in Queensland, including several projects on quolls and other dasyurids. The research group includes many students co-supervised by government and NGO collaborators such as the Australian Wildlife Conservancy, the Queensland Trust for Nature, and Queensland government agencies, and engaged in several studies on landscape-scale distribution of threatened mammals.

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