

# MOUNT EMERALD WIND FARM – NORTHERN QUOLL MONITORING PROGRAM



## SUMMARY OF RESULTS: OCTOBER 2017

Monitoring Grid (refer to Fig. 1)	No. individual quolls detected (naïve occupancy) <sup>1</sup>		Quoll population estimate (se) <sup>2</sup>		Quoll occupancy (se) <sup>3</sup>		Quoll detection probability (se) <sup>4</sup>		Overall trend in Quoll population between sampling occasions
	Oct 2016	Oct 2017	Oct 2016	Oct 2017	Oct 2016	Oct 2017	Oct 2016	Oct 2017	
Mt Emerald Site 1	10 (0.3889)	6 (0.1944)	20 (6.96)	12.64 (6.56)	0.52 (0.11)	0.4474 (0.271)	0.047 (0.02)	0.039 (0.0265)	All abundance metrics downwards
Mt Emerald Site 2	13 (0.5278)	8 (0.25)	25 (7.57)	Insufficient recaptures	0.79 (0.16)	Insufficient data	0.052 (0.018)	0.0179 (0.0059)	All abundance metrics downwards
Davies Ck Site, Davies Ck NP	11 (0.72)	13 (0.42)	17.44 (5.71)	24.3 (7.217)	0.79 (0.08)	0.5144 (0.1125)	0.102 (0.023)	0.11 (0.026)	Abundance upwards, occupancy downwards
Tinaroo Ck Site, Dinden NP	12 (0.6667)	19 (0.6389)	19.16 (5.72)	39.06 (9.79)	0.95 (0.08)	0.98 (0.1867)	0.044 (0.014)	0.073 (0.018)	All abundance metrics upwards or stable
Upper Walsh River Site	8 (0.4848)	0 (0.00)	17.99 (10.57)	No quoll captures	0.77 (0.16)	Insufficient data	0.046 (0.015)	Insufficient data	All abundance metrics downwards
Brooklyn Sanctuary <sup>5</sup>	NA	8 (0.25)	NA	22.93 (10.96)	NA	0.434 (0.1798)	NA	0.059 (0.027)	NA

**Table 1. Four metrics of quoll abundance and detection probability values for six quoll monitoring sites, on two comparable occasions, Oct 2016 and Oct 2017.**

### NOTES

<sup>1</sup> Naïve occupancy is the proportion of sites at which quolls were detected

<sup>2</sup> Population estimated using spatially explicit capture-recapture modelling (Efford 2016);

<sup>3</sup> Occupancy is the proportion of sites (in this case the 36 trail camera monitoring points within each monitoring grid), at which quolls are estimated to occur, given the modelled uncertainty in detecting quolls when they occur at a point. Modelled using Presence software (Hines 2006);

<sup>4</sup> Detection probability is the modelled probability of detecting a quoll on each detection opportunity when it is present at a site. Modelled using Presence software (Hines 2006);

<sup>5</sup> The Brooklyn site replaced the Biboorah site from July 2017 onwards;

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Trail cameras were used to collect capture-recapture and site occupancy data on six populations of northern quoll *Dasyurus hallucatus* (Map 1) during October-November 2017. Fifty-four individual quolls were detected (Table 1) during approximately 3000 camera trap days. Population estimates were able to be generated at two thirds (4/6) of the sites due to low numbers of spatial recaptures at 2 two of the sites. Occupancy estimates were also only able to be generated at two thirds of the sites due to very low detection rates there.



**Figure 1 - Indicative locations of the six monitoring grids (red diamonds) used to monitor Northern Quoll populations in the northern Atherton Tablelands from July 2017 onwards. Monitoring site names in white text. Local place names in black text. Basemap: GoogleEarth Pro 9 December 2017.**

The number of quoll individuals detected on each of our 3km<sup>2</sup> sites ranged from 1 to 19. The numbers from the Mt Emerald sites are at the lower end of this range (Table 1). Of the four sites for which population sized could be estimated, the Mt Emerald 1 site had the lowest population size of any site that could be modelled. Occupancy could only be calculated for one of the Mt Emerald sites (Mt Emerald 1) and was at the lower end of occupancy ranges of any of the six sites (Table 1).

### Changes in populations between October 2016 and October 2017

The October 2017 monitoring session marks the first time during this project we have repeat monitoring data from the same season in different years. This is important as quoll abundance, activity and detection probability are likely to vary with seasonal life history stages. Comparative data reveal all indices of northern quoll abundance (no. individuals, proportion of sites detected, modelled population size, and occupancy) have decreased on the two Mt Emerald sites between October 2016 and October 2017 (Table 1, Fig 2).

Interpretation of this with respect to the role of construction activity on quoll populations is ambiguous, as one of the control sites (Walsh) has demonstrated an even more extreme decline in

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quoll abundance during the same period (Table 1), effectively disappearing from this site despite no obvious changes in land management there. Metrics of quoll abundance at the other two control sites for which we have comparable data have increased or remained stable during the same period (Table 1).

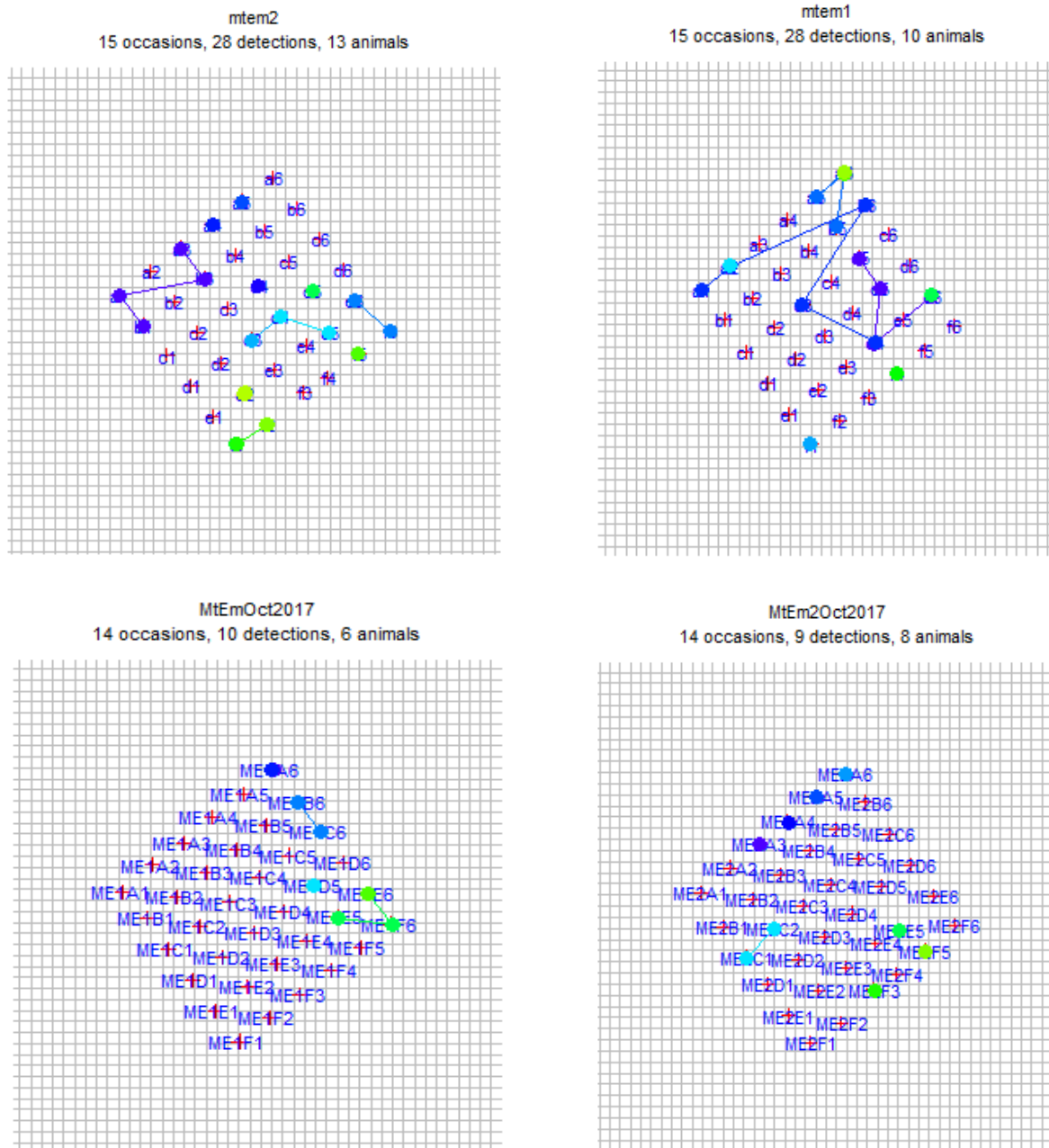


Fig 2. Comparison of detections of northern quolls at Mt Emerald 1 site between October 2016 (top left) and October 2017 (top right), and at Mt Emerald 2 site between October 2016 (bottom left) and October 2017 (bottom right). Labelled red crosses indicate camera trap locations, coloured dots are quoll detections, and coloured lines show movements by individuals between detectors.

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### References

Efford, M. G. (2016) secr: Spatially explicit capture-recapture models. R package version 2.10.4. <http://CRAN.R-project.org/package=secr>.

Hines, J. E. (2006). PRESENCE- Software to estimate patch occupancy and related parameters. USGS-PWRC. <<http://www.mbr-pwrc.usgs.gov/software/presence.html>>.