

THE VALUE OF MAMMAL MONITORING ON THE FIVE RIVERS RESERVE, BRONTE

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ABSTRACT

A survey of terrestrial mammals was undertaken on the Five Rivers Reserve as part of the 2014 National Bush Blitz program and Save The Tasmanian Devil Program. Motion sensor cameras were installed at 46 sites on roads and tracks across the reserve and collected six weeks later. Camera images were scored according to species presence; their detection rate and a determination of the number of individual Tasmania devils, feral cats, eastern quoll and spotted-tailed quoll was made. A total of 24 vertebrate species were identified from 4,375 fauna images collected over 1,669 trap nights. Of these 15 were mammal species.

A total of 96 days were required to deliver this program at an estimate cost of over \$78,378. Volunteers played a critical role in nearly every aspect of program delivery with ten individuals contributing 37% of the total time and labour costs. The challenge is to ensure this monitoring program continues long-term to maximise its conservation value therefore ongoing volunteer involvement will be critical to its success.

INTRODUCTION

The Five Rivers Reserve in Tasmania's Central Highlands is located approximately 15 km northwest of Bronte Park and spans over 11,000 ha. The reserve is owned and managed by the Tasmanian Land Conservancy and protected in perpetuity by a conservation covenant under the *Tasmanian Nature Conservation Act 2002*. It is predominantly eucalypt forest interspersed with a rich and diverse range of alpine and sub-alpine vegetation communities and habitats of high conservation value. In the past the reserve has been subject to various intensities of commercial timber harvesting but retains substantial areas of un-logged and regenerating forest plus many other priority vegetation types, all in varying size and condition (TLC 2014).

To date, 239 fauna species have been recorded on the Five Rivers Reserve, which includes 22 species of mammal, 44 bird, 8 reptile and 3 amphibian species (CofA

2014; TLC 2014). Since the outbreak of devil facial tumour disease the Bronte region, including parts of the Five Rivers Reserve, has become an important monitoring site for the nationally endangered Tasmanian devil (*Sarcophilus harrisii*) by staff from the Save The Tasmanian Devil Program (Devil Facial Tumour Disease Newsletter March 2006, p4). The Tasmanian Land Conservancy seeks to contribute to this program by establishing permanent monitoring sites across its reserve and to help address key questions about the status of Tasmanian devils and other carnivorous mammals in the Central Highlands region.

Nowadays the contribution made by volunteers is critical to the ongoing operation of many non-government and government organisations. Volunteers are integral to the success of the Tasmanian Land Conservancy and collectively their efforts help the organisation protect Tasmania's biodiversity and high conservation value places. In 2012-13

volunteers generously contributed 869 volunteer days to the TLC toward tasks such as managing invasive pests, improving knowledge on threatened species, producing strategic documents, communications, and governance of the organisation (TLC 2013). This paper is an example of the real cost of implementing a fauna research program and the importance of volunteer input.

SURVEY METHODS

In February 2014, 46 Scout Guard SG560Z Zero Glow cameras were installed at sites along roads and tracks across the Five Rivers Reserve. They were positioned 1-2 m above the ground (Plate 1) and a mixture of oats saturated in fish oil and canned fish was used to attract animals to the desired site where a photo could be taken (Plate 2). Cameras were collected in April 2014 and were operational for up to a maximum of 48 nights.



Plate 1. Camera mounted on ultra minipod bracket

After collection, cameras were downloaded, images were catalogued and photos were scored for species presence and their detection rate at each site. The number of different individual Tasmanian devils, feral cats, eastern quoll and spotted-tailed quoll was determined by manually studying images of these species to assess their body markings and other body characteristics at comparable focal lengths and image time sequences. This process is problematic and results in animals of 'known and unknown' identity.



Plate 2. Camera being set up by BHP volunteer with bait pod in the foreground

PROGRAM COMPONENTS

The monitoring program was divided into stages and each stage was evaluated in terms of delivery time and labour required. A day was calculated as 7.6 hours and labour was costed at \$35.21 per hour for TLC staff and volunteers based on the current standard volunteer rate endorsed by the Tasmanian government (MMC Link 2014).

RESULTS

Fauna

A total of 24 vertebrate species including a range of mammals, birds and reptiles were identified during the survey from 4,375 fauna images collected over 1,669 trap nights (Bryant 2014). Fifteen species of mammal (Table 1) were recorded including one previously unrecorded species – the long-nosed potoroo *Potorous tridactylus* (Plate 3). The four most commonly recorded species were Bennett's wallaby (46 sites, 558 detections), brushtail possum (42 sites, 364 detections), Tasmanian devil (35 sites, 157 detections) and common wombat (35 sites, 128 detections).



Plate 3. Long-nosed potoroo captured on camera

Tasmanian devils were widely distributed across the reserve at 35 sites, in 383 images and 157 detections. At least 48 individual devils were identified with a further 31 images of animals of unknown status. Tasmanian devil facial tumour disease was detected in devils at six sites by the appearance of large facial swellings beyond what would be considered normal facial scarring (Plate 4). Eastern quoll were captured at 13 sites, on 50 images and an assessment of coat patterns estimated 15 individuals with a further seven animals of unknown status. Spotted-tailed quoll were captured at two sites, on four images and two individual animals were identified.

Fourteen individual feral cats (Plate 5) were identified at 14 sites, on 50 images and 31 detections. No evidence was obtained of the presence of the European red fox.



Plate 4. Tasmanian devil with facial tumour disease

Project costs

Table 2 shows the time and labour value invested in the first year of this monitoring program. The project spanned a total of 96 days and 10 different volunteers participated: 8 with camera deployment, 1 with camera retrieval and 1 with photo and data analysis.

It is standard accounting practice to calculate project overheads by taking the cost of labour (\$25,689) and doubling the amount (\$51,378) to account for expenses such as salary add-ons, office facilities, management costs, travel, accommodation, field consumables and so on. The main equipment cost of the project was the cameras, which were funded by a \$27,000 community grant from Save the Tasmanian Devil UTAS Foundation. This means the total cost of delivering the monitoring program in its first year was \$78,378. Volunteers contributed 37% of the total time and labour and the UTAS grant supplement the overall project costs by 34%.

Table 1. Mammals recorded during the Five Rivers Reserve survey (e = endemic)

Species	This survey 2014	Total no of detections	Total sites recorded n=46
<i>Tachyglossus aculeatus</i> echidna	photo, seen	10	7
<i>Sarcophilus harrisii</i> Tasmanian devil (e)	photo, scats, den, latrine	157	35
<i>Dasyurus maculatus</i> spotted-tailed quoll	photo, scats	2	2
<i>Dasyurus viverrinus</i> eastern quoll (e)	photo, scats	36	13
<i>Vombatus ursinus</i> common wombat	photo, seen, scats, burrow	128	35
<i>Pseudocheirus peregrinus</i> common ringtail possum	photo	1	1
<i>Trichosurus vulpecula fuliginosus</i> common brushtail possum	photo, scats	364	42
<i>Macropus rufogriseus</i> Bennett's wallaby	photo, seen, scats	558	46
<i>Thylogale billardieri</i> Tasmanian pademelon (e)	photo, seen, scats	171	27
<i>Bettongia gaimardi</i> Tasmanian bettong	photo	2	1
<i>Potorous tridactylus</i> long nosed potoroo	photo	1	1
<i>Rattus lutreolus</i> swamp rat	photo	3	3
<i>Oryctolagus cuniculus</i> European rabbit	photo, seen, diggings, scats	5	2
<i>Dama dama</i> fallow deer	photo, seen, prints, scats	7	3
<i>Felis catus</i> cat	photo, seen, scats	31	14

Table 2. Monitoring program component costs

Monitoring program component	TLC staff days	Volunteer days
Planning, grant application, equipment purchase and assembly	7	-
Camera deployment (including site travel)	10	20
Camera retrieval (including site travel)	9	2
Equipment cleaning, storage, battery recharge	1	-
Image download, scoring and data entry	18	2
Carnivore pattern recognition - 4 species	1	9
Data collation, maps and reporting	14	3
Total labour investment days (\$25,689)	60 (\$16,056)	36 (\$9,633)

DISCUSSION

The information collected during this survey has added to the growing knowledge on the vertebrate fauna of the Five Rivers Reserve (CofA 2014; TLC 2014). A diversity of 15 mammal species is typical of Tasmania's high country in areas where mixed forest types, marshland and riparian habitats are interconnected by a network of roads and tracks. However, some obvious gaps in knowledge remain especially for the medium to smaller weight range mammals and particularly arboreal species.



Plate 5. Feral cat captured on camera

The most significant outcome of this work was gaining insight into the abundance and distribution of four of Tasmania's carnivorous mammals. The Tasmanian devil was found to be widespread across the reserve despite the ongoing persistence of the fatal devil facial tumour disease (www.tassiedevil.com.au/tasdevil.nsf/Publications/). The identification of a relatively large number of devils supports the view that a breeding population occurs on the reserve, which is sustained by the expanse of habitat but ongoing monitoring will help track their persistence and conservation status into the future. Fifteen individual eastern quoll were detected during the survey, which is an important finding given this species has recently been nominated for listing on Tasmania's threatened species

legislation due to concerns about Statewide population declines (Fancourt et al. 2013). The low number of spotted-tailed quoll detected may reflect either the natural rarity of this species in the area, its large territory size or that its arboreal habits limit it being captured more frequently at ground level. Ongoing monitoring of both quoll species should continue to yield valuable information. The finding of at least 15 feral cats on the reserve provides a start to decision making about the feasibility and most cost effective way of reducing cat numbers and their impacts.

The information obtained during the first year of this program provides a solid framework for ongoing work assuming the program can be maintained. A total of 96 days and over \$78,000 of value were invested into establishing this project and even though remote cameras have significantly improved the efficiencies of fauna monitoring (Meek et al. 2014), the time and cost of undertaking this work is not insignificant. Volunteers played a critical role in nearly every aspect of program delivery by contributing 37% of the total time and labour costs and a community grant supplemented the overall project costs by 34%. While some of the procedures will be refined over time, the analysis of images and communication of results will probably remain time consuming. Often the time needed to complete these latter components is underestimated in survey work yet the communication and reporting of results are essential if ongoing investment is to be supported. Volunteers provide an invaluable service by easing the workload and devoting the time needed to complete core tasks. They also invest intellectual capital and wisdom that goes beyond a dollar figure. Without their input, programs such as this would be difficult to deliver let alone sustain in the future.

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