Surviving the toads: patterns of persistence of the northern quoll *Dasyurus hallucatus* in Queensland.

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Photos: front cover – Northern quoll at Cape Upstart. Photo: M. Oakwood & P. Foster

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Summary

The northern quoll *Dasyurus hallucatus* has declined rapidly with the spread of the cane toad *Chaunus (Bufo) marinus* across northern Australia, and is now listed as endangered nationally. Against a general pattern of rapid decline to local extinction in most northern quoll populations soon after the arrival of cane toads, there have been reports of persistence in some northern quoll populations in areas of Queensland with cane toads. The number, location and extent of such co-existing quoll populations have not previously been examined systematically. Here we report on these populations, through analysis of historical records and substantial and extensive field surveys.

These persisting populations may be critical for the conservation outlook and management priorities for northern quolls generally. Broadly, these populations may persist because (i) they have some genetic characteristics that provide some immunity to toad toxins; (ii) they have some behavioural characteristics that reduce their interactions with toads (e.g. they may happen not to include frogs in their diet); (iii) they persist in places where toad numbers are very low; and/or (iv) they persist in the habitat that is of highest suitability for northern quolls, allowing them to maintain high reproductive output and high density and thus be able to sustain some toad-caused mortalities. Given the typical immediacy of quoll death with toad encounter, there would have been very strong selective forces should any individuals in the population have had behavioural or genetic traits that would have reduced their likelihood of attacking toads and/or reduced their susceptibility to toad toxins. Another possibility is that these persisting populations of quolls are insecure and may still be declining albeit at a more gradual rate than typical.

From a data base of >500 records of northern quolls (including many records gained from the public from appeals to the public in this project), we demonstrated a substantial and continuing reduction in range, and change in habitat. Quolls have shown a highly significant and continuing pattern of loss from lowlands, from areas of low relief, and from areas that have lower and less seasonal rainfall. The persisting quoll populations occur now mostly in the most rugged portions of their former range. This pattern was shown to be unrelated to change in the environments sampled by fauna survey generally in Queensland. This pattern is similar to, but more marked than, that observed elsewhere in their range (including the Northern Territory and Kimberley, prior to the arrival of toads) – that is, toads have accentuated a pre-existing pattern of decline. Persisting quoll populations in Queensland are now in areas long inhabited by toads, suggesting that the persistence may be stable.

We extrapolated the best current distributional model of Queensland quolls to the Northern Territory, and concluded that quoll persistence in the Top End of the Northern Territory will be marginal, but most likely to occur in the most rugged areas of the sandstone plateau and escarpment of western Arnhem Land.

We sampled 60 sites (20 in north Queensland, 20 in central Queensland and 20 in south-east Queensland) selected mostly on the basis of reasonably recent reports of quolls. We confirmed quoll persistence at 15 sites. Amongst this set of 60 sites, quolls were more likely to be present at sites with steeper slopes, shallower soils,

more rocks (particularly large rocks, boulders and outcrops, and with less disturbance by fires. There was no relationship between quoll presence or abundance and toad presence or abundance. Only two sites had quolls present but toads absent (or at least, not recorded during our sampling): these tended to be the steepest, furthest from water and had highest weed impact.

Our data suggest general ongoing contraction of range of northern quoll over the last decade, but also suggest that some populations may now be stable. The assessment of trends in these populations can be determined only with continuing monitoring of at least a substantial subset of the sites sampled here, probably with more intensive sampling effort.

Although not reported in detail here, preliminary analysis of genetic material from quolls in some of these persisting populations suggests that these quolls do not have any resistance to toad toxins. Thus, of the four mechanisms for persistence outlined above, it is most likely that these quoll populations persist because of either behavioural avoidance of toads and/or because these sites allow high reproductive output and high densities of quolls (giving them the capacity to lose individuals to toads without catastrophic loss to the total local quoll population). The contribution of the first of these mechanisms could be tested through a staged and judicious program of translocations of some individuals of these quoll populations to sites of former occurrence. The contribution of the second is reliant on maintaining habitat quality at these sites. The most important management contribution to this objective would be through establishment and implementation of an appropriate fire regime, characterised by a very low frequency of fire, with any fires being patchy and of low intensity.

Our management recommendations from this study are to:

> (1) implement an appropriate ongoing monitoring program at a set of at least 10 sites shown here to have persisting quoll populations, in order to chronicle trends in the abundance and distribution of these populations (and to attempt to assess their total population sizes and distributional limits);
>
> (2) maintain or enhance habitat suitability for quolls at sites of persistence by establishment or maintenance of an appropriate fire regime (few fires, and these patchy and relatively "cool");
>
> (3) develop and carefully implement an experimental translocation program, from a persisting population to a site with suitable habitat where quolls have disappeared, in order to assess whether the persisting quolls have behavioural traits that minimise toad impacts.

Introduction

The northern quoll *Dasyurus hallucatus* is restricted to northern Australia, and formerly occurred in a broad and almost continuous band across northern Australia from the Pilbara to near Brisbane, but by the 1990s appeared to have contracted to several disjunct populations: central Queensland, the wet tropics of northern Queensland, northern Cape York Peninsula, the northern and western Top End of the Northern Territory, the north Kimberley and the Pilbara (Braithwaite and Griffiths 1994; Oakwood 1997).

A range of factors may have contributed to this historic decline, and the relative impacts of different factors, and the timing of the quoll decline, may have varied across their range. Finlayson (1934) noted that in central Queensland:

> "In common with the *Peramelidae*, and indeed with most other small terrestrial or partly terrestrial mammals, the members of this family (Dasyuridae) in the Dawson Valley underwent a sudden diminution in the late eighties of last century [i.e. 1880s], and though some species have made brief recoveries from time to time, they have not persisted, and at the present time are reduced to vanishing point … The real nature of the causes underlying these declines is obscure, owing partly to the absence of reliable contemporary records covering any considerable area. In different parts of the country floods, fires, droughts, disease, and closer settlement are all confidently advanced as having been severally responsible, and no doubt they have all contributed. But it is significant that the first notable diminution took place at a time when the country was still very sparsely occupied, and secondly, that the causes have been highly selective …"

Several recent ecological studies have suggested that northern quolls may be vulnerable to the extensive frequent fires now characteristic of much of northern Australia (Begg 1981; Braithwaite 1996; Oakwood 2000, 2008a,b; Woinarski *et al*. 2001). At Kapalga Research Station in Kakadu, after imposing four different fire regimes on landscape-scale experimental plots for two years, most small mammal species, including northern quolls, were found to be more abundant on the unburnt plots (Braithwaite 1996; Corbett *et al*. 2003). In a detailed radio-tracking study in the same area, the main cause of northern quoll mortality was found to be predation in the period following extensive fire because the reduction in vegetative groundcover increased their vulnerability (Oakwood 2000, 2008a). Predators included dingoes, dogs, feral cats, snakes, owls and kites. Reduction in protective vegetative cover may also occur in areas that are heavily grazed (Oakwood 2000).

Other factors that may have been involved more locally in the historic decline of this species are habitat clearance, human persecution, and disease. Where northern quolls occurred around human settlements, there have often been active campaigns to eradicate them, both in the past (Dixon and Huxley 1985) and present (e.g. landowners west of Proserpine, P. Foster *pers. comm*.). Perhaps more pervasively, northern quolls probably suffered some population reductions due to broad-scale poisoning targeting dingoes on pastoral and other agricultural lands. As an example of the extent of these poisoning programs, Kerr (1967) reported that in one year alone (1964), 1,300,000 baits, typically strychnine-laced, were dropped from light aircraft over a route of 15,000 miles in the north of Western Australia. Such broad spectrum

poisons were widely available and used (often with little or no regulation) across much of the pastoral lands and over many decades. These would have caused at least some fatalities for northern quolls, and may have contributed to the decline and local extinction especially in the pastoral portions of its range. More recently, baiting programs have become more regulated and paid more attention to the consequences for non-targeted wildlife.

Another factor potentially involved in the historic decline of northern quolls is disease. Drastic population crashes of the other three species of Australian quoll were recorded during the early 1900s and for two of these, the spotted-tailed quoll (*D. maculatus*) and the eastern quoll (*D. viverrinus*), this rapid decline was attributed to an unknown epidemic that swept through populations of several marsupial species at the time (Wood Jones 1923; Fleay 1932, 1945; Le Souef 1923; Troughton 1951; Edgar 1983). Toxoplasmosis, a disease caused by an exotic protozoan parasite, has been suggested to have been the cause (Shepherd and Mahood 1978; Caughley 1980), although there is no empirical; evidence to support this. There is no direct evidence of such disease affecting northern quolls. In a more recent and systematic review, Abbott (2006) compiled historic records of observations of diseased native mammals and proposed that an exotic epizootic disease triggered faunal collapse sequentially across Western Australia, particularly from the 1880s to 1920s. He considered northern quolls showed only weak partial immunity to this disease, and suggested that the disease spread to the Kimberley region in about 1910. It is possible that subsequent episodes of this or other diseases may have continued to diminish populations of northern quolls and other native mammals across northern Australia since. The only recent direct consideration of disease in northern quolls is a study focusing on disease and parasitism of northern quolls around Kakadu in the 1990s (Oakwood and Pritchard 1999; Oakwood and Spratt 2000). This study concluded that parasitism and disease was unlikely to have been a major factor contributing to the decline of northern quolls in that region at that time.

However, far more severe than this historic decline of northern quolls has been the more recent pattern of population collapse in the immediate aftermath of invasion of areas by the exotic cane toad *Chaunus (Bufo) marinus*. The toad has spread rapidly to the north, south and west from its initial release in central north Queensland in 1935, now occupies more than half of the historic range of the northern quoll, and is likely to overlap entirely the range of the northern quoll (with the arguable possibility of excluding the quoll population in the Pilbara) within about 10-20 years (Sutherst *et al*. 1996; van Dam *et al*. 2002). As with a range of other predator species, northern quolls will be rapidly killed in their attempted predation of toads by the toad's toxins. Recent studies have suggested that this mortality has led to rapid population decline and local extinctions for some goanna and snake species (Smith and Phillips 2006; Doody *et al*. 2006; Griffiths and McKay 2007), but in a comprehensive risk analysis, van Dam *et al*. (2002) suggested that the predator species whose survival was most likely to be at risk because of toad invasion was the northern quoll.

Although not previously systematically documented, anecdotal evidence suggests severe reductions in northern quoll populations throughout Queensland over the last 70 years. For example, Donald Thomson reported that northern quolls were well distributed over Cape York Peninsula in the 1930-40s particularly in the hills (Dixon and Huxley 1985) but as cane toads invaded that area in the mid 1980s to mid 1990s,

northern quolls were observed to "disappear" by local natural historians (Burnett 1997). At one monitored site, this disappearance occurred within three months of toad arrival, with no evidence of subsequent return.

The more recent cane toad invasion into the Northern Territory has been monitored more systematically, and this monitoring has shown a rapid and dramatic impact on northern quoll populations. Across a broad region of the south of Kakadu National Park, Watson and Woinarski (2003) compared trapping success for northern quolls at 77 monitored sites immediately pre- and post-toad arrival (2002-03), and with 33 control sites (not yet invaded by cane toads) trapped over the same periods. There was a highly significant ($p<0.005$) decline in northern quoll abundance (from a mean of 2.5 captures per quadrat to zero trapped) in the toad invaded sites, but no decline in the control sites. Also in Kakadu National Park, during the same period, a detailed radio-tracking and trapping study of northern quolls at two sites during cane toad invasion demonstrated that one population became extinct within 12 months of arrival of the toads and another population was reduced from 30 individuals to four over a period of 3 months (Oakwood 2004, 2008a). Radio-tracking allowed corpses of northern quolls poisoned by cane toads to be located and these had distinctive characteristics; bright red lips, nose bleeds, ear bleeds and purple teats (Oakwood 2004, 2008). Over much the same period, extensive trapping (4000 trap-nights at 56 widely dispersed sites) in sandstone uplands (the prime northern quoll habitat) in the south of Kakadu in February 2003 (about 2 years after toad invasion) resulted in no northern quolls (Watson and Woinarski 2004).

This rapid decline, including local extinctions, of the Northern Territory northern quoll populations was the prime reason for the recent listing of the species as endangered under the Australian *Environment Protection and Biodiversity Conservation Act* 1999, and for the listing of cane toads as a key threatening process to biodiversity under the *EPBC Act*.

Within the Northern Territory, a range of responses has been used to attempt to ameliorate the impact of toads on the conservation outlook for northern quolls. These have included the translocation of northern quolls to offshore islands (Rankmore *et al*. 2008), the establishment of a northern quoll captive breeding programs (Territory Wildlife Park: Kirwan and Gogler 2008) and attempts to maintain some mainland areas free of cane toads (Sawyer 2006).

In considering the prognosis for northern quolls in the Northern Territory (and indirectly, in northern Western Australia, where toads have not yet invaded), we sought perspective from a consideration of the status of the species in Queensland, where there has obviously been a longer-term interaction between toads and northern quolls. However, there is little documented information on this status (mostly confined to a small number of reports of localised loss or persistence: e.g. Pollock 1999). Accordingly, we attempted here to undertake a systematic and comprehensive assessment of the extent to which northern quoll populations have persisted in Queensland.

Specifically, this study aims to:

(i) compile all records of northern quolls in Queensland, in order to systematically assess the extent of decline and the characteristics of sites where the species may have persisted; and

(ii) undertake field surveys in sites of recent records, in order to characterise any habitat or other features of sites of persistence, and to establish the baseline for any ongoing monitoring that may examine whether these relictual northern quoll populations at such sites are expanding, stable or declining.

This study was recognised by the National Cane Toad Taskforce as one of the highest priority actions for the assessment of the impacts of cane toads upon biodiversity (Taylor and Edwards 2005).

Knowledge of such patterns of persistence may help prioritise conservation management efforts for northern quolls at sites not yet invaded by toads, and should help provide for a more considered assessment for the prognosis for northern quolls throughout their range. Persistence may occur at sites with low toad numbers, more extreme seasonality, where many alternative foods are available, or in areas of highest habitat quality for northern quolls. Alternatively, the mechanism allowing persistence of these populations may be due to some behavioural adaptation or selection (toad avoidance) or to some genetic resistance to cane toad toxin within these northern quoll populations.

In addition to these primary objectives, the study also sought to increase community awareness of northern quolls and to promote a positive attitude in the community towards the species; and to collect genetic samples of northern quolls in relictual populations, for subsequent analysis aimed at assessing whether these populations may contain any genetic characteristics that render them less susceptible to poisoning by toads.

Relevant ecology

The northern quoll is a predominantly nocturnal marsupial carnivore weighing up to 1100 g (Oakwood 2008b). It is the smallest of the four Australian quoll species. Northern quolls are usually solitary and have large home ranges relative to their size, over 100 ha for males and approximately 35 ha for females (Oakwood 2002). Northern quolls occupy a variety of habitats including eucalypt forest, eucalypt woodland, monsoon rainforest, along beaches and around human settlements but are particularly common in steep dissected rocky country (Dahl 1897; Calaby 1973; Begg 1981; Dixon and Huxley 1985; Friend and Taylor 1985; Schmitt *et al.* 1989; Menkhorst and Woinarski 1992; Woinarski *et al.* 1992; Braithwaite and Griffiths 1994; Oakwood 2002, 2008a,b). Northern quolls den during the day in rocky outcrops, tree hollows, hollow logs, termite mounds, goanna burrows and human dwellings (Dixon and Huxley 1985; Braithwaite 1990; Andersen and Jacklyn 1993; Oakwood 2002, 2008b). Northern quolls have only one breeding season per year, with young being born in the middle of the year. Their diet is opportunistic, heavily focused on invertebrates but also including vertebrates (including frogs) and fleshy fruit (Pollock 1999; Oakwood 2008b).

Methods

Northern quoll Queensland distributional database

A database was compiled of locality records for northern quolls in Queensland, based on records from both Australian and overseas museums, other databases (including compilations of fauna records maintained by relevant Queensland agencies, and by Dr Alex Kutt), publications, trap records and personal observations from reliable sources (Appendix A). In part, these records have been collected individually by the authors since the early 1990s (e.g. Oakwood 1997) and these were merged for this project.

Additional records were also widely sought. A media release was sent to all Queensland regional newspapers and news radio services within the known or potential distribution of the species in Queensland, in order to gather hitherto unreported sightings from the community (Appendix B). Articles were also placed in community group newsletters including the Faunacare newsletter which is circulated in the Proserpine/ Airlie Beach region, Barung News and the Mary River Codline, which service the Mary River catchment.

The collation of all known records of northern quolls in Queensland was reduced to unique records (i.e. with no duplicate records of the same latitude, longitude, year and locality name). This data base of unique records was used to investigate historical changes in northern quoll distribution, and the factors associated with any such change. Note that there are inevitably some caveats in interpretation of these data, including that the locational precision of earlier records is substantially less than more recent records, and that there has been no consistent and systematic sampling of northern quolls (or other wildlife) across the State equitably across the time period considered. Further, the data base we compiled includes a collation across a set of previously collated records: in some cases, duplicates of the same record may have been retained due to variable rounding errors and/or datum updates. We tried to minimise such duplicate records, mostly by reference to information on the collector and collection date.

Field survey

Trapping

We undertook targeted sampling for northern quolls at sixty sites (Table 1, Fig. 1) across Queensland, selected primarily on the basis of reports of northern quolls in the last 20-30 years, and/or perceived likelihood of their presence. John Winter and Helen Myles surveyed from Cape York to Townsville (20 sites, 64 transects), Peter Foster and Meri Oakwood from Townsville to Rockhampton (20 sites, 80 transects) and Scott Burnett and Ben Holmes from Rockhampton to Gympie (20 sites, 60 transects). We attempted to sample a broad range of sites across each region. Some sites with recent northern quoll records could not be sampled due to prohibitive logistical constraints or because permission to access sites was problematical.

Sites were located on a variety of land tenures including Aboriginal freehold, National Park, State Forest, leasehold and private land. Where possible, sites were a minimum of 10 km apart. At each site, we sampled three or four transects (typically separated by at least 0.5 km), for a total of 204 transects sampled. At each transect, 10 cage traps (either treadle or hook traps, mostly 20 x 20 x 50 cm and 12 x 12 x 20 cm) were placed in pairs on either side of a road or track, with each pair being 200 m apart. Traps were baited with one of four bait mixtures (peanut butter/rolled oats/anchovies; peanut butter/rolled oats/vegetable oil; peanut butter/rolled oats/chicken stock; or chicken). Traps were opened for three successive nights and checked early each morning. Two sites were trapped for only two successive nights due to vehicle breakdown.

Site sampling occurred in the period December 2006 to November 2007. Trapping was concentrated in the months between December and September, to minimise possible disturbance during the nursery denning period.

Any captured northern quolls were transferred to a cloth handling bag, weighed, sexed, and measured. Their approximate age (using size, pouch staining, time of year and tooth wear), reproductive condition and general condition was assessed. In the Northern region a small tissue sample was taken from the tip of their ear for DNA analysis. This tissue was stored in 70% ethanol. In the Central region each northern quoll was marked by taking a small snip of hair from an individual location to allow recaptured animals to be identified. Ectoparasites and scats were collected opportunistically. Northern quolls were then released at the trap site where they were captured. Non-target species were identified, weighed, sexed and then released at the site of capture.

DNA samples from quolls captured in the central Queensland region were sent to Professor Tom Madsen (University of Wollongong) for analysis, and parasites were sent to Dr David Spratt (CSIRO) with voucher specimens being lodged with the Wildlife Parasite Collection (CSIRO Sustainable Ecosystems) in Canberra.

Cane toad surveys

At each of the 60 study sites, a count of cane toads was carried out by driving at night along 15 km of nearby road and track. The GPS locations for the start and end of each transect, weather conditions (rainfall, temperature, humidity), width of road and amount of traffic was recorded (see Appendix E for data sheet). Due to the variable amount and nature of the track network around sites, driving speed varied from 5 km/hour to 20 km/hour, and in a few cases the 15 km toad transect had to comprise repeat samples of smaller stretches.

Note that toad sampling was done only at the site (rather than the transect) level, and the toad sampling route interpolated between quoll traps and extended beyond them.

Habitat description

Habitat details were recorded for every transect. This information comprised a large set of attributes relating to topographic and landscape setting; disturbance history and vegetation, with factors selected largely based on their feasible relevance to northern quoll habitat suitability (Table 2).

Analysis

Change in historical distribution

The collation of all known records of northern quolls in Queensland was reduced to unique records (i.e. with no duplicate records of the same latitude, longitude, year and locality name: Fig. 2). This data base of unique records was used to investigate historical changes in northern quoll distribution, and the factors associated with any such change. Note that there are inevitably some caveats in interpretation of these data, including that the locational precision of earlier records is substantially less than more recent records, and that there has been no consistent and systematic sampling of northern quolls (or other wildlife) across the State equitably across the time period considered.

For every record, we attributed a set of locational and environmental attributes, comprising:

(i) *elevation* (from a 90 m resolution digital elevational model: Jarvis *et al*. 2006);

(ii) *topographic ruggedness* (calculated following Riley *et al*. (1999) to express the amount of elevation difference between adjacent cells of a digital elevation grid. The process essentially calculates the difference in elevation values from a centre cell and the eight cells immediately surrounding it. Then it squares each of the eight elevation difference values to make them all positive and averages the squares. The topographic ruggedness index is then derived by taking the square root of this average, and corresponds to average elevation change between any point on a grid and its surrounding area.);

(iii) *mean annual rainfall* (using ANUCLIM: Houlder 2000);

(iv) *rainfall seasonality* (using ANUCLIM);

(v) *degree of land modification*. This was derived from the "VAST" national coverage, with categories 1=residual (natural), 2=modified, 3=transformed, 4,5=replaced (Thackway and Lesslie 2006). Note that this coverage does not provide information on the date at which modification occurred, hence we use it in analyses only for time periods since 1990.

(vi) *time since colonisation by cane toads.* Dataset provided by Ben Phillips and Rick Shine.

(vii) distance from rivers. Based on 1:100 000 watercourse mapping provided by Geoscience Australia.

We used Kruskal-Wallis ANOVA to examine whether there was variation in the values of these attributes linked to northern quoll records across a series of time periods: pre 1930, 1931-1950, 1951-1970, 1971-1990, 1991-2000 and post 2000. Any significant variation observed may be due to change in the environmental range of northern quolls across this timespan and/or to bias (historical change) in the sampling regime (e.g. earlier faunal records may have been biased towards more developed and accessible areas). To test for the latter, we ran a parallel analysis using an equivalently-sized data set comprising random samples of records of mammal species other than northern quolls (based on a collation of nearly 120,000 mammal records, compiled by Queensland Environment Protection Agency: Fig. 3).

For each of the six time periods above, we modelled the distribution of northern quolls in relation to the environmental attributes above, using generalised linear modelling (with binomial distribution, logit link function and backward stepwise elimination of variables). Such modelling may be most sensitive and robust if it includes reliable absence data. However the lack of consistent and systematic sampling (which could be used to derive absence records) precludes this approach, and instead we randomly generated a series of "pseudo-absences" for this modelling (Fig. 3). Notwithstanding some limitations, such an approach has been widely used to derive plausible distributional models for a wide range of other species and situations (e.g. Milne *et al*. 2006). These distributional models are mapped, and the total distributional area compared across the time periods.

Field survey

The association of northern quoll occurrence with each measured (continuous or ordinal scale) environmental variable was tested individually, across all sampled transects, using Mann-Whitney U tests. Association of northern quoll occurrence with categorical variables was examined with χ^2 tests.

To examine relationships with habitat features more synthetically, we assessed the similarity between all pairs of transects in suites of environmental variables (the set of all vegetation factors, the set of all disturbance factors, and the set of all topographic and landform characters), using Bray-Curtis similarity indices. Based on this similarity matrix, sites were then ordinated, using multi-dimensional scaling within the program PRIMER (Clarke and Gorley 2001). These analyses were duplicated, once with all included variables standardised (to range from 0 to 1) and once with the raw (unstandardised) data. We used ANOSIM to assess whether pairs of transects with northern quolls were likely to be more similar in their set of environmental features than randomly-selected pairs of transects.

In order to relate the occurrence of quolls to the field information about cane toad occurrence, we reduced all transect data at a site to site-level averages. Given the presumed (and uncontrollable) influence upon toad counts of extraneous factors [notably weather at the time of sampling, but also road type and sampling month], the counts of toads (alive and dead combined) were compressed to an ordinal scale (0=no toads observed, 1=toads observed but fewer than 1 per km; 2= 1-5 toads/km, and 3 = >5 toads/km), and also as simple presence/absence.

We used a simple χ^2 test to examine whether there was any significant association (or disassociation) between the presence of toads and quolls at a site; we also used Spearman rank correlation to test whether there was any relationship between quoll abundance (mean number caught per transect) and the abundance class of toads at a site.

We then classified all sites into four types – toads and quolls absent; toads present but quolls absent; quolls present but toads absent; and both quolls and toads present – and used Kruskal-Wallis ANOVA to examine whether there were any significant differences in individual environmental variables amongst these four types.

Finally, we assessed similarity amongst sites in a set of environmental variables (slope, altitude, relief, soil depth, litter depth, grass cover, litter cover, rock cover, abundance of logs, bare soil cover, fire impact and recency, canopy cover, midstorey cover, shrub (1-5m height) cover, ground cover, cover of rocks (20-60 cm diameter), cover of rocks (>60 cm diameter), boulders, rock outcrop, and distance to permanent water), with similarity derived from Euclidean distance following normalisation of the individual variables. Based on this similarity matrix, sites were then ordinated, using multi-dimensional scaling within PRIMER. We used ANOSIM to assess whether the similarity matrix was related to the categorisation of sites by presence of toads and quolls.

Results

Change in historical distribution

Historical trends in the environmental and other characteristics of northern quoll records are illustrated in Fig. 4. Differences in these variables, and their trends, between northern quoll records and those of non-quoll mammal records are summarised in Table 4. For elevation, northern quoll records are typically higher than non-quoll records, there is a trend for both sets of records to be at higher elevations over time, but this trend is significantly more marked for northern quoll than non-quoll records. For ruggedness, there is no consistent difference between northern quoll and non-quoll records nor any significant time effect, however, there is significant divergence between the historical trend for northern quoll records (to more rugged areas in more recent samples) and the historical trend for non-quoll records (no such trend). For rainfall, across all periods, northern quoll records were more

likely to be in higher rainfall sites than non-quoll records, and this disparity increased over time. Rainfall seasonality showed a similar pattern – northern quoll records occurred in more seasonal areas than non-quoll mammal records, and this became more divergent over time. There are no significant main or interaction effects for distance to rivers.

There is little historical trend in the toad arrival date for non-quoll records, but a marked change in toad arrival date for the northern quoll records. In general, early northern quoll records preceded the arrival of toads, but more recent northern quoll records are from sites that have had a relatively long period of toad presence. The land condition (VAST) assessment should be viewed with two caveats: it is not a continuous variable and it is based on current land condition (without reference to the data at which that condition may have arisen). For both northern quoll and non-quoll records, earlier records are in areas now relatively transformed, whereas more recent records tend to be in residual (intact) native vegetation. This pattern is consistent for both northern quolls and non-quolls and may reflect either decline of native fauna in areas following their modification and/or selection of more recent fauna sampling to be mainly in intact vegetation, or both. Across all time periods, northern quoll records tend to occur more than non-quoll records in areas that are now relatively intact. Notwithstanding this general pattern, we were advised in this study of a number of locations of quolls around human dwellings and infrastructure and in built-up areas.

Distributional models for each time period are summarised in Table 3 and mapped in Fig. 5. The model for the earliest period included only the term annual rainfall, and had relatively low explanatory power. The next period (1941-70) also included the term ruggedness, but still had relatively little explanatory power. The next period (1971-90) included a highly significant elevation component, and explained appreciably more of the deviance. In the next period (1991-2000), ruggedness was added to the preceding model, and the explanatory power remained reasonably good. In the most recent time period, ruggedness was replace din the best model by rainfall seasonality, and the model had very good (51% of deviance) explanatory power. When land condition and toad arrival date were also included as candidate variables to the most recent period, a more complex (4-factor) model was derived, suggesting a very strong association of the most recent northern quoll records with increasing time since toad arrival, and, less strongly but still highly significantly with increasing rainfall seasonality, with increasing elevation and with increasing distance from rivers. This model was exceptionally good, explaining about two-thirds of the total deviance.

These models were used to map the predicted distribution of quolls across these different time periods (Fig. 5). This mapping shows a general but uneven trend for contraction in the range of quolls, particularly after 2000, towards a concentration in the Wet Tropics and Einasleigh Uplands area, with increasingly isolated and small pockets elsewhere along and just inland from the mid-eastern coast.

We extrapolated the models for the two most recent time periods to the Northern Territory. The post-2000 model suggested the northern quoll would persist in the Northern Territory, albeit with a drastically reduced range based largely on a small portion of the sandstone plateau of western Arnhem Land (Fig. 6).

Field survey

Northern quolls were captured on 30 of the 204 transects (15 of the 60 sites). The total trap success rate was 1.2 % (75 quolls captured (including recaptures) from 6060 trap-nights).

Northern quoll occurrence showed substantial geographic variation (Fig. 1), with northern quolls far more likely to be present at transects in Central Mackay Coast, Wet Tropics and Brigalow Belt North bioregions, and far less likely to be present in Cape York Peninsula, South-East Queensland and Brigalow Belt South bioregions (Table xx). Trap success was highest in the central sector (2.7%), then northern (0.5%) and then southern (0%).

The likelihood of northern quolls being recorded on transects was significantly associated with many topographic and landscape variables, few vegetation features, and some disturbance variables (Table 6). Specifically, northern quolls were more likely to be present in transects that (in order from most significant) had shallower soils, had greater cover of boulders, had less fire impact, were closer to permanent water, had more extensive cover of rocks with diameter 60 cm to 2m, had greater cover of outcropping rock, were steeper, had more extensive total rock cover, were less likely to have been burnt recently, had logs more widely spaced, had more weed impact, had fewer branch hollows, had less logging impact, had fewer stags, were closer to current water, had more goat impact and were at lower elevations. They were also more likely to occur in transects on private land.

Many of these variables are inter-correlated (Appendix H), such that at least some of these significant associations may be due to the coincident association with other variables that directly affect habitat suitability for northern quolls.

The pattern of environmental similarity amongst transects was depicted in ordinations, undertaken separately for different sets of environmental variables; and the relationship of northern quoll occurrence with this environmental patterning was tested with ANOSIM. The occurrence of northern quolls on transects was unrelated to variation amongst the set of all vegetation factors, the set of floristic factors, the set of vegetation structural factors and the set of disturbance factors, but showed significant association with the set of topographic and landscape setting factors (Table 8; Fig. 7).

Cane toads were recorded at 12 of the 14 sites at which quolls were trapped, and at 35 sites for which no quolls were recorded. Eleven sites had neither quolls nor toads. Across all sites, there was no significant relationship between quoll abundance and toad abundance (r_s=-0.002, p>0.5), and sites with quolls were neither more nor less likely to have toads than sites without quolls (χ^2= 0.03, p=0.87).

Of the set of 54 environmental variables considered, nine varied significantly amongst sites with varying combinations of quolls and toads (Table 9), with a further six variables approaching significance (p<0.1). Compared to sites with quolls, sites with toads tended to be less steep, had deeper soils, had fewer boulders, were closer to

water, tended to have greater fire impact, and had fewer weeds. There were only two sites that had quolls but not toads, but these sites were notable in having (by far) the steepest slopes, being furthest from permanent water and having most extensive cover of large rocks and boulders. These two quoll but toad-absent sites also had the most weed impact, but least cover of shrubs, fewest stags and were more likely to have (feral) goats and horses. Given that only two sites fell into the quoll but not toad category, it is difficult to interpret these relationships, but some at least are presumably non-causal.

The ordination of sites according to their similarities in environmental variables is displayed in Figs. 8 (with sites symbolised according to whether quolls and toads were present or absent) and 9 (displaying marked variation in some of the environmental variables across this ordination space). Sites that were similar in this set of environmental features were likely to share similar classes in toad-quoll occurrence (ANOSIM R=0.139, p=0.034).

Discussion

The results reported here present the first systematic assessment of the distribution of northern quolls in Queensland, and characterise the geographic and environmental pattern of its changing distribution and now relictual distribution. This study corroborates more localised previous studies (notably Burnett 1997) that demonstrated local extinctions of northern quoll soon after areas were invaded by cane toads, but also corroborates and extends previous reports (mostly unpublished, other than notably Pollock 1999) that, notwithstanding broad-scale decline, northern quolls have persisted in some locations with toads.

This study comprised two main components - distributional modelling of historic records and characterisation of the habitat of current sites of persistence. These provide complementary approaches to understanding factors that may mediate persistence or extinction for northern quoll populations. The results from these different approaches are broadly consistent, but also reveal separate insights.

The historical analysis revealed that fate (local extinction or persistence) of Queensland's northern quoll populations was non-random. Rather, there were distinct geographic and environmental patterns. With analysis comparing northern quoll records with those of non-quoll fauna records, we found that northern quoll populations were far more likely to persist at higher altitude sites, more rugged sites and sites with higher and more seasonal rainfall, with these trends not due to general patterns of fauna survey effort in Queensland. These trends continue – compared with northern quoll records from the 1991-2000 period, northern quoll populations currently (post 2000) are more likely to be in even higher altitudes and more rugged environments (Fig. 4). These trends are consistent with a continuing retreat.

Previous studies, notably those of Schmitt *et al*. (1989) in the Kimberley, Oakwood (2000) and Woinarski *et al*. (2007) in the Northern Territory, and Pollock (1999) in

the Central Queensland Coast area, have also reported that rugged rocky areas are likely to provide the most suitable habitat for northern quolls. Thus the retreat of the Queensland northern quoll populations to such areas is a contraction from sub-optimal habitat to areas of highest habitat suitability. This trend (towards loss of populations from lower rainfall, less rugged areas) is consistent with, but more rapid and accentuated than, contraction evident in the Northern Territory and Kimberley, over the last 100 or so years, prior to the arrival of cane toads (Kitchener 1978; Braithwaite and Griffiths 1994; Oakwood 1997).

Most of the trends revealed in this analysis suggest ongoing decline, however there is also a historical trend for northern quolls to now occur at sites in which toads have been long present, with this trend significantly different to that for the Queensland mammal fauna as a whole. One optimistic interpretation of this result is that if a quoll population survives the initial impact of toads, it may recover. At the very least, it is clear that there are some populations that have now long persisted (>30 years) with toads, as reported previously for populations in the Mackay area by Pollock (1999).

Analysis that considered historical records of northern quoll relative to "pseudo-absences" was largely consistent with that for the comparison with non-quoll fauna records. Habitat models for quolls changed over time. The earliest records (pre 1941) suggested that quolls occurred widely in higher rainfall areas, without any particular association with topographic features. This relatively unspecialised habitat selection has been increasingly replaced by an association with topographic factors, as quolls have disappeared from the lower rainfall and lowland portions of their former range. Predictive mapping based on these models suggests that the core northern quoll population in Queensland is now centred on the Wet Tropics and Einasleigh Uplands areas. For this study, the resolution of this mapping is coarse, because we used pseudo-absences generated from most of Queensland, including very extensive areas that are unsuitable for northern quolls. It would be possible to enhance the mapping resolution by using a more narrowly circumscribed set of pseudo-absence comparison records, but that is beyond the scope of this study.

With appropriate caution, the models derived from Queensland can be extrapolated to other parts of the northern quoll's range, to anticipate the likely responses of northern quoll populations in areas only recently colonised, or not yet colonised, by cane toads. We present two such extrapolations to the Northern Territory. That based on the Queensland quoll records in the 1991-2000 period suggests a reasonably hopeful outlook for northern quolls in the Northern Territory, but that based on the model from Queensland records in the post 2000 period is notably less hopeful, with retreat to a very small core range in the sandstone escarpment and plateau of western Arnhem Land. There is some (limited) evidence that this latter scenario is realistic, with recent reports (S. Winderlich, Parks Australia, 2008) of persistence of some northern quolls in one area of this escarpment (and a few other sites) within an otherwise overall context of broad-scale regional extinctions.

Our field survey for northern quolls in Queensland confirmed their persistence in at least 14 sites. Our trap effort per site was limited (90-120 trap-nights), and in some cases the most suitable habitat present was no readily accessible, so it is feasible that we failed to record quolls at some sites where they persisted. The border-line adequacy of this trapping effort per site is also evident from the four sites where we

reported quolls from only one individual. Habitat relationships of northern quolls amongst this set of field sites were mostly similar to those reported from the broader distributional modelling, particularly the clear association with more rugged rocky areas. One notable difference was that amongst this set of survey sites, northern quolls were more likely to occur in lower elevation areas. This contrast is largely scale-related: the survey sites were selected largely as being potentially suitable for northern quolls and mostly located in upland areas; whereas the broader distributional modelling compared quoll sites with pseudo-absence sites from across Queensland (most of which were at relatively low altitudes). The habitat relationships derived from the field survey indicated that most vegetation features are largely irrelevant for northern quolls. Likewise, except for fire, quoll occurrence was largely unrelated to disturbance factors. Consistent with previous studies elsewhere (e.g. Begg 1981; Braithwaite 1996; Oakwood 2000, 2008a; Woinarski *et al*. 2001), the results from this survey suggested that northern quolls were more likely to occur in areas with least fire impact. This conclusion is consistent with other recent studies by QEPA (E. Adams, A. Dinwoodie, D. Ball *pers. comm*.). In the central region, there was a clear pattern across the sites whereby quolls were absent or in very low numbers anywhere where fire has been extensive (Conway NP, Homevale NP, Gamma State Forest southern section) and most abundant where fire has been excluded/minimised to a very low level for long periods of time (e.g. Goldcreek Rd 18 years since fire, Crediton State Forest, Midge Point 2) or where there are large boulders to break up the fire scar into a fine mosaic (Cape Upstart). At sites such as Crediton State Forest, quolls were present where cattle grazing has minimised fire if there was still cover present (e.g. lantana and boulders).

A perhaps surprising feature of these results was the lack of association of northern quolls with the abundance of hollows and fallen logs, typically used as denning sites (Oakwood 1997). The lack of this expected association may be because quolls were mostly recorded at more rugged rocky areas, and that rocky crevices provided ample (and preferred) denning opportunities there. This conclusion is supported by radio-tracking studies in Kakadu, Northern Territory, that demonstrated a preference for rocky crevices as dens if these were available (Oakwood 1997).

Cane toads were recorded at 12 of the 14 sites at which we recorded northern quolls, and there was no relationship across sites between toad presence (or abundance) and quoll presence (or abundance). This suggests that quolls are not persisting at particular sites because those sites have no or few cane toads. Rather, they are persisting at sites in co-existence with cane toads. A minor refinement of this generalisation is that there is some ecological differentiation between toads and quolls, with quolls being more likely to occur at steeper, rockier sites with shallow soils, and more distant from water.

Our study was too brief and extensive to include detailed population estimates for the sites of persistence, and hence to predict the viability of these populations. However, our study provides a foundation point from which an ongoing monitoring program can be developed, and such monitoring will be able to assess whether these populations are stable, declining or recovering. As a step towards the development of such monitoring, we provide a digest of all populations known to be still persisting or recently reported, in Appendix B. In order to have adequate statistical power, such a monitoring program would require a greater trap effort per site than that provided

here, as the numbers caught per site in our survey were generally low (maximum 12 individuals per site, but mean at occupied sites = 3.1 individuals). A specific monitoring program should aim to include at least 10 of the sites sampled here, should aim to establish the total population size and distributional limits of each persisting population, and should aim to detect whether these are increasing, decreasing or stable.

Northern quolls are known to be generally highly susceptible to the toxins in cane toads. Persistence of some populations of northern quolls with cane toads may be explained through several possible mechanisms: (i) they have some genetic characteristics that provide some immunity to toad toxins; (ii) they have some behavioural characteristics that reduce their interactions with toads (e.g. they may happen not to include frogs in their diet); (iii) they persist in places where toad numbers are absent or very low; and/or (iv) they persist in the habitat that is of highest suitability for northern quolls, allowing them to maintain high reproductive output and high density and thus be able to sustain some toad-caused mortalities.

Genetic samples were taken from some persisting quoll populations in this study and compared with samples from populations in the Northern Territory known to have proven susceptible to toads. The analysis of this genetic analysis is not reported here, but preliminary results (T. Madsen *pers. comm*.) indicate that there is no genetic factor in the persisting Queensland quolls that provides immunity from toad toxins. Our results also suggest that mechanism (iii) above is also largely untrue – at most sites of quoll persistence, toads are present (and in some cases, abundant).

We suggest instead that quolls have persisted at sites that offer the highest habitat suitability. At such sites, quoll density and reproductive success is relatively high, and hence the quoll population can afford to suffer some losses to toads (in part because losses to other predators may be relatively low in the refuge-rich rocky habitat). Further, such quoll "hotspots" may support relatively large quoll populations and hence reasonably high genetic and behavioural heterogeneity. If any quolls in such populations have behavioural traits that minimise the chances of being poisoned by toads (e.g. through not including frogs in the diet), then these traits will be strongly selected for.

This hypothesis can be readily tested by feeding trials (albeit these may be ethically challenging) and/or by translocating some quolls from a persistent population to suitable sites in which quolls have disappeared. Any such translocation would have to be undertaken in a carefully staged process, and would have to ensure that the removal of individuals from a persistent population had no significant detrimental impact on the viability of that population. Removal during the juvenile dispersal period would minimise such impact.

The conservation outlook of the persistent quoll populations will be enhanced where management can maintain the habitat quality of those sites and thus minimise detrimental impacts from other factors. The most obvious management requirement is the establishment and/or maintenance of an appropriate fire regime, specifically a regime that is characterised by infrequent fire, with such fire being patchy and relatively cool.

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Table 1. The locations of the 60 study sites throughout Queensland where surveys for northern quolls were conducted in 2006-2007. For Region: North = Cape York to Townsville, Central = Townsville to Rockhampton, South=Rockhampton to Gympie. For tenure: AWC=Australian Wildlife Conservancy. Note that all geocodes are in WGS84 datum. Acronyms for bioregions: BBN=Brigalow Belt North; BBS=Brigalow Belt South; CMC=Central Mackay Coast; CYP=Cape York Peninsula; EU=Einasleigh Uplands; SEQ=South-east Queensland; WT=Wet Tropics.

Region	*site no.*	*Nearest town*	*Location*	*Tenure*	*Month surveyed*	*bioregion*	*zone*	*easting*	*northing*
North	1	Mapoon	Mapoon, Red Beach	Aboriginal freehold	Dec 06	CYP	54	595245	8670258
North	2	Mapoon	Mapoon, Big Swamp	Aboriginal freehold	Dec 06	CYP	54	596281	8673321
North	3	Weipa	Batavia Downs	Leasehold	Dec 06	CYP	54	671892	8594071
North	4	Weipa	Embley Range	Leasehold	Dec 06	CYP	54	674544	8593679
North	5	Kairi	Tinnaroo Falls	National Park	Jan 07	WT	55	344622	8101513
North	6	Mt Carbine	Brooklyn, Mt Spurgeon Rd	Leasehold AWC	Jan 07	EU	55	303290	8173278
North	7	Mt Carbine	Brooklyn, Pump Crossing Rd	Leasehold AWC	Jan 07	EU	55	300118	8167979
North	8	Mareeba	Tinnaroo Ck Rd, Emu Ck	National Park	Mar 07	WT	55	344348	8107619
North	9	Mareeba	Tinaroo Creek Rd, Douglas Creek	Leasehold	Mar 07	EU	55	340944	8110818
North	10	Tolga	Tolga, Vollert's	Private	Mar 07	EU	55	334717	8105223
North	11	Herberton	Silver Valley, Dry River	Leasehold	Apr 07	EU	55	317949	8069351
North	12	Herberton	Silver Valley, Wild River	Leasehold	Apr 07	EU	55	323386	8073371
North	13	Paluma	Deception Creek West	Leasehold AWC	Apr 07	EU	55	399094	7890556
North	14	Paluma	Deception Creek East	Leasehold AWC	Apr 07	EU	55	395566	7890951
North	15	Paluma	Hellhole Creek South	Leasehold AWC	Apr 07	EU	55	400669	7876501
North	16	Paluma	Hellhole Creek North	Leasehold AWC	Apr 07	EU	55	401388	7880086
North	17	Mt Carbine	Brooklyn, Pom Pom Mine Road	Leasehold AWC	May 07	EU	55	314506	8158394
North	18	Mt Carbine	Brooklyn, Luster Creek	Leasehold AWC	May 07	EU	55	312516	8155793
North	19	Cooktown	Shiptons Flat	Leasehold	May 07	WT	55	310346	8254145
North	20	Cooktown	Mt Poverty	Leasehold	June 07	WT	55	308439	8246454
Central	1	Yeppoon	Byfield State Forest, Atherton Mt	State Forest	May 07	CMC	56	264933	7481332
Central	2	Yeppoon	Byfield State Forest, Upper Stony Ck	State Forest	May 07	CMC	56	256386	7466162
Central	3	Proserpine	Rangemore	Private	Jun 07	CMC	55	644491	7742650
Central	4	Proserpine	Dittmer	State Forest	June 07	CMC	55	646465	7738239
Central	5	Proserpine	Silver Creek	Private	June 07	CMC	55	653866	7733508
Central	6	Proserpine	Goldcreek Rd (adj Proserpine SF)	Private	June 07	CMC	55	648978	7733568
Central	7	Bloomsbury	Midge Point, Jimmys Rock Rd	Crown/Private	June 07	CMC	55	679867	7717155

Region	*site no.*	*Nearest town*	*Location*	*Tenure*	*Month surveyed*	*bioregion*	*zone*	*easting*	*northing*
Central	8	Bloomsbury	Midge Point, Bloomsbury Rd	Private	June 07	CMC	55	676216	7714222
Central	9	Proserpine	Ameliavale (nr Andromache SF)	Private	June 07	CMC	55	644314	7725508
Central	10	Airlie Beach	Conway National Park	National Park	July 07	CMC	55	681655	7743446
Central	11	Bowen	Cape Upstart	Private/NP	July 07	BBN	55	584025	7810631
Central	12	Airlie Beach	Woodwark Bay (adj Dryander NP)	Private	July 07	CMC	55	671417	7761362
Central	13	Hydeaway Bay	Cape Gloucester	Private	July 07	CMC	55	654064	7780211
Central	14	Townsville	Magnetic Island	NP/Private	July 07	BBN	55	486593	7886441
Central	15	Townsville	Cape Cleveland	National Park	Aug 07	BBN	55	498996	7869074
Central	16	Calen	Cathu State Forest Sth	State Forest	Sept 07	CMC	55	659209	7696771
Central	17	Mackay	Cathu State Forest Nth	State Forest	Sept 07	CMC	55	651797	7702754
Central	18	Mackay	Crediton State Forest	State Forest	Sept 07	CMC	55	656144	7648411
Central	19	Mackay	Eungella Dam	Leasehold	Sept 07	BBN	55	643653	7661958
Central	20	Mackay	Gamma State Forest	State Forest	Sept 07	WT	55	647316	7668142
South	1	Gympie	Curra State Forest	State Forest	Mar. 07	SEQ	56	466158.9	7112694
South	2	Injune	Mt Moffat, Mailbox Track	National Park	April 07	BBS	55	588668.3	7229387
South	3	Injune	Mt Moffat, Marlong Arch	National Park	April 07	BBS	55	591354.5	7237869
South	4	Injune	Lonesome N.P, Candlesticks Rd	National Park	April 07	BBS	55	684728.1	7176430
South	5	Injune	Lonesome N.P, Gaswell	National Park	April 07	BBS	55	695237.4	7172414
South	6	Gympie	Brooyar State Forest	State Forest	April 07	SEQ	56	452069.6	7108275
South	7	Gympie	King State Forest	State Forest	April 07	SEQ	56	456197.1	7104858
South	8	Gladstone	Kroombit Tops, Boxflat	National Park	April 07	SEQ	56	290555.6	7305218
South	9	Gladstone	Kroombit Tops, Razorback	National Park	April 07	SEQ	56	288807	7297835
South	10	Monduran	Bania Forest Reserve	Forest Reserve	April 07	SEQ	56	355460.8	7241753
South	11	Monduran	Bania Forest Reserve II	Forest Reserve	April 07	SEQ	56	356901.3	7239676
South	12	Rockhampton	Berserker Range, Moores Creek	National Park	Nov. 07	BBN	56	251323.7	7419712
South	13	Rockhampton	Berserker Range, New Zealand Gully	National park	Nov. 07	BBN	56	257885.3	7416732
South	14	Mt Morgan	Mt Morgan, Citriodora track	Private Nature Reserve	Nov. 07	BBS	56	243003.4	7387219
South	15	Mt Morgan	Mt Morgan, Belgamba Nature Reserve	Private Nature Reserve	Nov. 07	BBS	56	245382.2	7386450
South	16	Gracemere	Stanwell, Mercy East	Private Nature Reserve	Nov. 07	BBS	56	226623.1	7395381
South	17	Gracemere	Stanwell, Tongs Corner	Private Nature Reserve	Nov. 07	BBS	56	230664.3	7398660
South	18	Springsure	Ka Ka Mundi N. P, Carnarvon Station	National Park	Nov. 07	BBS	55	541428.4	7248379
South	19	Springsure	KaKa Mundi N.P, Mt Ka Ka Mundi	National Park	Nov. 07	BBS	55	548188.7	7255626
South	20	Springsure	Ka Ka Mundi N. P, Bunbuncundoo Spring	National Park	Nov. 07	BBS	55	543689.2	7251494

Table 2. Environmental and other attributes recorded at field survey transects. Code numbers for each environmental variable relate to variables included in modelling described in Table 8. Variable type relates to the form of distribution: "cont." means continuous.

attribute	*variable type*	*how assessed*	*mean (s.e; .range)*
topographic and landscape setting			
1. slope	cont.	degrees; estimated	9.8 (0.7; 0-70)
2. altitude	cont.	m.; topographic maps	370.8 (20.6; 2-1118)
3. topographic position	ordinal	categorised as either ridge (1), midslope (2), flat (3) or gully (4)	2.05 (0.06; 1-4)
4. relief	ordinal	the altitudinal variation within 300m radius, categorised as >300m (5), 90-300m (4), 30-90m (3), 9-30m (2) or <9m (1).	2.53 (0.08; 1-5)
5. soil depth	ordinal	categorised as deep (3), shallow (2) or skeletal (1)	2.20 (0.05; 1-3)
6. soil texture	ordinal	categorised as clay (5), clay-loam (4), loam (3), sandy-loam (2) or sand (1)	2.35 (0.08; 1-5)
7. total rock cover	ordinal	categorised as none (0), few (1), moderate (3) or many (4)	1.37 (0.08; 0-3)
8. cover of rocks (of 20-60 cm size)	cont.	surficial cover scored as 0 (0), <2% (1), 2-10% (2), 10-20% (3), 20-50% (4), 50-90% (5) or >90% (6)	2.02 (0.14; 0-6)
9. cover of rocks (of 60 cm to 2 m size)	cont.	as for 8	1.57 (0.12; 0-6)
10. cover of boulders	cont.	as for 8	0.70 (0.08; 0-5)
11. cover of outcropping rock	cont.	as for 8	0.82 (0.08; 0-4)
12. distance to cliff	cont.	distance to nearest cliff or escarpment: estimated (in km.) to maximum score of >5 km.	2.41 (0.15; 0-5.5)
13. rock type (geology)	categorical	sandstone; laterite; metasediment; limestone; basalt; granite; other	
14. distance to permanent freshwater	cont.	scored as <50m (1), 50-500m (2), 500m-5km (3), >5km (4)	2.75 (0.06; 1-4)
15. distance to current freshwater	cont.	as for 14	2.50 (0.06; 1-4)
disturbance			
16. age	ordinal	scored as 1=old-growth; 2=disturbed old; 3=mature; 4=disturbed mature; 5=young	3.06 (0.09; 1-5)
17. logging	ordinal	scored as none (0), light (1), moderate (2) or severe (3)	0.73 (0.07; 0-3)
18. grazing	ordinal	as for 17	0.72 (0.06; 0-3)

attribute	*variable type*	*how assessed*	*mean (s.e; .range)*
19. fire	ordinal	as for 17	1.31 (0.06, 0-3)
20. weeds	ordinal	as for 17	1.02 (0.07; 0-3)
21. goats	ordinal	as for 17	0.02 (0.01; 0-1)
22. pigs	ordinal	as for 17	0.48 (0.04; 0-2)
23. rabbits	ordinal	as for 17	0.13 (0.02; 0-1)
24. horses	ordinal	as for 17	0.17 (0.03; 0-1)
25. most recent fire	ordinal	scored as <6 mo (0), 6-12 mo (1), 1-3 yr (2) or >3 yr (3)	2.35 (0.06; 0-3)
vegetation and environment			
26. dominant tree type	categorical	scored as eucalypt (including *Corymbia*) (1), rainforest (2), *Melaleuca* (3), *Acacia* (4), *Casuarina* (5), *Lophostemon* (6), exotic (7), *Pandanus* (8) or none (0)	
27. forest structural type	ordinal	scored as closed forest (1), open forest (2), woodland (3), open woodland (4), scattered trees (5)	2.83 (0.05; 1-4)
28. Allocasuarina	ordinal	scored as none (0), few (1), moderate (2), many (3)	0.60 (0.06; 0-3)
29. Acacia	ordinal	as for 28	1.04 (0.07; 0-3)
30. Banksia	ordinal	as for 28	0.17 (0.03; 0-3)
31. decorticating bark	ordinal	as for 28	0.90 (0.05; 0-3)
32. mistletoe	ordinal	as for 28	0.33 (0.05; 0-3)
33. epiphytes	ordinal	as for 28	0.22 (0.04; 0-3)
34. flowers	ordinal	as for 28	0.49 (0.05; 0-3)
35. fleshy fruits	ordinal	as for 28	0.36 (0.04; 0-3)
36. emergent canopy cover	cont.	estimated; %	0.67 (0.18; 0-20)
37. canopy cover	cont.	estimated; %	30.6 (1.3; 0-80)
38. canopy height	cont.	estimated, in m.	17.5 (0.4; 0-35)
39. midstorey cover	cont.	estimated; %	19.3 (1.4; 0-90)
40. shrub (1-5 m) cover	cont.	estimated; %	16.2 (1.2; 0-80)
41. ground vegetation cover	cont.	estimated; %	64.6 (2.3; 0-100)
42. dominant shrub type	categorical	scored as mesic (1), sclerophylous (2), mixed (3), heath (4), grasstree (5) or none (6)	
43. litter depth	ordinal	scored as 0 (0), <2cm (1), 2-10cm (2), >10cm (3)	1.25 (0.04; 0-3)
44. litter cover	ordinal	as for 28	1.35 (0.04; 0-3)

attribute	*variable type*	*how assessed*	*mean (s.e; .range)*
45. bare soil	ordinal	as for 28	1.24 (0.06; 0-3)
46. no. termite mounds	ordinal	as for 28	0.61 (0.05; 0-3)
47. understorey type	binary	scored as grass or other.	
48. tree spacing	cont.	sum of point-centre quarter (distances to 4 nearest trees > 30 cm dbh) [to max of 75m per quarter]	67.4 (3.0; 13-300)
49. tree mean dbh	cont.	mean dbh of the 4 trees sampled in 48	45.9 (0.9; 0-102)
50. no. hollows <5 cm	cont.	no. hollows (<5 cm dbh) in the trees sampled in 48	4.07 (0.33; 0-26)
51. no. hollows >5 cm	cont.	no. hollows (>5 cm dbh) in the trees sampled in 48	2.06 (0.21; 0-20)
52. no. logs (>10 cm)	ordinal	as for 28	1.42 (0.05; 0-3)
53. no. log piles	ordinal	as for 28	0.11 (0.03; 0-3)
54. no. stags (>10 ..)	ordinal	as for 28	0.91 (0.05; 0-3)
55. no. trunk hollows	ordinal	as for 28	0.76 (0.05; 0-3)
56. no. branch hollows	ordinal	as for 28	1.27 (0.05; 0-3)
57. log spacing	cont.	as for 48, but for fallen logs (>30 cm diameter)	195.5 (6.0; 23-380)
58. log hollows	cont.	no. hollows in these logs	2.75 (0.22; 0-15)

Also recorded was GPS location (for every trap site) and land tenure.

Table 3. Frequency distribution of Queensland northern quoll records across different time periods.

period	*no. of records*
undated	29
Pre 1941	54
1941-70	77
1971-90	143
1991-2000	165
post 2000	86
total	**554**

Table 4. Comparison of quoll and non-quoll records ("record type") and their historical trends, for a set of environmental and other variables.

variable	term	df	F	p
elevation	intercept	1	884.5	<0.00001
	record type	1	5.2	0.022
	period	4	15.0	<0.00001
	period x record type	4	8.3	<0.00001
ruggedness	intercept	1	517.2	<0.0001
	record type	1	0.6	0.42
	period	4	1.9	0.12
	period x record type	4	4.4	0.0017
rainfall	intercept	1	4464.0	<0.00001
	record type	1	57.3	<0.00001
	period	4	1.8	0.12
	period x record type	4	3.1	0.015
rainfall seasonality	intercept	1	9559.8	<0.00001
	record type	1	315.2	<0.00001
	period	4	10.0	<0.00001
	period x record type	4	5.0	0.0006
toad arrival date	intercept	1	16537629	<0.00001
	record type	1	69.0	<0.00001
	period	4	26.1	<0.00001
	period x record type	4	5	0.0007
land condition	intercept	1	2082	<0.00001
	record type	1	26.3	<0.00001
	period	4	6.1	0.000081
	period x record type	4	0.4	0.81
distance to river	intercept	1	278.7	<0.00001
	record type	1	2.1	0.15
	period	4	1.4	0.20
	period x record type	4	0.1	0.98

Table 5. Summary of models for quoll distribution for each of five time periods. Note that all models considered the terms rainfall, rainfall seasonality, elevation, topographic ruggedness, and distance to river. In addition the POST 2001 (ii) model considered land condition and toad arrival date.

							goodness of fit			
		estimate	*s.e*	*Wald*	*p*			*df*	*deviance*	*% explained*
PRE-1941	intercept	-4.626752	0.304016	231.6111	0.000000		model	1052	357.796	16.0%
	rainfall	0.001885	0.000244	59.4322	0.000000		null	1053	426.092	
1941-70	intercept	-4.072527	0.252644	259.8422	0.000000		model	1074	481.614	13.1%
	rainfall	0.001537	0.000226	46.1189	0.000000		null	1076	554.631	
	rugged	0.037065	0.015796	5.5056	0.018956					
1971-90	intercept	-5.675097	0.338237	281.5162	0.000000		model	1140	578.230	32.9%
	elevation	0.002480	0.000470	27.8441	0.000000		null	1142	861.783	
	rainfall	0.003095	0.000231	178.9637	0.000000					
1991-2000	intercept	-5.313930	0.314079	286.2553	0.000000		model	1161	637.603	32.9%
	elevation	0.002036	0.000472	18.6210	0.000016		null	1164	950.437	
	ruggedness	0.061209	0.012533	23.8529	0.000001					
	rainfall	0.002662	0.000220	145.7643	0.000000					
POST 2001 (i)	intercept	-11.44252	1.397275	67.06250	0.000000		model	1082	292.880	51.3%
	elevation	0.00594	0.000632	88.34206	0.000000		null	1085	601.179	
	seasonality	0.03691	0.010335	12.75566	0.000355					
	rainfall	0.00298	0.000322	85.75499	0.000000					
POST 2001 (ii)	intercept	494.566	56.52617	76.55076	0.000000		model	1053	200.896	66.6%
	elevation	0.003	0.00078	13.39493	0.000252		null	1085	601.179	
	dist_river	0.302	0.09208	10.78949	0.001021					
	toad arrival	-0.258	0.02935	77.38077	0.000000					
	seasonality	0.056	0.01386	16.03900	0.000062					

Table 6. Comparison of environmental variables for transects with and without quolls recorded during the 2006-07 surveys. z is the score associated with Mann-Whitney U tests, with associated p values: ns=not significant, * p<0.05, ** p<0.01, *** p<0.001.

attribute	*mean (quoll) [n=30]*	*mean (non-quoll) [n=174]*	*z*	*p*
topographic & landscape setting				
slope	15.7	8.8	3.01	**
altitude	296.6	383.6	1.98	*
topographic position	2.3	2.0	1.74	ns
relief	2.5	2.5	0.27	ns
soil depth	1.7	2.3	4.44	***
soil texture	2.4	2.3	0.06	ns
rock cover	2.0	1.3	3.01	**
cover of rocks (of 20-60 cm size)	2.1	2.0	1.22	ns
cover of rocks (of 60 cm to 2 m size)	2.5	1.4	3.49	***
cover of boulders	1.6	0.5	4.28	***
cover of outcropping rock	1.5	0.7	3.33	***
distance to cliff	2.8	2.3	0.70	ns
distance to permanent water	3.1	3.0	0.52	ns
distance to current water	2.2	2.5	2.04	*
disturbance				
age	3.2	3.0	0.25	ns
logging	0.3	0.8	2.42	*
grazing	0.8	0.7	0.35	ns
fire	0.7	1.4	4.02	***
weeds	1.4	0.9	2.54	*
goats	0.07	0.01	2.00	*
pigs	0.3	0.5	1.78	ns
rabbits	0.1	0.1	0.49	ns
horses	0.07	0.18	1.59	ns
most recent fire	2.7	2.3	2.80	**
vegetation and environment				
forest structural type	2.9	2.8	0.59	ns
Allocasuarina	0.3	0.6	1.80	ns
Acacia	1.1	1.0	0.17	ns
Banksia	0.03	0.2	1.75	ns
decorticating bark	1.1	0.9	1.72	ns
mistletoe	0.2	0.3	0.86	ns
epiphytes	0.3	0.2	0.80	ns
flowers	0.7	0.4	1.42	ns
fleshy fruits	0.3	0.4	0.11	ns
emergent canopy cover	0.3	0.7	0.42	ns
canopy cover	26.3	31.4	1.68	ns
canopy height	17.4	17.5	0.20	ns
midstorey cover	22.1	18.5	1.59	ns
shrub (1-5 m) cover	22.1	18.5	0.77	ns

attribute	*mean (quoll) [n=30]*	*mean (non-quoll) [n=174]*	*z*	*p*
ground vegetation cover	64.3	59.4	0.65	ns
litter depth	1.3	1.2	0.37	ns
litter cover	1.2	1.4	1.50	ns
bare soil	1.1	1.3	0.40	ns
no. termite mounds	0.5	0.6	0.31	ns
tree spacing	75.6	66.0	1.27	ns
tree mean dbh	45.8	45.9	0.76	ns
no. hollows <5 cm	3.0	4.3	1.20	ns
no. hollows >5 cm	1.3	2.2	1.05	ns
no. logs (>10 cm)	1.2	1.4	1.31	ns
no. log piles	0.10	0.11	0.12	ns
no. stags (>10 ..)	0.6	1.0	2.17	*
no. trunk hollows	0.5	0.8	1.88	ns
no. branch hollows	1.0	1.3	2.48	*
log spacing	221.7	179.2	2.55	*
log hollows	2.1	2.8	1.61	ns

Table 7. Comparison of categorical and ordinal scale environmental variables for transects with and without quolls recorded during the 2006-07 surveys. Bioregion acronyms as in Table 1. This table lists only those variables for which a significant difference (based on χ^2 tests) was observed. Probability levels: * $p<0.05$; ** $p<0.01$; *** $p<0.001$.

	bioregion							χ^2
	CYP	WT	EU	CMC	BBN	BBS	SEQ	
no quolls	16	12	32	45	15	33	21	24.3 ***
quolls	0	4	4	15	7	0	0	(df=6)

	tenure						χ^2
	cons	lease	SF	Aboriginal	private	other	
no quolls	79	21	42	8	22	2	31.0 ***
quolls	5	6	3	0	16	0	(df=5)

	most recent fire				χ^2
	0-6 mo	6-12 mo	1-3 yr	> 3 yr	
no quolls	12	15	58	89	8.7 *
quolls	1	1	4	24	(df=3)

Table 8. Summary table of relationships between quoll occurrence and similarity between transects in sets of environmental variables. Values given in body of table are R values from ANOSIM, with associated probability (p). Refer to Table 2 for code numbers for environmental variables included.

model set	*data treatment*	*variables included*	*R*	*p*
all vegetation	standardised	28,29,30,31,32,33,34,35,36,37,38, 39,40,41,43,44,45,48,49,50,51,52, 53,54,55,56,57,58	-0.033	0.70
	unstandardised		-0.034	0.77
vegetation structure	standardised	36,37,38,39,40,41,43,44,45,48,49, 50,51,52,53,54,55,56,57,58	-0.081	0.56
	unstandardised		-0.033	0.75
floristics	standardised	28,29,30,32,33,34,35	-0.022	0.62
	unstandardised		-0.015	0.61
topography & landscape setting	standardised	1,2,3,4,5,6,7,8,9,10,11,12,14,15	0.084	0.007
	unstandardised		0.132	0.008
topography	standardised	1,3,4,5,6,7,8,9,10,11	0.071	0.019
	unstandardised		0.034	0.16
disturbance	standardised	16,17,18,19,20,21,22,23,24,25	-0.021	0.70
	unstandardised		-0.031	0.76

Table 9. Comparison of environmental variables for sites with varying combinations of quolls and toads. Variables are included only where $p<0.1$, from Kruskal-Wallis ANOVA. Values in body of Table are means, but note that most of the considered variables were ordinal.

attribute	*quolls absent; toads absent*	*quolls absent; toads present*	*quolls present; toads absent*	*quolls present; toads present*	*H*	*p*
no. of sites	*11*	*35*	*3*	*11*		
slope	9.5	7.5	30.3	11.9	6.3	0.097
soil depth	2.3	2.4	1.5	1.8	9.2	0.027
cover of bare soil	1.8	1.1	1.4	1.2	8.1	0.044
cover of rocks (of 60 cm to 2 m size)	2.1	1.3	2.4	1.8	7.1	0.067
cover of boulders	0.8	0.3	1.6	1.4	12.2	0.007
distance to permanent water	3.5	2.9	3.9	2.8	9.9	0.019
distance to current water	3.1	2.5	2.8	2.2	7.3	0.062
fire	1.5	1.5	1.0	0.9	7.6	0.056
goats	0	0	0.5	0	29.0	0.0001
horses	0.3	0.2	0.5	0	6.4	0.095
banksia	0.08	0.25	0.38	0	9.1	0.029
midstorey cover	8.2	21.2	19.4	23.8	9.0	0.029
cover of shrubs (1-5m)	12.5	19.1	2.8	16.6	8.8	0.032
weed impact	0.5	1.0	1.8	1.3	7.7	0.052
no. of stags	0.9	1.1	0.1	0.7	7.9	0.047

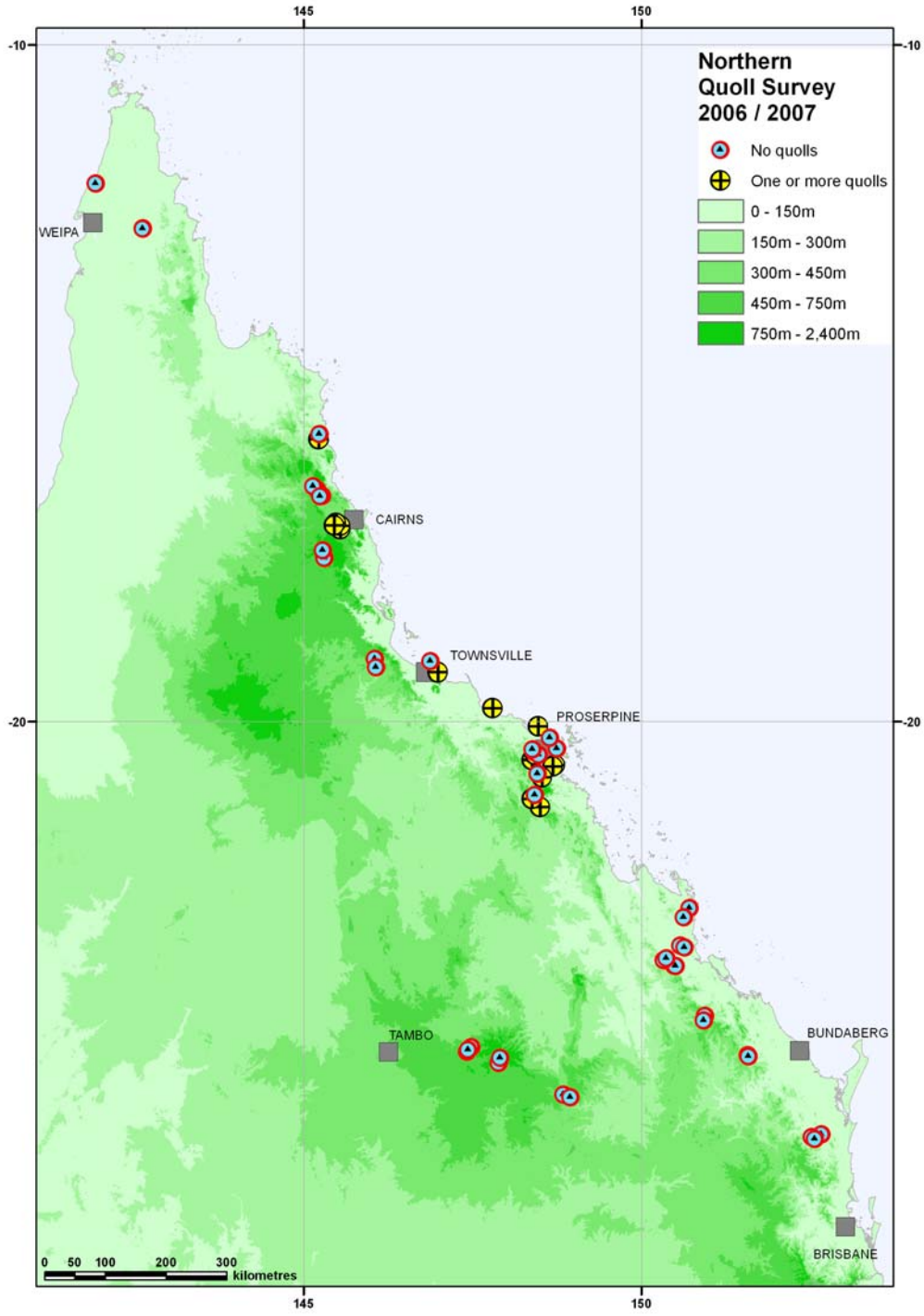


Figure 1. Sites sampled during this study for northern quolls.

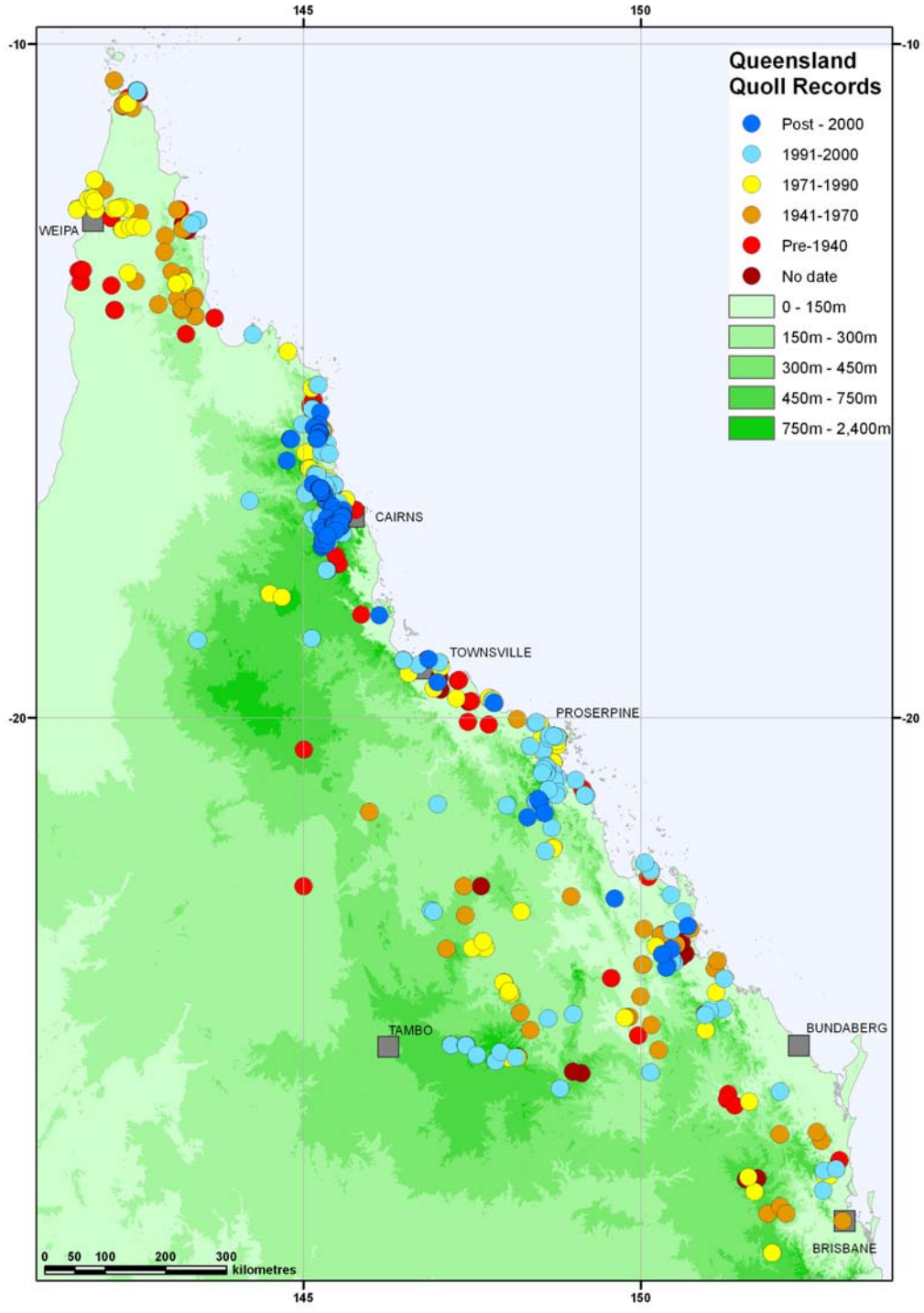


Figure 2. Location of all northern quoll records listed in the data base collated here.

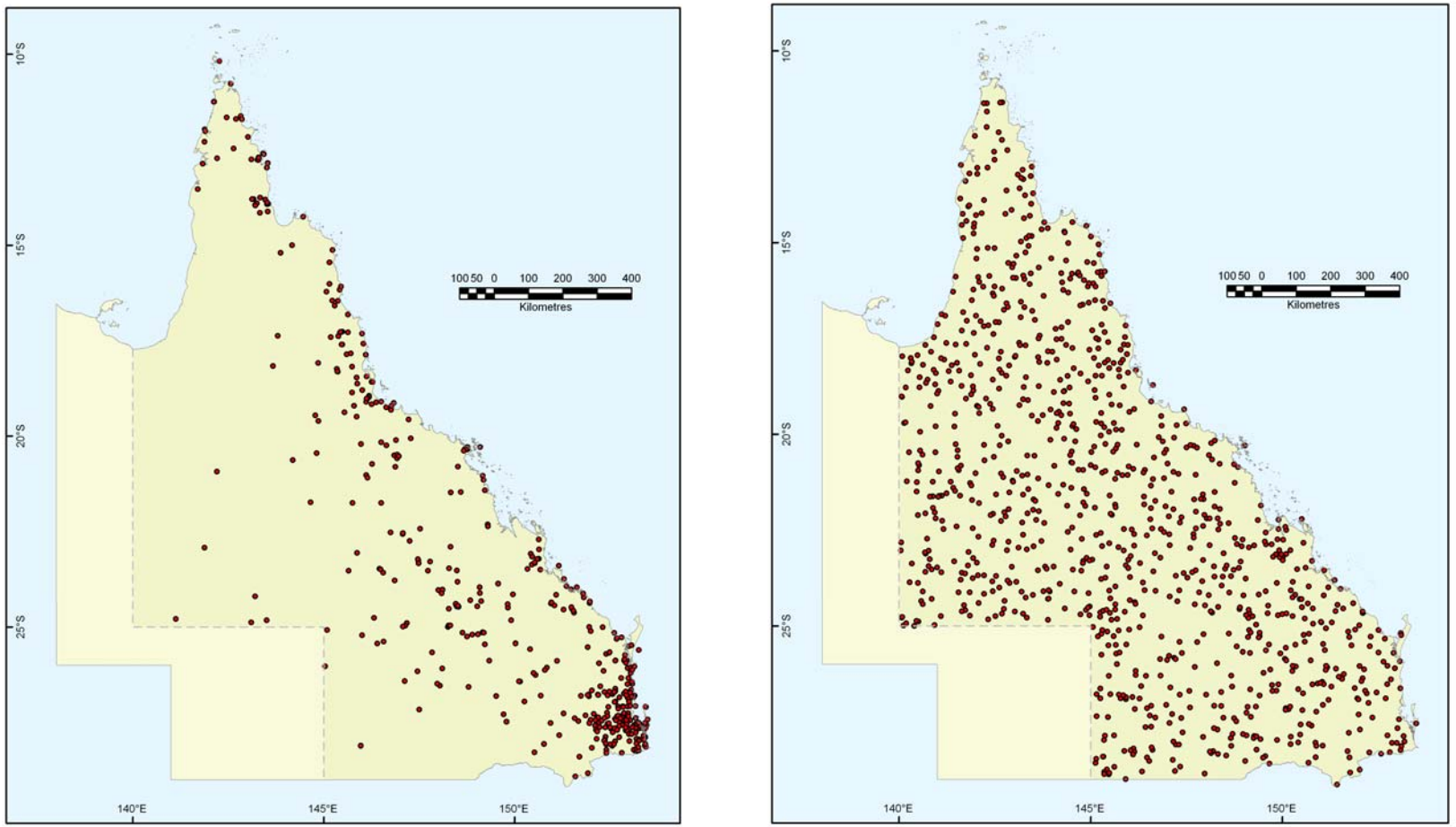
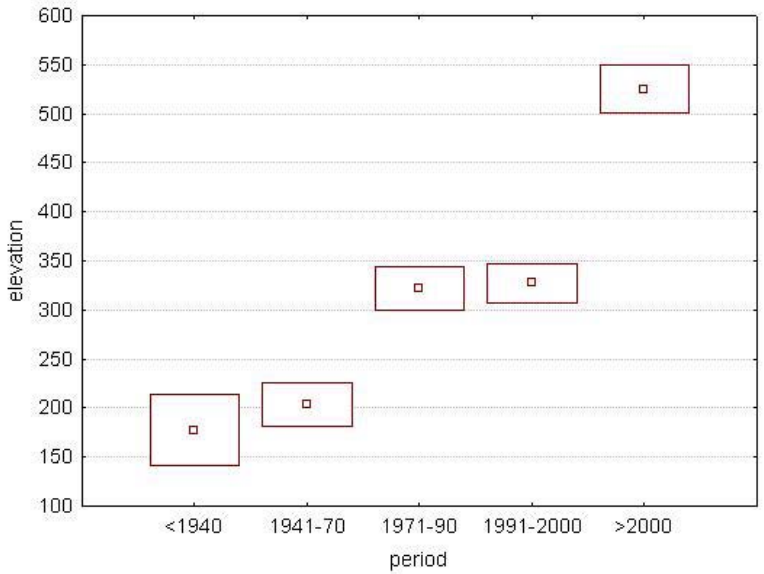


Figure 3. Location of randomly-selected non-quoll mammal records (left), and randomly selected points ("pseudo-absences") (right), used in spatial modelling.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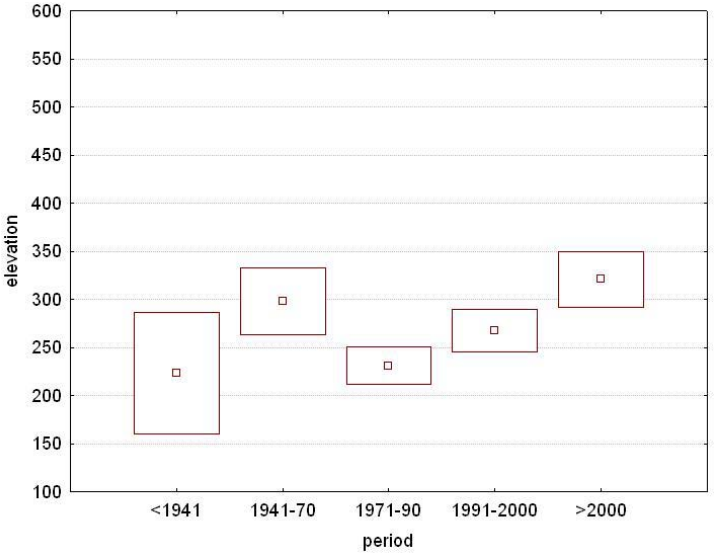
1971-90
1991-2000
>2000
period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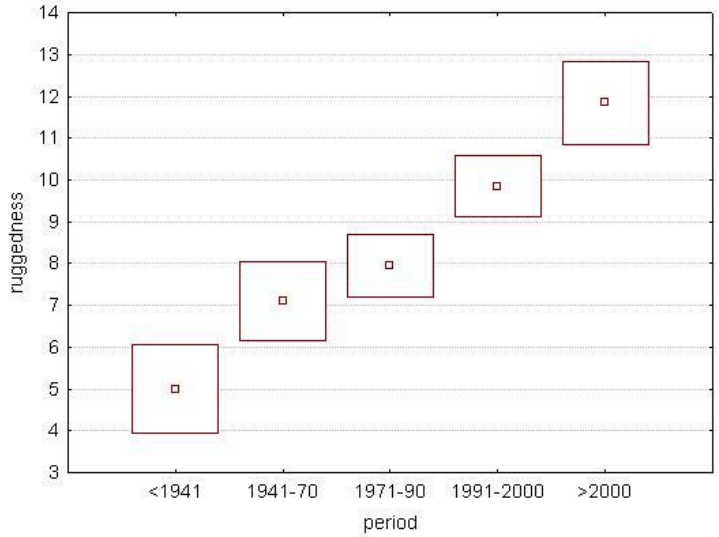
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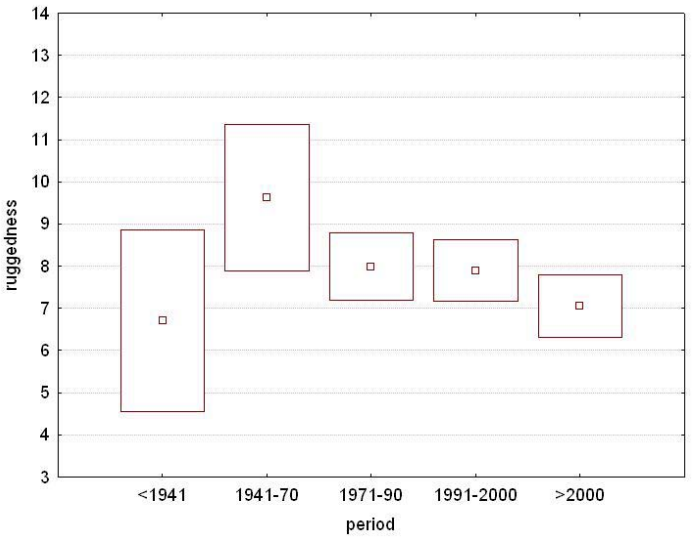
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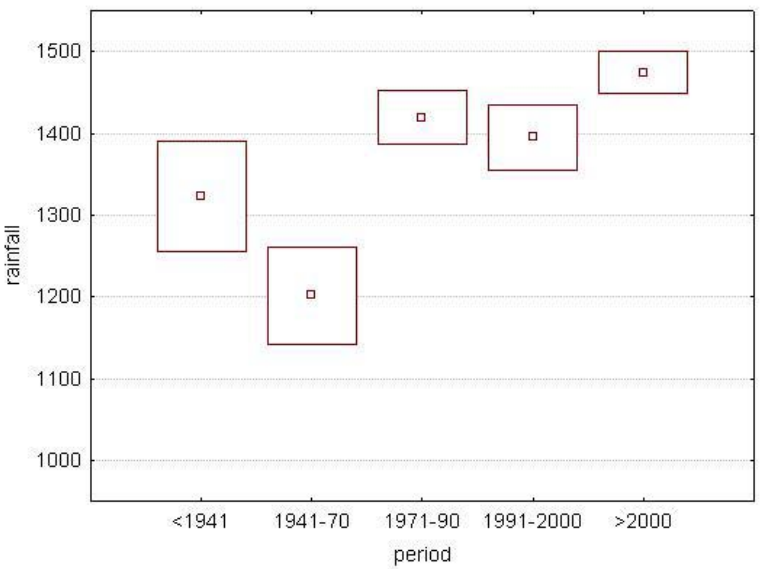
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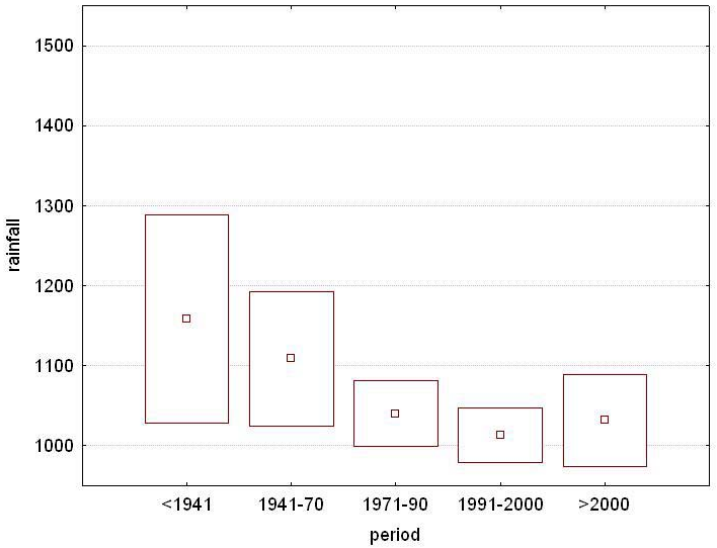
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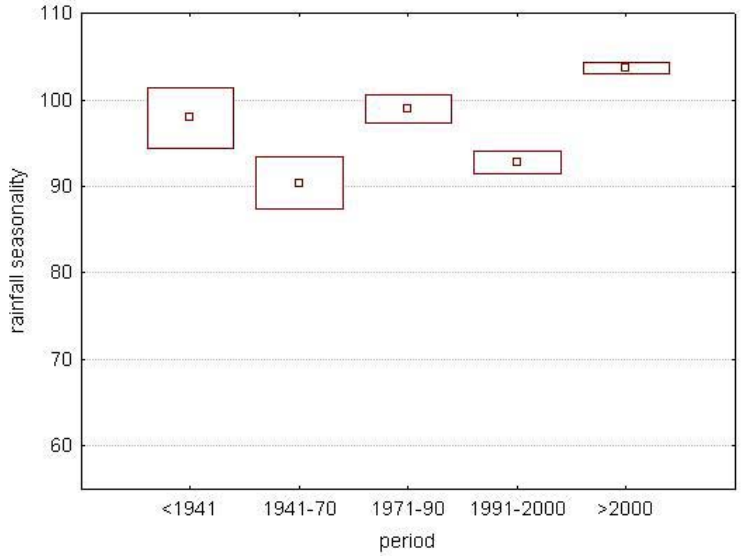
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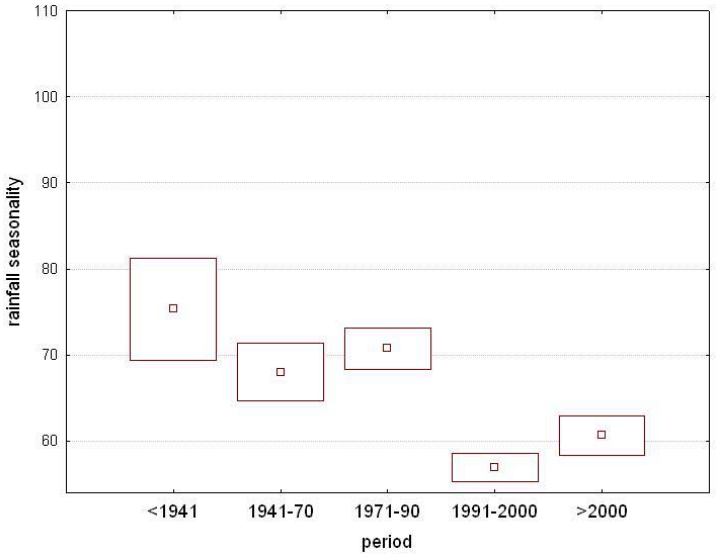
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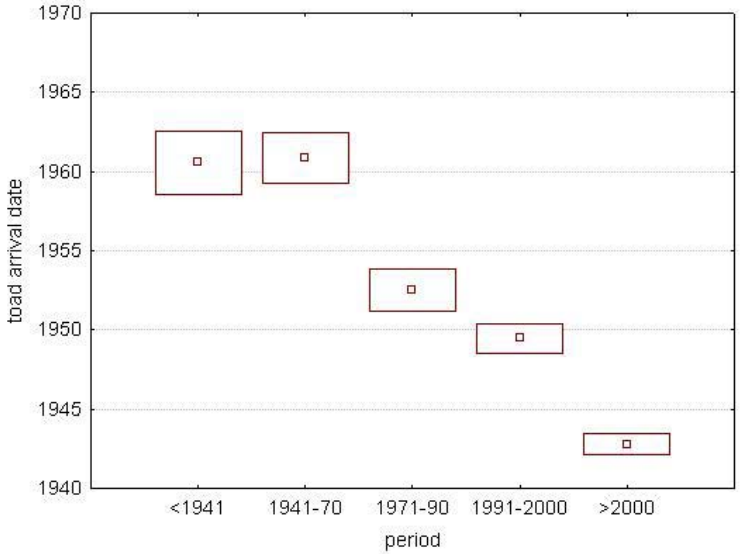
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1991-2000
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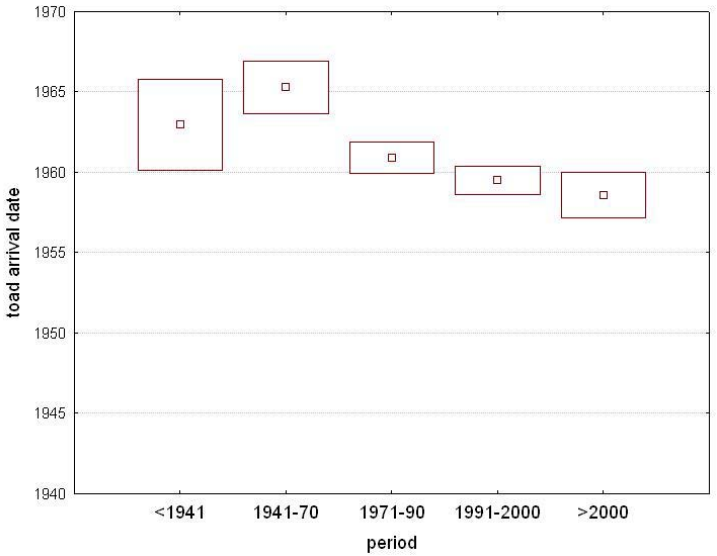
period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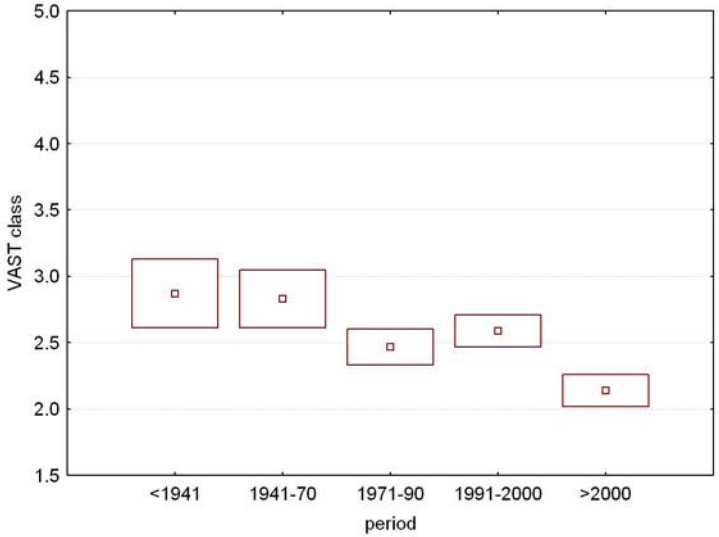
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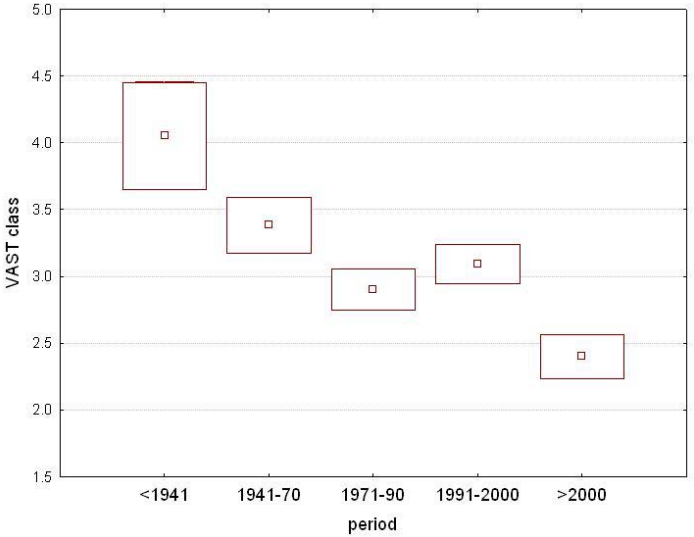
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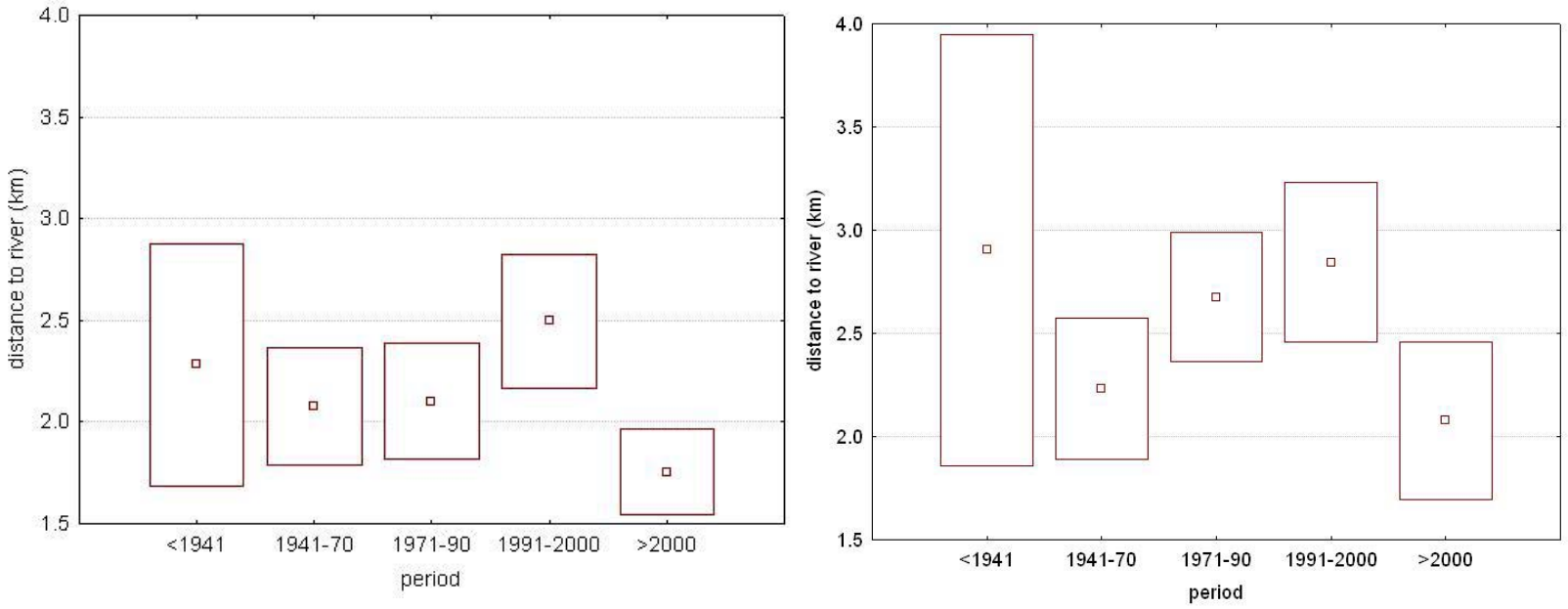

Figure 4. Historical trends in the environmental and other features associated with records of northern quolls (on the left) and matched records of non-quoll mammal species (on the right). Small squares indicate means, with boxes indicating standard error. Note that VAST (land condition) class represents the current value.

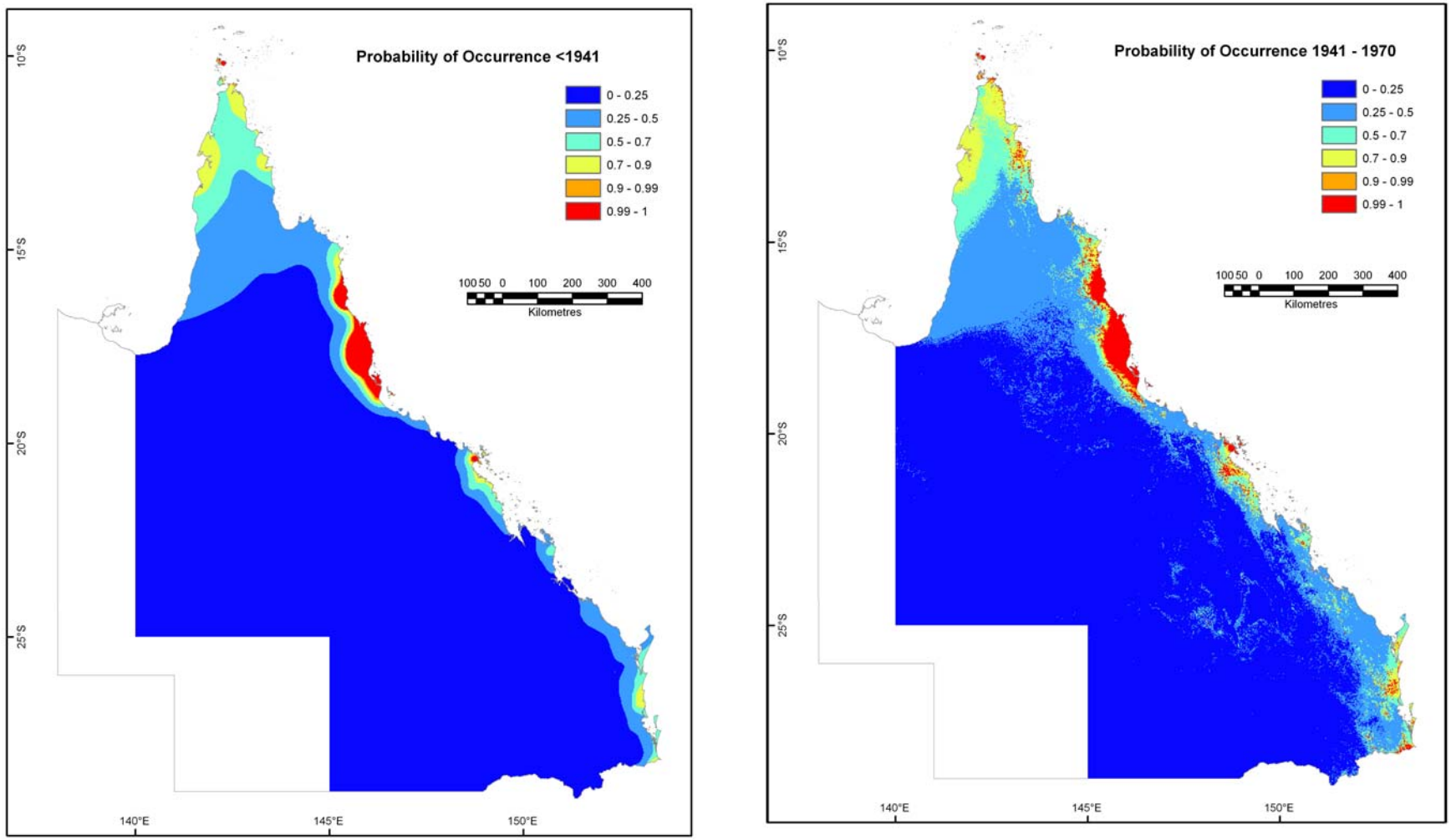

Figure 5. Predictive distributional modelling of northern quolls for a series of time periods: (a) pre 1941 and 1941-70.

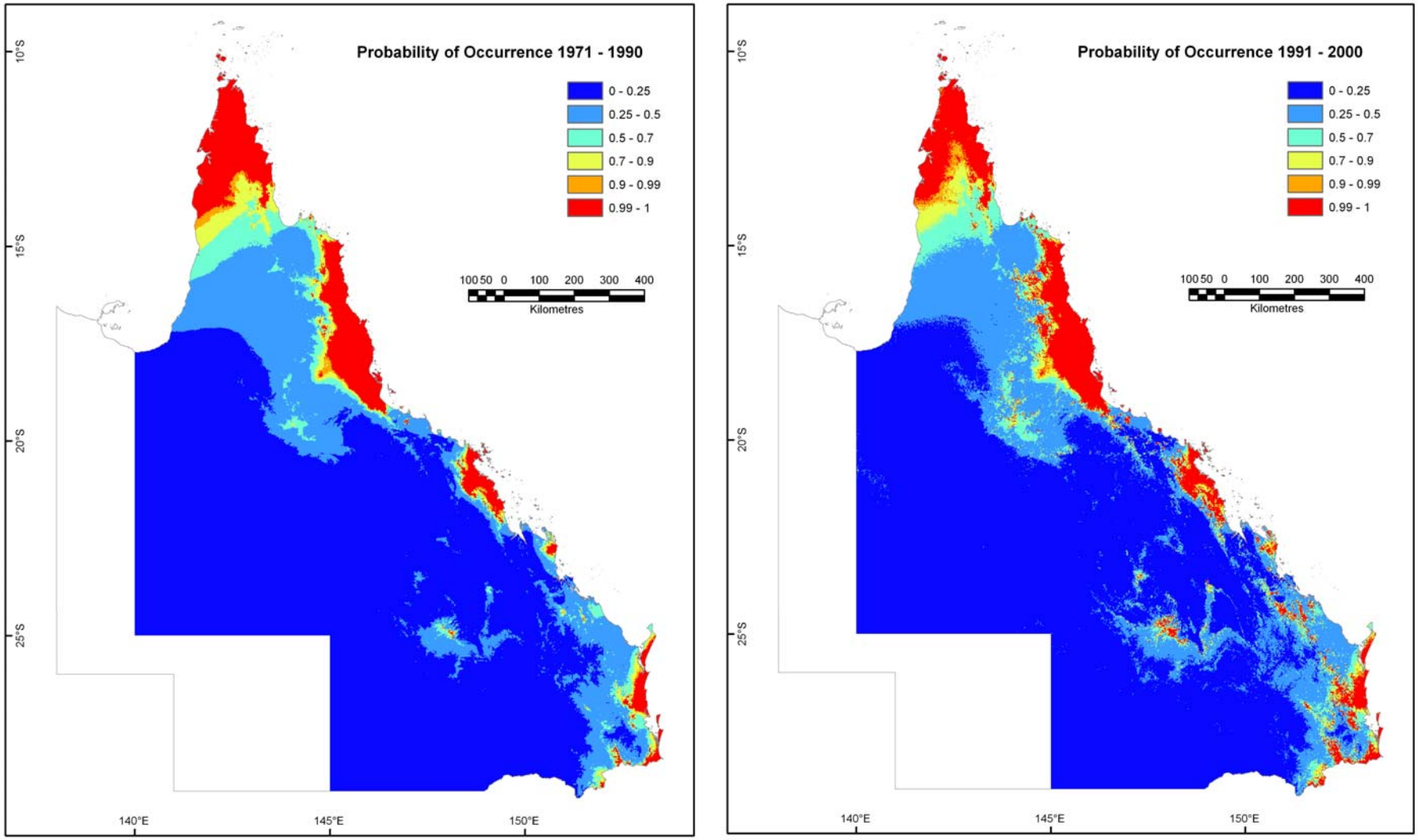

Figure 5. Predictive distributional modelling of northern quolls for a series of time periods: (b) 1971-90 and 1991-2000.

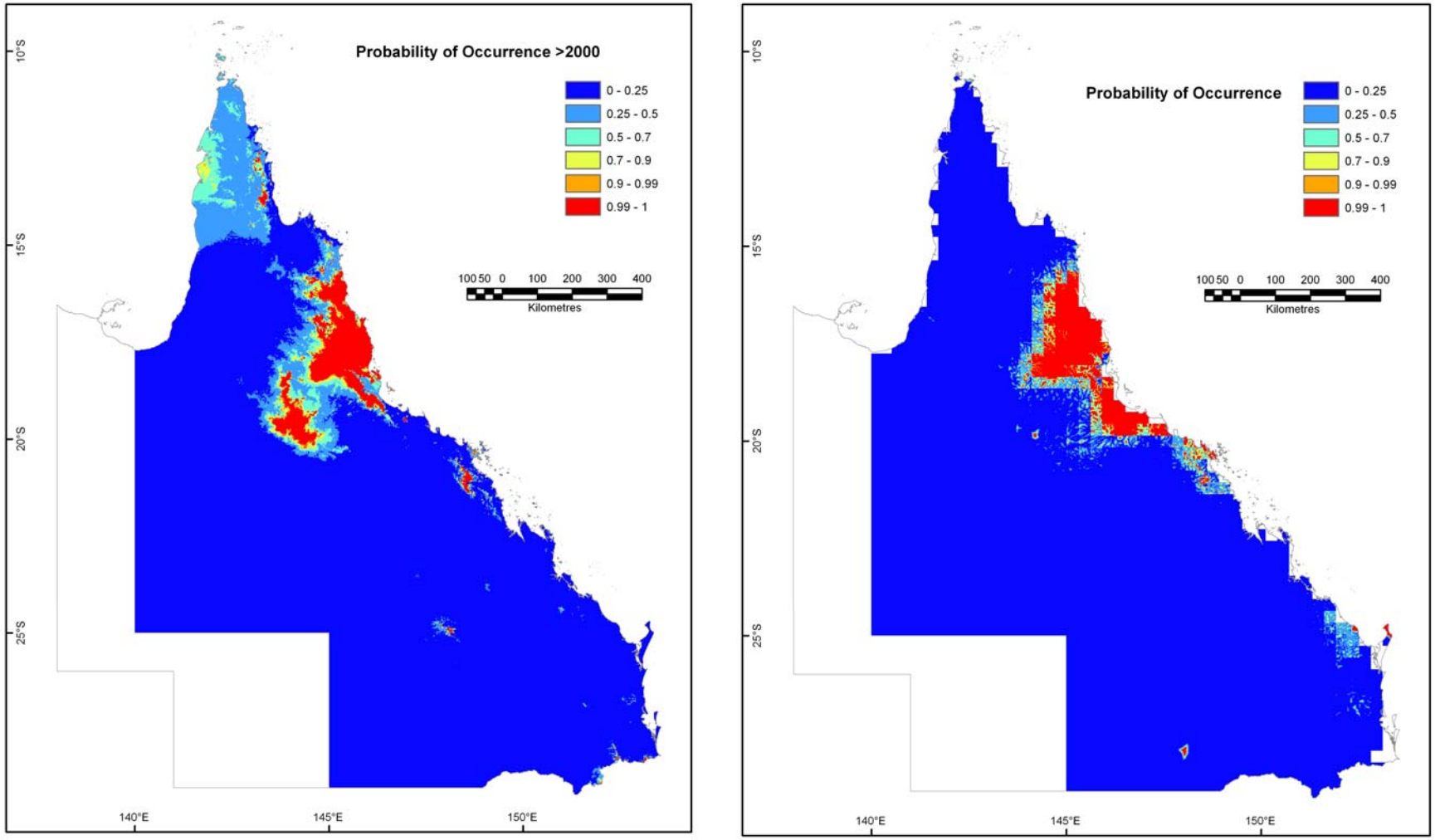

Figure 5. Predictive distributional modelling of northern quolls for a series of time periods: (c) post 2000 (excluding the variables VAST and toad arrival date [left] and including those variables in the modelling [right]).

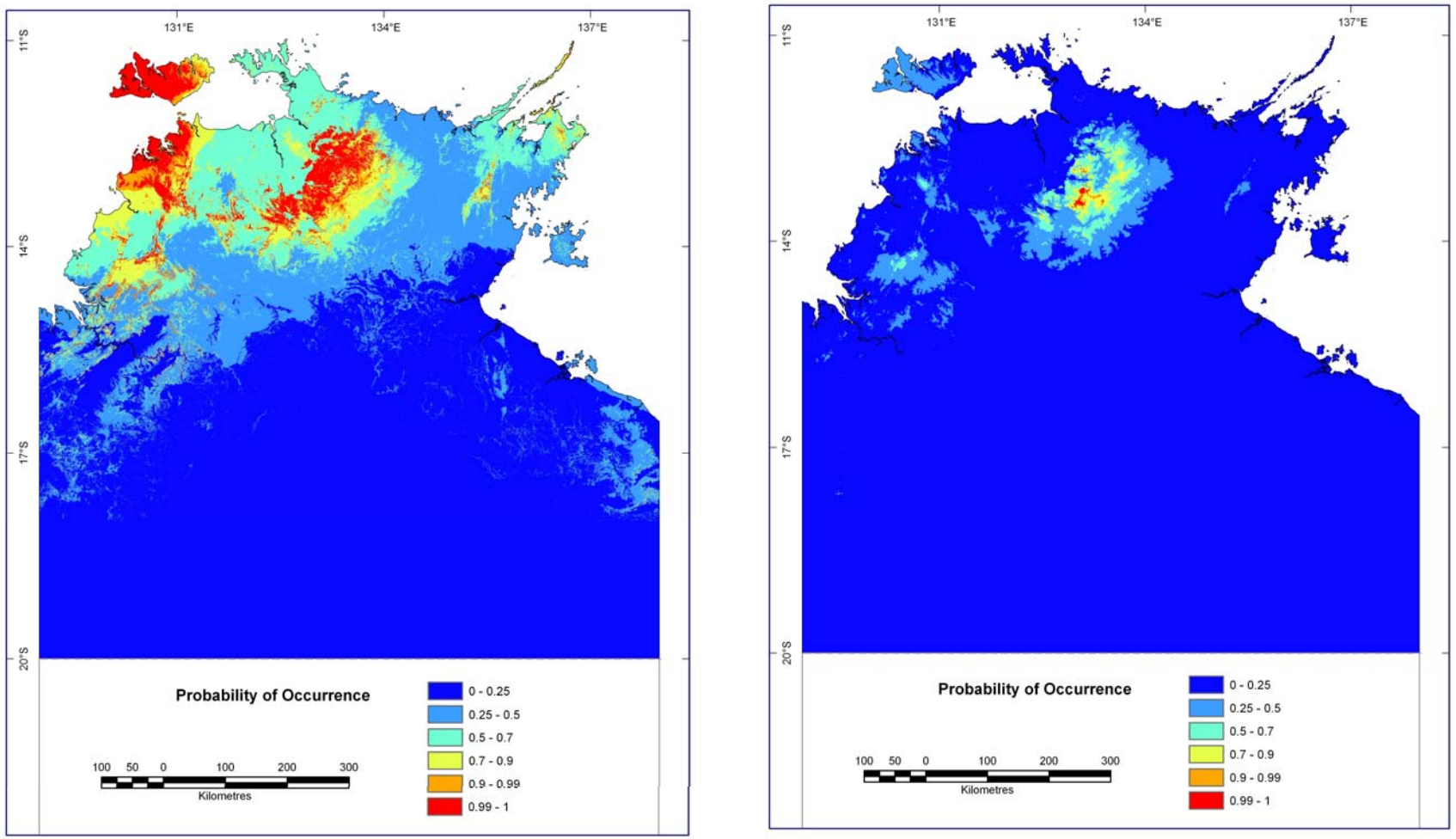

Figure 6. Extrapolation of Queensland-derived distributional modelling of northern quolls to the Northern Territory: Queensland model for the period 1991-2000 (left), and Queensland model for the period post 2000 (right).

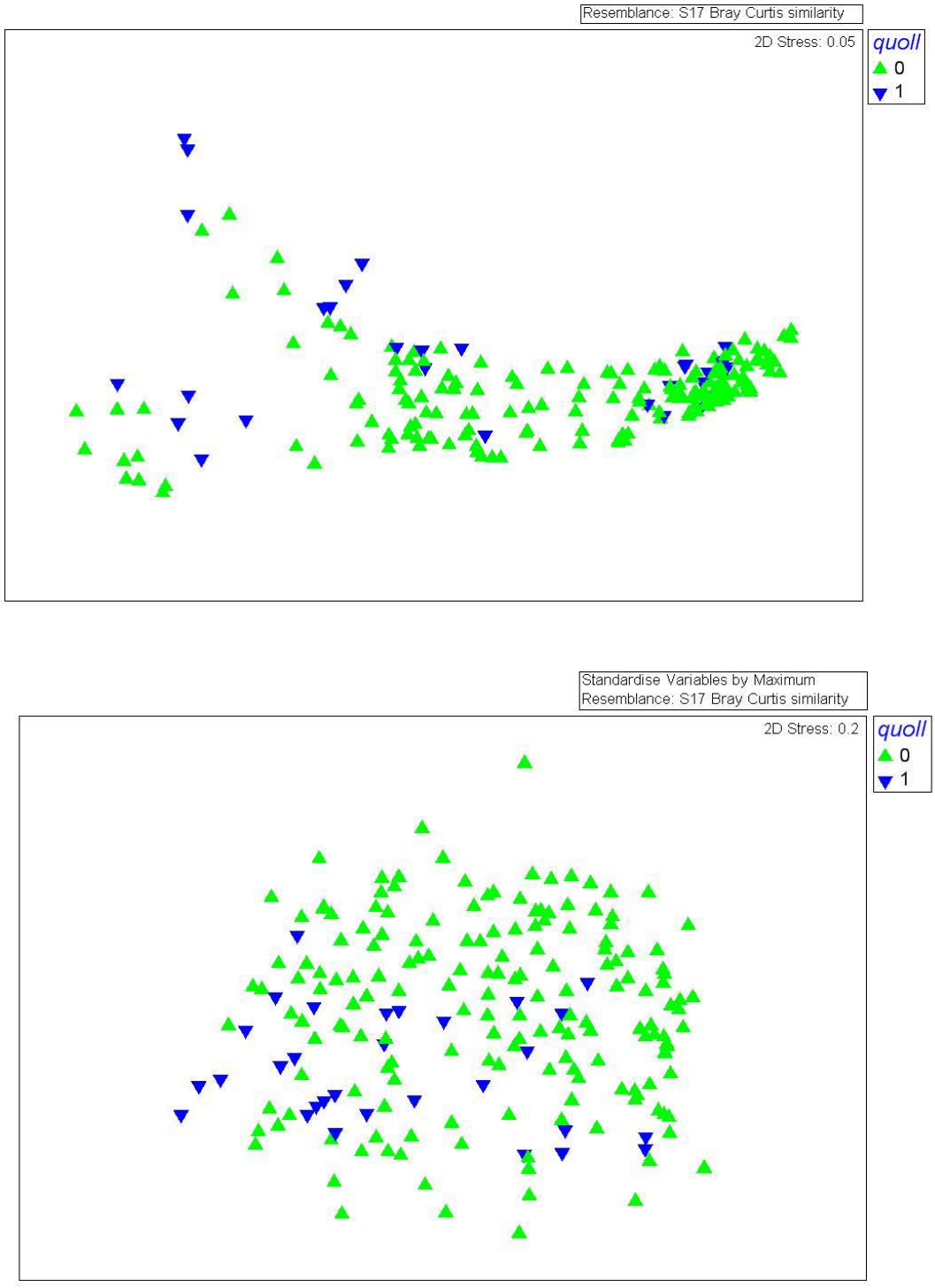

Figure 7. Ordination of all transects by their similarity in the set of topographic and landscape setting factors (see Table 8 for list of factors included). Top figure is based on unstandardised data; bottom figure based on standardised values. Transects in which quolls were captured are marked as inverse blue triangles.

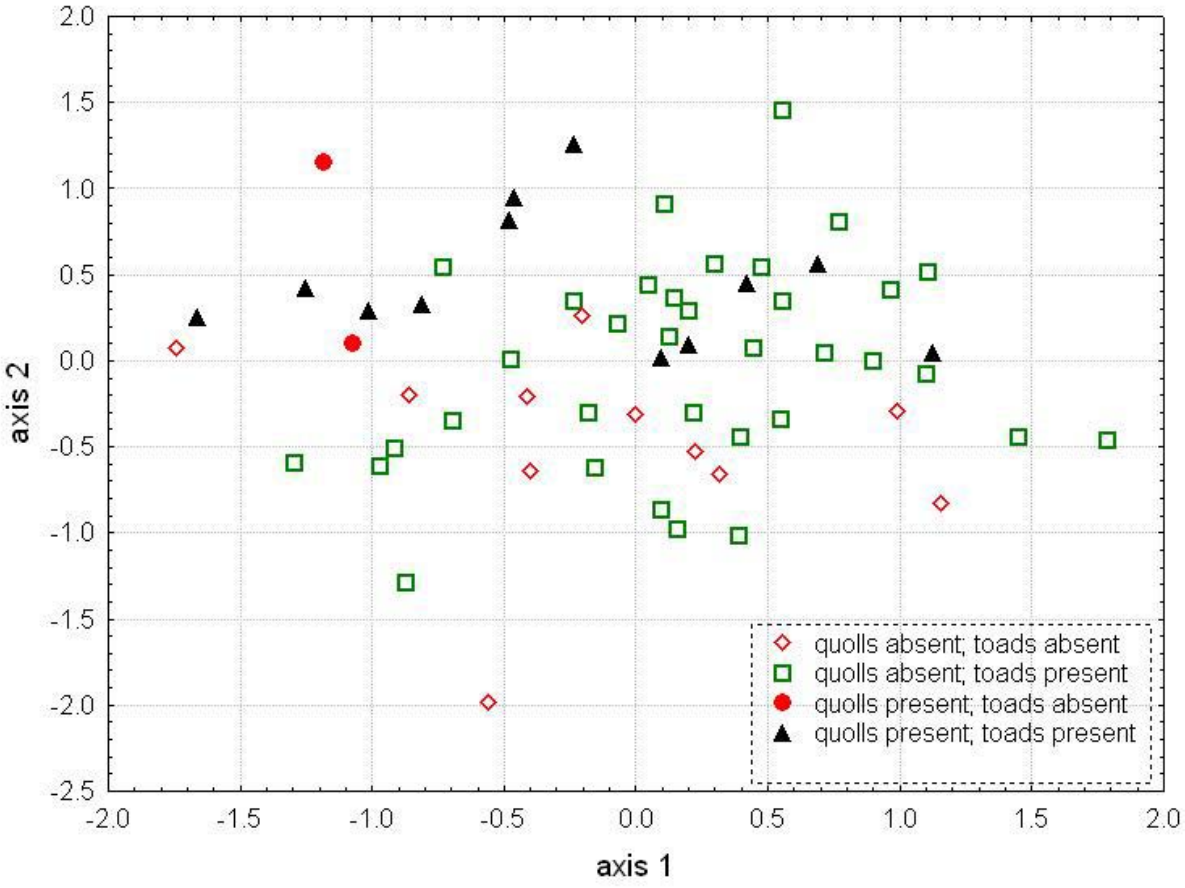

Figure 8. Ordination of all **sites** by their similarity in a restricted set of topographic and landscape setting factors (see Table 6 for list of factors included). Symbols indicate differing combinations of quolls and toads present or absent.

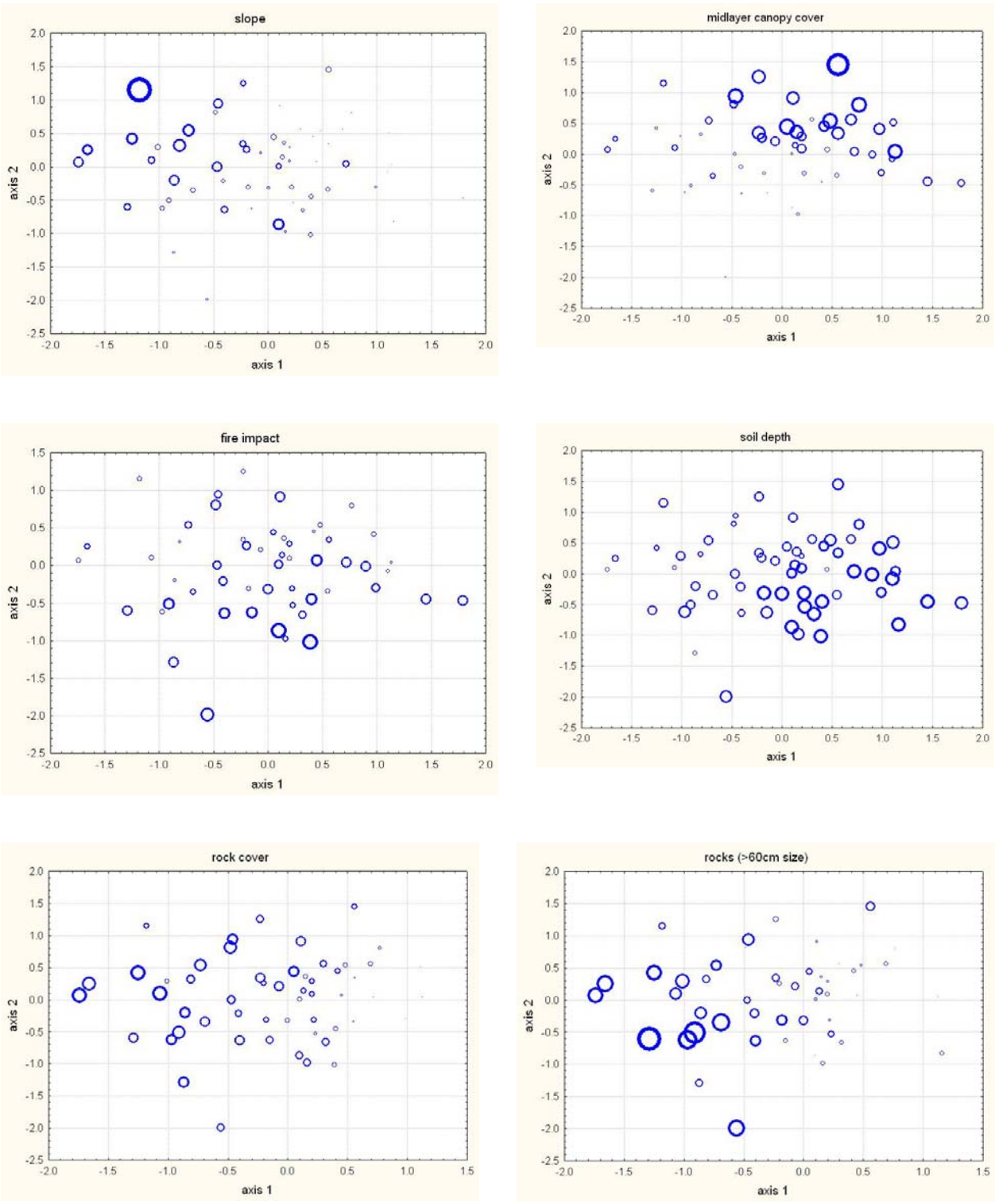

Figure 9. Variation in selected environmental variables for the ordination space shown in Fig.8. Size of the bubble represents increase in value for the variable considered.

List of Appendices

Appendix A. Collation of records of northern quolls in Queensland. Records are arranged from north to south.

QuollID	rev_LAT	rev_LONG	YEAR	LOCALITY	OBSERVER	SOURCE
543	-10.5400	142.1900	1940	Cowal Creek: Cape York Peninsula, <1940	QLMU	M Oakwood
545	-10.6895	142.5315	0	Pajinka	Chris Roberts	Nquoll Records 081106
542	-10.6918	142.5326	1993	PAJINKA WILDERNESS LODGE CAMPGROUND, 0.5KM S OF CAPE YORK	GRANT J. & LEUNG L.	qld Mam database
541	-10.6928	142.5336	1985	Pajinka Lodge, 0.5 km SSE Cape York	Ian Wright	JWWdatabase
547	-10.7000	142.5333	1913	Piara, Cape York (10m)	NHMUK	M Oakwood
548	-10.7000	142.5333	1994	Mt Bremer,Cape York	CYPLUS	M Oakwood
540	-10.7010	142.5326	1994	0.3KM SW OF MOUNT BREMER	GRANT J. & LEUNG L.	qld Mam database
539	-10.7275	142.5553	0			Qld Historical Fauna database
538	-10.7983	142.4053	1912			Qld Historical Fauna database
537	-10.8458	142.3667	1948	Red Island Point	Am. Museum of Nat. History, Watt (1993)	qld Mam database
546	-10.8833	142.4000	1989	Nr Bamaga (just N of Jardine River)	M. Delaney	M Oakwood
544	-10.9000	142.3250	1924	Cowal Ck,Cape York (sea level)	NHMUK	M Oakwood
536	-10.9100	142.3250	1948	Cowal Creek Mission	Am. Museum of Nat. History, Watt (1993)	qld Mam database
535	-10.9250	142.3250	0	Cowal Creek	Queensland Museum, Watt (1993)	qld Mam database
534	-10.9500	142.4667	1948	Higgins Field	Am. Museum of Nat. History, Watt (1993)	qld Mam database
532	-12.0181	141.8986	1980	RED BEACH, 7KM SOUTH OF CULLEN POINT, (S)	Winter & Atherton (1985, Unpubl. data)	qld Mam database
533	-12.0333	141.9125	1940	Red Beach, <1940	QLMU	M Oakwood
531	-12.1700	142.0500	1948	Wenlock,(Batavia River): North Queensland	AMMNH	M Oakwood
527	-12.2902	141.8761	1981	MAPOON ROAD, BETWEEN MYERFIELD & BATAVIA OUTSTATION LANDING	KERLE A. & WHITFORD D.	qld Mam database
530	-12.3000	141.8167	1981	Pennefather? River, Cape York	CYPLUS	M Oakwood
526	-12.3033	141.8105	1981	PENNEFATHER ROAD, 12KM SE OF PENNEFATHER RIVER MOUTH	Atherton, R.G.	qld Mam database
525	-12.3320	141.9071	1981	Batavia Outstation Landing to Myerfield road	Anne Kerle, Dick Whitford	JWWdatabase
523	-12.4200	142.3000	1985	Emberley Range	CYPLUS	M Oakwood
522	-12.4300	142.2600	1985	Batavia Downs	CYPLUS	M Oakwood
521	-12.4400	142.3700	1985	Emberley Range	CYPLUS	M Oakwood
520	-12.4400	142.2300	1985	Emberley Range	CYPLUS	M Oakwood
515	-12.4500	141.6500	1981	13km E of Duikfen Point	Queensland Museum, Watt (1993)	qld Mam database
516	-12.4500	141.6500	1981	NOMENADE CREEK/PINE RIVER BAY	Atherton, R.G., MATTHEW P.A. & TURNBULL C.	qld Mam database
517	-12.4500	141.6500	1981	13km E of Duikfen Point	Not Available	qld Mam database
519	-12.4500	142.1900	1981	York Downs	CYPLUS	M Oakwood

QuollID	rev_LAT	rev_LONG	YEAR	LOCALITY	OBSERVER	SOURCE
518	-12.4568	141.6428	1981	NOMENADE CREEK/PINE RIVER BAY, (O)	Atherton, R.G., MATTHEW P.A. & TURNBULL C.	qld Mam database
528	-12.4583	141.9100	1981	Duikfen Pt: 13km NE	QLMU	M Oakwood
529	-12.4583	141.9100	1981	Weipa-Pine River	CYPLUS	M Oakwood
513	-12.4600	143.1300	1948	Tozer Range:North Queensland	AMMNH	M Oakwood
514	-12.4600	143.1700	1914	Claudie River: North Queensland	MV	M Oakwood
512	-12.5100	142.5700	1948	Brown's Creek, Pascoe River, Cape York	AMMNH	M Oakwood
511	-12.5833	142.1500	1932	Australia, Qld: Lower Archer River	Donald Thomson	Nquoll Records 081106
524	-12.6167	143.4333	1993	Cape Weymouth	CYPLUS	M Oakwood
510	-12.6172	143.4323	1993	1KM SW OF CAPE WEYMOUTH	VENABLES B. & PRITCHARD J.	qld Mam database
509	-12.6186	143.4311	1993	1KM SW OF CAPE WEYMOUTH, (O)	Nat. Rainforest Cons. Program (Unpubl. data)	qld Mam database
508	-12.6650	143.3178	1983			Qld Historical Fauna database
507	-12.6667	143.2167	0	Scrubby Ck, Iron Range, G. Wood	Graeme Wood	Nquoll Records 081106
506	-12.6773	143.3436	2000	Portland Roads Road, 2.4 km S of Ogilvie Hill	Mick Blackman	JWWdatabase
505	-12.7027	142.5033	1985	EMBLEY RANGE, 18.5 KM WSW OF BATAVIA DOWNS	WINTER J.W. & WHARTON G.	qld Mam database
504	-12.7144	142.4314	1985	BATAVIA DOWNS RD, 14KM NE OF YORK DOWNS HOMESTEAD, (O)	Winter (Unpubl. data, 1973, 1975a,b)	qld Mam database
503	-12.7202	142.6111	1985	EMBLEY RANGE, 9 KM SW OF BATAVIA DOWNS	WINTER J.W. & WHARTON G.	qld Mam database
502	-12.7451	143.2274	1948			Qld Historical Fauna database
501	-12.7500	142.3167	1982	Sudleigh Road, between Weipa & Batavia Downs	Australian Museum	qld Mam database
500	-12.7517	142.3111	1981	YORK DOWNS OLD HOMESTEAD	Atherton, R.G., MATTHEW P.A. & JOHNSON P.M.	qld Mam database
499	-12.7527	143.2095	1948	Tozer Range	Am. Museum of Nat. History, Watt (1993)	qld Mam database
498	-12.7667	143.2833	0	Claudie River	Museum of Victoria	qld Mam database
497	-12.8500	142.9500	1948	Pascoe River	Am. Museum of Nat. History, Watt (1993)	qld Mam database
496	-13.0860	142.9428	1948	Wenlock	Am. Museum of Nat. History, Watt (1993)	qld Mam database
495	-13.3489	141.7030	1932	Archer River Estuary	Donald F.Thomson	JWWdatabase
494	-13.3579	141.7307	1932	Lower Archer River ("Aurukun Mission")	Donald F.Thomson	JWWdatabase
493	-13.3667	141.6667	1932	Archer River Estuary	Museum of Victoria	qld Mam database
492	-13.3800	143.0500	1948	Croll Creek (Coen-Wenlock Rd):North Queensland	AMMNH	M Oakwood
491	-13.4000	142.4000	1988	Rokeby National Park, Cape York	M. Delaney	M Oakwood
489	-13.4500	143.2000	1938	Rocky scrub, north of Coen	AMMNH	M Oakwood
490	-13.4500	143.2000	1948	McIlwraith range (Darlington)	Tate	M Oakwood
488	-13.5200	142.5100	1948	Coen River, The Bend (700ft) North Queensland	AMMNH	M Oakwood
487	-13.5250	143.2292	1978	Attack Ck, 45km N of Coen	Queensland Museum, Watt (1993)	qld Mam database
486	-13.5254	143.2289	1978	BUTHEN BUTHEN ROAD, ATTACK CR XING, 11 KM ENE BIRTHDAY MT, (S)	Winter (1980, Unpubl. data)	qld Mam database
484	-13.5333	141.7000	1932	Lower Archer River	Museum of Victoria	qld Mam database

QuollID	rev_LAT	rev_LONG	YEAR	LOCALITY	OBSERVER	SOURCE
485	-13.5333	141.7000	1933	Lower Archer River	Museum of Victoria	qld Mam database
483	-13.5600	143.1200	1974	Coen	Robinson et al	M Oakwood
478	-13.5700	143.1200	1932	Coen, Cape York	MCZMA	M Oakwood
479	-13.5700	143.1200	1938	Coen	AMNH	M Oakwood
480	-13.5700	143.1200	1938	Coen	AMNH	M Oakwood
481	-13.5700	143.1200	1940	Coen, <1940	QLMU	M Oakwood
482	-13.5700	143.1200	1960	Coen	AUMU	M Oakwood
477	-13.5833	142.1500	1933	Australia, Qld: Lower Archer River	Donald Thomson	Nquoll Records 081106
476	-13.7419	143.3806	1948			Qld Historical Fauna database
475	-13.7777	143.1345	1948	Croll Creek	Am. Museum of Nat. History, Watt (1993)	qld Mam database
474	-13.7985	143.3817	1948	Rocky Scrub	Am. Museum of Nat. History, Watt (1993)	qld Mam database
473	-13.8333	143.2833	1932	McIlwraith Range	Museum of Comp. Zoology, Watt (1993)	qld Mam database
472	-13.8652	142.8511	1948	Coen River	Am. Museum of Nat. History, Watt (1993)	qld Mam database
471	-13.9233	143.1997	1948			Qld Historical Fauna database
470	-13.9400	143.2011	1948			Qld Historical Fauna database
469	-13.9485	142.2011	1938			Qld Historical Fauna database
467	-13.9500	142.2000	1938	Coen	Am. Museum of Nat. History, Watt (1993)	qld Mam database
468	-13.9500	143.2000	1960	Coen	D TORRENS COEN	Nquoll Records 081106
465	-14.0400	143.4000	1938	Port Stuart, Cape York	AMMNH	M Oakwood
466	-14.0400	143.4000	1948	Port Stewart, Cape York	Tate	M Oakwood
463	-14.0667	143.6833	1914	Stewart River	Dodd W.D.	Nquoll Records 081106
464	-14.0706	143.6844	1938			Qld Historical Fauna database
460	-14.3066	143.2631	1928	Ebagoola	Donald F.Thomson	JWWdatabase
462	-14.3167	144.2500	1994	Bathurst Range, W of Cape Melville	QLMU	M Oakwood
461	-14.5667	144.7667	1974	Starcke, 20km N of Wakooka	D. Storch	M Oakwood
458	-15.0667	145.2000	1989	Helenvale, Cooktown Rd junction	0	Nquoll Records 081106
459	-15.0667	145.2167	1997	Shiptons Flat Road, 1st culvert	0	Nquoll Records 081106
457	-15.1100	145.1200	1974	23km S of Cooktown	Robinson et al	M Oakwood
456	-15.2800	145.1500	1899	Cooktown	NHMUK	M Oakwood
455	-15.3500	145.1100	1922	Annan River, Cooktown	NHMUK	M Oakwood
454	-15.4000	145.1400	1948	Black Mountain:North Queensland	AMMNH	M Oakwood
452	-15.4100	145.1400	1991	Black Mt, near Cooktown	AUMU	M Oakwood
453	-15.4100	145.1400	1994	Trevathon Ck, Black Mt	QLMU	M Oakwood
451	-15.4167	145.1167	0	Cooktown area	0	Nquoll Records 081106
448	-15.4200	145.1300	1948	Helenvale:North Queensland	AMMNH	M Oakwood
449	-15.4200	145.1300	1994	Helenvale	QLMU	M Oakwood
450	-15.4200	145.1300	1995	Helenvale (common there)	R.Whiston	M Oakwood
447	-15.4400	145.1800	1950	Home Rule:North Queensland	AMMNH	M Oakwood

QuollID	rev_LAT	rev_LONG	YEAR	LOCALITY	OBSERVER	SOURCE
446	-15.4500	145.1700	1990	Rossville, S of Cooktown	AUMU	M Oakwood
445	-15.4614	145.2516	2007	Grassy Hill, Cooktown	Nerell Heiner	JWWdatabase
444	-15.4800	145.1600	1985	Shiptons Flat	QLMU	M Oakwood
443	-15.5233	145.2219	1996			Qld Historical Fauna database
442	-15.5250	145.2208	1974	Annan bridge nr Cooktown	Queensland Museum, Watt (1993)	qld Mam database
441	-15.6455	144.9828	1996	Northern limestone outcrop, above tributary of East Normandy R, Kings Plains Station. GHPL	QFRI Database	qld Mam database
440	-15.6500	145.2167	1974	Black Mt, 27.4km S Cooktown	0	Nquoll Records 081106
439	-15.6539	145.2217	2004			Incidental Records
437	-15.6735	145.2428	1948	Black Mountain, S of Cooktown	Am. Museum of Nat. History, Watt (1993)	qld Mam database
438	-15.6735	145.2428	1974	Black Mountain, S of Cooktown	Queensland Museum, Watt (1993)	qld Mam database
436	-15.6771	145.2162	1989	Helenvale-Cooktown road junction, 1.5 km WSW Black Mt	J.W.Winter	JWWdatabase
435	-15.6792	145.2167	1989	Helenvale-Cooktown junction	Queensland Museum, Watt (1993)	qld Mam database
434	-15.6833	145.2333	1990	Black Mountain, near Cooktown.	Australian Museum	qld Mam database
433	-15.6947	145.1558	2002	KINGS PLAIN	K.R. MCDONALD, M. ANSTIS	qld Mam database
432	-15.6985	145.2178	1948	Helenvale	Am. Museum of Nat. History, Watt (1993)	qld Mam database
431	-15.7318	145.3011	1948	Home Rule	Am. Museum of Nat. History, Watt (1993)	qld Mam database
429	-15.7500	145.2700	1995	Rossville (often seen along road)	R.Whiston	M Oakwood
430	-15.7500	145.2708	1990	Rossville, South of Cooktown.	Australian Museum	qld Mam database
426	-15.7600	145.2283	1996	Shiptons Flat area, Collingwood Prospect (mine camp)	Kath Handasyde	JWWdatabase
427	-15.7600	145.2283	1996	Shiptons Flat area, Collingwood Prospect (mine camp)	Kath Handasyde	JWWdatabase
428	-15.7600	145.2283	1997	Shiptons Flat area, Collingwood Prospect (mine camp)	Kath Handasyde	JWWdatabase
425	-15.7644	145.2252	2003			Scientific Purposes Permit Returns
424	-15.7657	145.2291	2003			Scientific Purposes Permit Returns
423	-15.7658	145.2325	2003			Scientific Purposes Permit Returns
422	-15.7662	145.2366	2003			Scientific Purposes Permit Returns
421	-15.7667	145.2250	1997	Shiptons Flat area	Kath Handasyde	JWWdatabase
420	-15.7667	145.2667	1892	Foot of Mt Finnigan (tin mines)	Semon (1899)	qld Mam database
419	-15.7672	145.2363	2003			Scientific Purposes Permit Returns
418	-15.7672	145.2344	2003			Scientific Purposes Permit Returns
417	-15.7700	145.2217	1996	Shiptons Flat area, (near river crossing at Banana Flat)	Kath Handasyde	JWWdatabase
416	-15.7705	145.2258	2003			Scientific Purposes Permit Returns
415	-15.7717	145.2217	1995	Shiptons Flat area, (Banana Flat),	Kath Handasyde	JWWdatabase
414	-15.7767	145.2128	1996	Shiptons Flat area, tracking tower #3	Kath Handasyde	JWWdatabase
413	-15.7823	145.2280	2003			Scientific Purposes Permit Returns
412	-15.7917	145.2333	1996	Shiptons Flat area, (approx 1km north of Banana Flat)	Kath Handasyde	JWWdatabase
410	-15.7928	145.2344	1937			Qld Historical Fauna database
411	-15.7928	145.2344	1949			Qld Historical Fauna database

QuollID	rev_LAT	rev_LONG	YEAR	LOCALITY	OBSERVER	SOURCE
404	-15.7985	145.2511	1948	Shipton's Flat	Am. Museum of Nat. History, Watt (1993)	Qld Historical Fauna database
405	-15.7985	145.2511	1949	Shipton's Flat	Am. Museum of Nat. History, Watt (1993)	Qld Historical Fauna database
406	-15.7985	145.2511	1950	Shipton's Flat	Am. Museum of Nat. History, Watt (1993)	Qld Historical Fauna database
407	-15.7985	145.2511	1951	Shipton's Flat	Am. Museum of Nat. History, Watt (1993)	Qld Historical Fauna database
408	-15.7985	145.2511	1952	Shipton's Flat	Am. Museum of Nat. History, Watt (1993)	Qld Historical Fauna database
409	-15.7985	145.2511	1985	Shipton's Flat	Queensland Museum, Watt (1993)	Qld Historical Fauna database
400	-15.8000	145.2500	1985	Shipton's Flat	Queensland Museum, Watt (1993)	qld Mam database
401	-15.8000	145.2500	1994	Shiptons Flat, S of Cooktown	R. Martin	M Oakwood
402	-15.8000	145.2500	1998	Shipton's Flat	0	Nquoll Records 081106
403	-15.8000	145.2500	1999	Shipton's Flat	0	Nquoll Records 081106
399	-15.8420	145.2217	2007	Mount Poverty Road	Charlie Roberts	JWWdatabase
398	-15.8538	145.1954	2005	Normanby Tin Works	Charlie Roberts	JWWdatabase
397	-15.8569	145.2101	2007	Mount Poverty Road	J.W.Winter, H.V.Myles	JWWdatabase
396	-15.8618	145.2081	2007	Mount Poverty Road	J.W.Winter, H.V.Myles	JWWdatabase
395	-15.8639	144.8224	2007	Lakeland Downs, "One Mile" Stemmler house	Andy & Anita Stemmler	JWWdatabase
394	-15.8647	144.8048	2007	Peninsula Development Road,	Anita Stemmler	JWWdatabase
393	-15.9300	145.3500	1995	Bloomfield, 7 miles Nth of the Bloomfield River	R. Whiston	M Oakwood
389	-16.0500	145.2700	1991	Coconut Beach Resort, Cape Tribulation	B.Flick,H.Spencer	M Oakwood
390	-16.0500	145.2700	1993	Cape Tribulation, in house of shopkeeper, 1am	P.Mason	M Oakwood
391	-16.0500	145.2700	1993	Cape Tribulation, trapped at National Parks house	P.Mason	M Oakwood
392	-16.0500	145.2700	1994	Cape Tribulation, in foothills 1km from coast	P.Mason	M Oakwood
388	-16.0667	145.3167	1976	Mt Molloy, 0.5km	0	Nquoll Records 081106
387	-16.0667	145.0333	1972	Mt Molloy	0	Nquoll Records 081106
386	-16.0833	145.3833	1997	Biboohra, 10km N	0	Nquoll Records 081106
385	-16.1810	144.7573	2003	Cooktown Rd near Palmer River roadhouse	Michael Anthony	JWWdatabase
384	-16.2985	145.0844	1976	Spencer Ck, Mt Windsor Tableland	Not Available	qld Mam database
383	-16.3000	145.0833	1976	Spencer Ck, W & E, watershed, Mt Windsor Tableland	0	Nquoll Records 081106
382	-16.3041	145.0955	1976	Mt Windsor Tableland, W/E Spencer Creek watershed	Kenny Jack	JWWdatabase
381	-16.3600	145.2000	1983	Julatten to Mt Molloy Rd	QLMU	M Oakwood
379	-16.3900	145.1700	1994	Mt Molloy, 2km N	D. Storch	M Oakwood
380	-16.3900	145.1800	1992	Cooktown Hwy, 4km from Mt Molloy	QLMU	M Oakwood
378	-16.4000	145.2000	1995	Mount Molloy	P. Brown	M Oakwood
377	-16.4600	145.3800	1971	Black Mountain Rd: Kuranda	QLMU	M Oakwood
376	-16.4900	145.3800	1996	10km W of Kuranda, roadkill	S. Comport	M Oakwood
375	-16.5297	145.1396	2007	Mount Carbine Village	Ross Fagg	JWWdatabase
374	-16.5400	145.4500	1988	Cairns, 19 Anderson St	Storch, D	M Oakwood
372	-16.5500	145.4600	1936	Cairns	MV	M Oakwood

QuollID	rev_LAT	rev_LONG	YEAR	LOCALITY	OBSERVER	SOURCE
373	-16.5500	145.4600	1995	Cairns	M. Trannery	M Oakwood
371	-16.5500	145.3200	1995	Kuranda, 1.8km E of Davies Ck. Bridge	D. Storch	M Oakwood
369	-16.5600	145.3200	1980	Goldmine Ck, 0.5km N:Mareeba-Kuranda Rd	QLMU	M Oakwood
370	-16.5600	145.3200	1990	0.5km S of Davies Ck Bridge:Mareeba-Kuranda Rd	QLMU	M Oakwood
367	-16.5900	145.2500	1972	Mareeba, 24km S of :North Queensland	ANWC	M Oakwood
368	-16.5900	145.2500	1972	Mareeba, 8km W of :North Queensland	ANWC	M Oakwood
366	-16.5973	145.2521	2007	BROO48		A. Kutt
363	-16.5974	145.2539	2006	BROO47		A. Kutt
364	-16.5974	145.2539	2006	Carbine Tableland, Mt Lewis track between Leichhardt and Station Creeks	Brooke Bateman	JWWdatabase
365	-16.5974	145.2539	2007	BROO47		A. Kutt
362	-16.5981	145.2480	2007	BROO49		A. Kutt
361	-16.5983	145.2478	2007	Carbine Tableland, Mt Lewis track between Leichhardt and Station Creeks	Brooke Bateman	JWWdatabase
360	-16.5985	145.3344	1983	Julatten-Mt Molloy Rd	Not Available	qld Mam database
357	-16.5994	145.2428	2006	BROO50		A. Kutt
358	-16.5994	145.2428	2006	Carbine Tableland, Mt Lewis track between Leichhardt and Station Creeks	Brooke Bateman	JWWdatabase
359	-16.5994	145.2428	2007	BROO50		A. Kutt
356	-16.6000	145.3333	1983	Julatten-Mt Molloy Rd	Queensland Museum, Watt (1993)	qld Mam database
355	-16.6068	145.3519	2000	Eulama Creek Rd, Julatten	Ron Stannard	qld Mam database
354	-16.6167	145.3333	0	EULUMA CREEK ROAD, JULATTEN	0	Nquoll Records 081106
352	-16.6454	145.2627	2006	BROO01		A. Kutt
353	-16.6454	145.2627	2007	BROO01		A. Kutt
351	-16.6488	145.2618	2006	BROO02		A. Kutt
349	-16.6500	145.0333	1999	Marreba Rd, 1km S of Mt. Molloy	0	Nquoll Records 081106
350	-16.6500	145.3000	1992	Mt Molloy, 4 km from on Cooktown Hway	0	Nquoll Records 081106
348	-16.6580	145.2626	2007	BROO03		A. Kutt
347	-16.6628	145.3039	1992	Cooktown Highway, 4 km from Mt Malloy	Bill Lindeman	JWWdatabase
346	-16.6632	145.2411	1995	Luster Creek, SE Lighthouse Mountain	Rupert Russell	JWWdatabase
345	-16.6659	145.2993	2001	Peninsula Development Road, 3.5 km WNW Mount Molloy PO	Michael Anthony	JWWdatabase
343	-16.6667	145.3167	1976	0.5km W of Mt Molloy	Queensland Museum, Watt (1993)	qld Mam database
344	-16.6667	145.3333	1976	Mt Molloy	Queensland Museum, Watt (1993)	qld Mam database
342	-16.6683	145.2845	2007	Peninsula Development Road - between Mt Malloy and Mt Carbine	Brooke Bateman	JWWdatabase
341	-16.6829	145.3309	1999	on Mareeba Rd, 1km south of Mt Molloy	Scott Burnett	qld Mam database

QuollID	rev_LAT	rev_LONG	YEAR	LOCALITY	OBSERVER	SOURCE
340	-16.6833	145.0333	1998	Mt Molloy Area	0	Nquoll Records 081106
339	-16.7615	145.5228	0	Flaggy Ck, north of Kuranda	Martin Cohen	Nquoll Records 081106
337	-16.7667	145.6333	1971	Black Mountain Rd, Kuranda	Queensland Museum, Watt (1993)	qld Mam database
338	-16.7667	145.6333	1971	Black Mountain Rd, Kuranda	Queensland Museum, Watt (1993)	qld Mam database
336	-16.7806	145.3435	2007	Mareeba Mt Molloy Rd "Lake Mitchell", 2 km SW Mount Consider	Michael Anthony	JWWdatabase
334	-16.7833	144.2000	1994	Bathurst Ra, W of Cape Melville	0	Nquoll Records 081106
335	-16.7833	145.3333	0	QUAIDS DAM, LAKE MITCHELL, 19 KM S OF MT MOLLOY	0	Nquoll Records 081106
333	-16.8002	145.3629	2007	Mareeba - Mt Molloy Rd, between Big Mitchell Cr & Little Mitchell R	Michael Anthony	JWWdatabase
332	-16.8025	145.3646	2000	100m north of Big Mitchell Creek, Peninsula Development Rd	Eric Sticklen	qld Mam database
331	-16.8073	145.5184	1995	Flaggy Creek, 2 km NE Koah	Paul Morris	JWWdatabase
330	-16.8396	145.3717	2000	Mareeba 9Km north, wetlands turn-off	Shawn Depper	qld Mam database
329	-16.8671	145.4213	2007	Bilwon Road, Biboohra	Jack & Sue Skinner	JWWdatabase
328	-16.8748	145.4438	2006			Incidental Records
327	-16.9023	145.4134	2005	Mareeba - Mt Molloy Rd, 2.2 km north of Mareeba Wetlands turn-off Biboohra	Michael Anthony	JWWdatabase
325	-16.9167	145.7667	1911	Cairns	Museum of Victoria, Watt (1993)	qld Mam database
326	-16.9167	145.7667	1936	Cairns	Museum of Victoria	qld Mam database
324	-16.9192	145.5942	2003	Clohesy R Rd, 1000m e first ford	Burnett	Nquoll Records 081106
322	-16.9333	145.5333	1980	Goldmine Ck, Mareeba-Kuranda Rd	Queensland Museum, Watt (1993)	qld Mam database
323	-16.9333	145.5333	1990	Davies Ck bridge, Mareeba-Kuranda Rd	Queensland Museum, Watt (1993)	qld Mam database
321	-16.9475	145.5379	1990	Kuranda-Mareeba road, 0.5 km S. Davies Creek bridge	J.W.Winter	JWWdatabase
320	-16.9655	145.4120	2006	52 McGrath Road, 3 km NNW Mareeba PO	Dick Eussen	JWWdatabase
319	-16.9831	145.4911	2007	Kennedy Highway, 7 km east of Mareeba	Brian Venables	JWWdatabase
318	-16.9874	145.5620	2001	Davies Ck, NP	Conrad Hoskin`	Nquoll Records 081106
317	-16.9985	145.3511	1972			Qld Historical Fauna database
316	-16.9985	145.4344	0	Mareeba	Not Available	qld Mam database
315	-16.9985	145.3511	1972	5 MILES W OF MAREEBA;	Not Available	qld Mam database
314	-17.0000	145.4333	0	Mareeba	South Australian Museum	qld Mam database
313	-17.0000	145.3500	1972	5 MILES W OF MAREEBA;	CSIRO	qld Mam database
309	-17.0000	145.3400	1990	Davies Ck Rd, 2.4km NNE Mt Turtle	J. Winter	M Oakwood
310	-17.0000	145.3400	1990	Davies Ck Rd, 3.4km NNW Mt Turtle	J. Winter	M Oakwood
311	-17.0000	145.3400	1990	Davies Ck Rd, 2.6km NNE Mt Turtle	J. Winter	M Oakwood
312	-17.0000	145.3400	1990	Davies Ck, Lamb Range	J. Winter	M Oakwood

QuollID	rev_LAT	rev_LONG	YEAR	LOCALITY	OBSERVER	SOURCE
308	-17.0000	145.3300	1990	Davies Ck Rd, 3.8km NNW Mt Turtle	J. Winter	M Oakwood
307	-17.0000	145.2600	1969	Mareeba	SAM	M Oakwood
306	-17.0000	145.2500	1988	Between Mareeba & rest area, Mareeba-Kuranda Road	J. Winter	M Oakwood
305	-17.0014	145.5682	1995			Qld Historical Fauna database
304	-17.0037	145.5676	1990	Davies Creek Rd, Lamb Range, 3.8km NNW Mt Turtle	J.W.Winter, H.V.Myles	JWWdatabase
303	-17.0082	145.5704	1990	Davies Creek Rd, Lamb Range, 3.4 km NNW Mt Turtle	J.W.Winter, H.V.Myles	JWWdatabase
302	-17.0098	145.5702	1988	Davies Creek Road, Lamb Range	J.W.Winter, D.L.Storch	JWWdatabase
301	-17.0099	145.4323	1988	Mareeba-Kuranda Rd. betweem Mareeba & rest area	R.Whitford	JWWdatabase
300	-17.0117	145.5786	1988	Davies Creek Road, Lamb Range	J.W.Winter, D.L.Storch, D.Whitford	JWWdatabase
299	-17.0121	145.5789	1994			Qld Historical Fauna database
298	-17.0143	145.5802	2005			Far Northern Threatened Species
297	-17.0147	145.5825	1990	Davies Creek Rd, Lamb Range, 2.6 km NNE Mt Turtle	J.W.Winter, H.V.Myles	JWWdatabase
295	-17.0147	145.5810	2000			Far Northern Threatened Species
296	-17.0147	145.5810	2003			Far Northern Threatened Species
294	-17.0148	145.5777	2005			Far Northern Threatened Species
293	-17.0148	145.5786	2004			Far Northern Threatened Species
292	-17.0149	145.5819	2000			Far Northern Threatened Species
291	-17.0167	145.5333	2000	Tinaroo, L Tinaroo	0	Nquoll Records 081106
290	-17.0167	145.3500	0	5 MILES W OF MAREEBA	0	Nquoll Records 081106
289	-17.0170	145.5850	2005			Far Northern Threatened Species
288	-17.0170	145.5816	2002			Far Northern Threatened Species
287	-17.0174	145.5844	1988	Davies Creek, Lamb Range, 1.5 km NE Mandarin Rock	J.W.Winter, D.L.Storch, D.Whitford	JWWdatabase
286	-17.0174	145.5853	1990	Davies Creek Rd, Lamb Range, 2.4 km NNE Mt Turtle	J.W.Winter, H.V.Myles	JWWdatabase
285	-17.0187	145.5853	1995			Qld Historical Fauna database
284	-17.0187	145.5838	2004			Far Northern Threatened Species
283	-17.0197	145.5842	1994			Qld Historical Fauna database
282	-17.0200	145.2500	1991	Kennedy Hwy:6.3km SSE Mareeba P. O.	QLMU	M Oakwood
281	-17.0276	145.3844	1992	Chewko Rd S of Mareeba	Not Available	qld Mam database
280	-17.0333	145.4167	1991	Mareeba, Kennedy Hwy	Queensland Museum, Watt (1993)	qld Mam database
279	-17.0410	145.3504	2003	Granite Gorge Caravan Park	Mandy Revetta	JWWdatabase
278	-17.0479	145.4301	1991	Kennedy Highway, 6.3 km SSE Mareeba P.O.	Bevan Pritchard	JWWdatabase
275	-17.0500	145.1300	1993	Lamb Range, Emu Ck to Mt Haig Rd	D. Storch	M Oakwood
276	-17.0500	145.3100	1994	Lamb Range, Emu Ck	D. Storch	M Oakwood
277	-17.0500	145.3100	1995	Lamb Range, Emu Ck	D. Storch	M Oakwood
274	-17.0600	145.2600	1988	"Jump-up" Mareeba-Atherton Road	J. Winter	M Oakwood
273	-17.0600	145.2500	1992	Herberton Range, Mt Baldy State Forest	D. Storch	M Oakwood
272	-17.0667	145.4167	1989	Mareeba airport	Queensland Museum, Watt (1993)	qld Mam database
271	-17.0687	145.4346	1989	Kennedy Highway, Mareeba Airport, 8 km N Mareeba	Marilyn Peterson	JWWdatabase

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270	-17.0700	145.3000	1992	Emu Ck, east of Mareeba	P. Johnson	M Oakwood
269	-17.0750	145.4167	1981	MAREEBA AERODROME;	CSIRO	qld Mam database
268	-17.0763	145.4900	1988	Tinaroo Creek Road, Lamb Range	J.W.Winter, M.Ahmet, Dick Whitford	JWWdatabase
266	-17.0800	145.2800	1994	Lamb Range, Tinaroo Ck Rd	D. Storch	M Oakwood
267	-17.0800	145.2800	1995	Lake Tinaroo	L. Moore	M Oakwood
265	-17.0800	145.5012	1988	Tinaroo Creek Road, Lamb Range	J.W.Winter, M.Ahmet, Dick Whitford	JWWdatabase
264	-17.0812	145.4957	2007	Tinaroo Creek Road, between Douglas Creek & Henry Hannam Drive	J.W.Winter, H.V.Myles	JWWdatabase
263	-17.0817	145.4932	2007	Tinaroo Creek Road, between Douglas Creek & Henry Hannam Drive	J.W.Winter, H.V.Myles	JWWdatabase
262	-17.0832	145.4354	1996	Kennedy Highway, 0.2 km N Turkinje	J.WJ.W.Winter, H.V.Myles, H.Mcrea, D.Davidson	JWWdatabase
261	-17.0853	145.5177	2007	Tinaroo Creek Road, between Douglas Creek & NP boundary	J.W.Winter, H.V.Myles	JWWdatabase
260	-17.0900	145.3400	1989	Tinaroo Dam, 17km W of Little Musgrave	SAM	M Oakwood
259	-17.0907	145.5193	2007	Tinaroo Creek Road, between Douglas Creek & NP boundary	J.W.Winter, H.V.Myles	JWWdatabase
258	-17.0949	145.5214	1994			Qld Historical Fauna database
257	-17.0992	145.5255	1988	Tinaroo Creek Road	J.W.Winter, M.N.Ahmet	JWWdatabase
256	-17.1000	145.4167	1981	Jumpup, 2km N Walkamin to Kennedy Hwy	0	Nquoll Records 081106
255	-17.1029	145.5311	1988	Emu Creek, Tinaroo Creek Rd, 7.7km WSW Mt Haig	J.W.Winter & M.N.Ahmet	JWWdatabase
254	-17.1049	145.4362	1988	"Jump Up" Kennedy Highway	R.Whitford	JWWdatabase
253	-17.1091	145.5373	2007	Tinaroo Creek Road, Emu Creek	J.W.Winter, H.V.Myles	JWWdatabase
252	-17.1175	145.4480	2007	Tolga, Vollert's, between Rocky Cr and Barron River	J.W.Winter, H.V.Myles	JWWdatabase
251	-17.1208	145.5416	1995			Qld Historical Fauna database
250	-17.1300	145.3600	1992	Walkamin		A. Kutt
249	-17.1395	145.4512	2007	Tolga, Vollert's, between Rocky Cr and Barron River	J.W.Winter, H.V.Myles	JWWdatabase
248	-17.1400	145.1800	1993	Mareeba 17km W of, On Mareeba-Dim	D. Storch	M Oakwood
247	-17.1466	145.4593	2007	Vollert Road, 8.75 km NNW Tolga PO	Hedwig Vollert	JWWdatabase
245	-17.1500	145.5667	1989	on road 2km e of Tinaroo	Mahony M.	Nquoll Records 081106
246	-17.1500	145.5667	1989	17 km W,Little Musgrave	South Australian Museum	qld Mam database
244	-17.1537	145.5507	2000	1.4km northeast of Tinaroo Dam wall	Ian Fox	qld Mam database
243	-17.1546	145.4621	2007	Vollert's place, 4.6 km SE Walkamin PO	Walter Vollert	JWWdatabase
242	-17.1563	145.5190	1995			Qld Historical Fauna database
240	-17.1600	145.2500	1981	Jumpup: 2km N Walkamin to Kennedy Hwy	QLMU	M Oakwood
241	-17.1600	145.5500	1940	Bellenden Ker, <1940	QLMU	M Oakwood
239	-17.1611	145.5470	2003	Danbulla Forest Drive near dam wall	Michael Anthony	JWWdatabase
238	-17.1650	145.5183	1995			Qld Historical Fauna database

QuollID	rev_LAT	rev_LONG	YEAR	LOCALITY	OBSERVER	SOURCE
237	-17.1655	145.5405	1995			Qld Historical Fauna database
236	-17.1663	145.5374	2007	Tinaroo Falls, "River Road"	J.W.Winter, H.V.Myles	JWWdatabase
235	-17.1667	145.4333	0	ROCKY CREEK, 8 KM N OF TOLGA, ATHERTON TABLELAND	0	Nquoll Records 081106
234	-17.1682	145.5225	1995			Qld Historical Fauna database
233	-17.1682	145.5481	2000	Pensini's Restaurant, Lake Tinaroo	Andrew Dennis	qld Mam database
552	-17.1821	145.2660	2007		D.Thornberg	
232	-17.1833	145.4542	1972	15 MILES S OF MAREEBA;	CSIRO	qld Mam database
553	-17.1839	145.2869	2007		D.Thornberg	
231	-17.2000	145.4333	1993	Mareeba, 20km S	0	Nquoll Records 081106
551	-17.2049	145.3120	2007		D.Thornberg	
554	-17.2141	145.3039	2007		D.Thornberg	
550	-17.2242	145.3187	2007		D.Thornberg	
230	-17.2244	145.4737	2005	6 Duncan Street, Tolga	Cecil V. Hill	JWWdatabase
549	-17.2327	145.3120	2007		D.Thornberg	
229	-17.2651	145.5844	1993	ATHERTON TABLELAND;	Not Available	qld Mam database
228	-17.2651	145.4178	1981	Jumpup, Kennedy-Walkamin Hwy	Not Available	qld Mam database
227	-17.2667	145.4167	1981	Jumpup, Kennedy-Walkamin Hwy	Queensland Museum, Watt (1993)	qld Mam database
226	-17.2952	145.3529	2001			Qld Historical Fauna database
225	-17.3083	145.3967	1994	Mt Baldy State Forest 194, Walsh River and adjacent slopes	QFRI Database	qld Mam database
223	-17.3600	145.2900	1921	5miles SW of Ravenshoe, Atherton Tableland	USNM	M Oakwood
224	-17.3600	145.2900	1948	Nine miles SW of Ravenshoe	Tate	M Oakwood
222	-17.3643	145.2928	2003	Picnic Rock, Watsonville	Scott Burnett	Nquoll Records 081106
221	-17.3678	145.3529	2004	Watsonville Range, powerlinr easement under powerline	Scott Burnett, Alastair Freeman	Nquoll Records 081106
220	-17.3890	145.3773	2000	Rifle Range, Herberton	Saeed De Ridder	qld Mam database
219	-17.4215	145.3352	2007	Western Creek, Silver Valley Road	Berryl Don	JWWdatabase
218	-17.4221	145.3337	2006	Silver Valley Road, Western Creek	Greg and Carol	JWWdatabase
217	-17.4331	145.3043	2007	Silver Valley Road, between Clotten (Conglomerate) Cr and watershed	Tom DeRidder	JWWdatabase
216	-17.4379	145.2809	2007	Lancelot Mine, Lance Creek	Lance Chapman	JWWdatabase
215	-17.4695	145.2759	2007	Lancelot, Silver Valley	Geordie	JWWdatabase
214	-17.6000	145.4833	1921	Ravenhoe	Nat. Museum of Nat. History, Watt (1993)	qld Mam database
213	-17.7182	145.5271	1922			Qld Historical Fauna database
210	-17.8100	145.3500	1995	Davies Ck State Forest, Lamb Range, N Qld	L. Pope	M Oakwood
211	-17.8100	145.3500	1995	Davies Ck State Forest, Lamb Range, N Qld	L. Pope	M Oakwood

QuollID	rev_LAT	rev_LONG	YEAR	LOCALITY	OBSERVER	SOURCE
212	-17.8100	145.3500	1996	Davies Ck State Forest, Lamb Range, N Qld	S. Comport	M Oakwood
209	-17.8100	145.3400	1995	Emerald Ck State Forest, Lamb Range, N Qld	S. Comport	M Oakwood
208	-18.1600	144.5000	1990	Undara		A. Kutt
207	-18.2106	144.6819	1989			Qld Historical Fauna database
206	-18.4667	145.8583	1882	Herbert Vale	Collett (1887)	qld Mam database
205	-18.4800	146.1295	2001	Bishops Peak	Stephen Williams	qld Mam database
204	-18.8200	145.1200	1993	Mary Farms, West Mary Rd	D. Storch	M Oakwood
203	-18.8500	143.4300	2000	Cobbold Gorge		A. Kutt
201	-19.1315	146.8602	2005			Incidental Records
200	-19.1360	146.8344	0	Magnetic Island (general)	Not Available	qld Mam database
199	-19.1400	146.4800	1940	Kissing Point:Townsville, <1940	QLMU	M Oakwood
198	-19.1500	146.4800	1995	Townsville, nr Instit of Marine Science	M. Trannery	M Oakwood
197	-19.1600	146.4800	1940	Townsville, <1940	QLMU	M Oakwood
196	-19.1831	147.0164	1975			Qld Historical Fauna database
202	-19.1833	147.0150	1992	Cape Cleveland, nr Townesville	P. Johnson	M Oakwood
195	-19.2151	146.7033	1991	VCL west of Townsville Town Common, western side of Bohle River	Not Available	qld Mam database
194	-19.2485	146.6344	1966	Townsville district, north Queensland	Not Available	qld Mam database
193	-19.2529	147.0353	1990	Mt Cleveland summit (site C4), E of Townsville	Not Available	qld Mam database
192	-19.3400	146.5600	1973	Major Ck: Woodstock	QLMU	M Oakwood
191	-19.3985	147.0178	0	Bowling Green Bay National Park	Not Available	qld Mam database
189	-19.4400	147.3100	1907	Mount Alma, Inkerman, N. Qld (200 feet)	NHMUK	M Oakwood
188	-19.4500	147.2900	1907	Beach, Mount Inkerman, N Qld	NHMUK	M Oakwood
187	-19.4750	146.9875	2007	Alligator Falls, Mount Elliot Seciton of Bowling Green Bay National Park	Luke Jackson	JWWdatabase
186	-19.5667	146.9333	1973	Majors Creek, Woodstock	Queensland Museum, Watt (1993)	qld Mam database
185	-19.5833	147.0333	0	WOODSTOCK ROOD, DOUBLE CREEK	0	Nquoll Records 081106
176	-19.7083	147.7550	1984	Cape Upstart Flagstaff Bay.	G.B. Sherman	Nquoll Records 081106
183	-19.7151	147.2678	1972	Lower Burdekin River district	Not Available	qld Mam database
184	-19.7151	147.7636	1967	NW corner, Cape Upstart	Not Available	qld Mam database
182	-19.7151	147.7636	1967			Qld Historical Fauna database
181	-19.7276	147.8094	1975	Cape Cattle Stn, Cape Upstart	Not Available	qld Mam database
190	-19.7500	147.8000	1992	Cape Upstart (sth of Home Hill)	P. Johnson	M Oakwood
180	-19.7526	147.4886	1907	Inkerman Stn area, S of Home Hill	Not Available	qld Mam database
179	-19.7651	147.4511	0	Inkerman	Not Available	qld Mam database
178	-19.7823	147.8286	1995	2km ESE Station Hill, Cape Upstart	Not Available	qld Mam database

QuollID	rev_LAT	rev_LONG	YEAR	LOCALITY	OBSERVER	SOURCE
177	-19.7831	147.8294	2002	Cape Upstart	John Augusteyn	qld Mam database
175	-19.7839	147.8275	1995	2km ESE Station Hill, Cape Upstart	Pollock (Unpubl. data)	qld Mam database
174	-20.0200	148.1700	1969	Langham: 160.9km NE Rockhampton	QLMU	M Oakwood
173	-20.0600	147.4400	1907	Mount Abbott, Inkerman	NHMUK	M Oakwood
172	-20.0672	148.4553	1996	0.4km E of Monties Resort	Pollock (Unpubl. data)	qld Mam database
171	-20.0825	148.4411	1993	1km S Monties Resort, Cape Gloucester	Pollock (Unpubl. data)	qld Mam database
170	-20.0947	148.5053	1986	Pioneer Dr, Dingo Beach	Pollock (Unpubl. data)	qld Mam database
169	-20.0984	147.7511	1907	Mt Abbot, S of Home Hill	Not Available	qld Mam database
168	-20.1011	148.4958	1986	1km SW Dingo Beach	Pollock (Unpubl. data)	qld Mam database
166	-20.2597	148.6467	1996	S Charleys Ck on rd to Dryander NP	Pollock (Unpubl. data)	qld Mam database
167	-20.2667	148.7167	1995	Airlie Beach airport	P. Johnson	M Oakwood
165	-20.2717	148.7128	1996	Airlie Beach Motorlodge	Pollock (Unpubl. data)	qld Mam database
164	-20.2847	148.7619	1991	Ranger barracks, Conway NP	Pollock (Unpubl. data)	qld Mam database
163	-20.2875	148.7694	1984	Swamp Bay carpark, Conway NP	Pollock (Unpubl. data)	qld Mam database
162	-20.2901	148.7761	1984	Conway NP, nr Swamp Bay entrance	C.T. Mumbray	qld Mam database
161	-20.2989	148.5340	1977			Qld Historical Fauna database
160	-20.3086	148.6394	1991	N junct. Richardson's Rd & Crofton Ck	Pollock (Unpubl. data)	qld Mam database
159	-20.3467	148.7583	1989	Repulse Ck, Conway NP	Pollock (Unpubl. data)	qld Mam database
157	-20.4100	148.7600	1989	Boat ramp W Wilson Beach, Proserpine R	Pollock (Unpubl. data)	qld Mam database
158	-20.4200	148.3600	1996	Bloomsbury, 40km N of Mackay (v uncommon)	D. Spooner	M Oakwood
156	-20.4700	145.0100	1923	Torrens Ck (1600feet)	NHMUK	M Oakwood
155	-20.4899	148.5234	1982			Qld Historical Fauna database
153	-20.4900	148.5561	1991	Proserpine Airport	Pollock (Unpubl. data)	qld Mam database
154	-20.4900	148.5561	1995	Proserpine Airport	Pollock (Unpubl. data)	qld Mam database
152	-20.6603	148.7028	1990	Hills W of Midge Pt	Pollock (Unpubl. data)	qld Mam database
151	-20.6625	148.7083	1990	Saros Resort land, S of Midgeton, 35km S Proserpine	WBM Oceanics (1992)	qld Mam database
150	-20.7111	148.5919	1996	Dogherty's Rd nr Bloomsbury	Pollock (Unpubl. data)	qld Mam database
149	-20.7297	148.6036	1995	2.5km S Bloomsbury, Bruce Hwy	Pollock (Unpubl. data)	qld Mam database
148	-20.7664	148.5589	1992	Close to Taringa nr Horse Ck	Pollock (Unpubl. data)	qld Mam database
147	-20.7972	148.5467	1995	Rangers res., Cathu SF	Pollock (Unpubl. data)	qld Mam database
146	-20.7983	148.5450	1996	Cathu SF barracks and forest rangers residence, west of Yalbaroo on Bruce Highway	DNR-General Fauna Database	qld Mam database
145	-20.8000	148.5419	1994	Pandanus Ck, Joxut SFP	Pollock (Unpubl. data)	qld Mam database
144	-20.8058	148.6986	1994	Commelli Farm, 7km E Yalbaroo	Pollock (Unpubl. data)	qld Mam database
143	-20.8179	148.5972	1994	E of Boundary Ck along Cathu Rd	Not Available	qld Mam database
142	-20.8187	148.6086	1996	1km N Cathu SF Rd & O'Connell R	Not Available	qld Mam database
141	-20.8194	148.5961	1994	E of Boundary Ck along Cathu Rd	Pollock (Unpubl. data)	qld Mam database

QuollID	rev_LAT	rev_LONG	YEAR	LOCALITY	OBSERVER	SOURCE
140	-20.8203	148.6075	1996	1km N Cathu SF Rd & O'Connell R	Pollock (Unpubl. data)	qld Mam database
139	-20.8225	148.5383	1994	Cathu SF, W Mt Macartney	Pollock (Unpubl. data)	qld Mam database
138	-20.9000	148.7669	1996	0.5km W of Calen	Pollock (Unpubl. data)	qld Mam database
137	-20.9139	148.7192	1990	Barron Pocket, 1.5km from Mt Charlton Rd	Pollock (Unpubl. data)	qld Mam database
136	-20.9211	148.7250	1994	Calen-Mt Charlton Rd nr Toons Rd	Pollock (Unpubl. data)	qld Mam database
135	-20.9239	149.0397	1994	Nr cliffs nr water supply, Cape Hillsborough NP	Pollock (Unpubl. data)	qld Mam database
134	-20.9483	148.7344	1990			Qld Historical Fauna database
133	-21.0564	149.1383	1936	0.5km S of Orphanage Swamp, Eimeo	Pollock (Unpubl. data)	qld Mam database
132	-21.0667	148.6333	1995	Eungella NP, Finch Hatton Gorge Section	0	Nquoll Records 081106
131	-21.1011	148.7753	1991	0.5km S Dow's Creek hall	Pollock (Unpubl. data)	qld Mam database
130	-21.1389	149.1714	1990	Canelands Shopping Centre, Mackay	Pollock (Unpubl. data)	qld Mam database
129	-21.1450	148.7447	1996	W Middleplain Ra. nr Gargett	Pollock (Unpubl. data)	qld Mam database
128	-21.1500	149.1833	1937	MACKAY	BUR SUGAR EXPERIMENT STN	Nquoll Records 081106
127	-21.1525	149.1714	1996	Adrian St, Mackay	Pollock (Unpubl. data)	qld Mam database
126	-21.1578	149.1967	1996	Evans Rd, Far Beach	Pollock (Unpubl. data)	qld Mam database
125	-21.2085	148.4877	2003			Qld Historical Fauna database
123	-21.2373	148.4533	1995	Hazlewood Gorge cliffline	Not Available	qld Mam database
124	-21.2373	148.4542	1995	Hazlewood Gorge cliffline	Not Available	qld Mam database
122	-21.2382	148.4503	1995	Hazlewood Gorge cliffline	Not Available	qld Mam database
121	-21.2389	148.4522	1995	Hazlewood Gorge cliffline	Pollock (Unpubl. data)	qld Mam database
120	-21.2397	148.4492	1995	Hazlewood Gorge cliffline	Pollock (Unpubl. data)	qld Mam database
118	-21.2573	148.5063	2003			Incidental Records
119	-21.2573	148.5063	2007			Mackay District Northern Quoll Project
117	-21.2818	146.9928	1991	Yandan mine site, Suttor R	Not Available	qld Mam database
116	-21.3000	148.0167	1994	Nebo, 80km NW at Hillalong Stn, Limestone Hill	0	Nquoll Records 081106
115	-21.3100	148.5521	1994	Crediton State Forest, 12km South of Crediton	Martin Schulz	qld Mam database
114	-21.4000	145.9800	1950	Darkies Range		A. Kutt
113	-21.4017	148.5367	1996	2km N Mt Britton mines	Pollock (Unpubl. data)	qld Mam database
112	-21.4124	148.5787	2003	Sydney Heads, Homevale National Park	Andrew Dinwoodie	qld Mam database
111	-21.4779	148.3257	2002	Kemmis Creek Nature Refuge (Proposed) - Fauna	Derek Ball	qld Mam database
110	-21.6322	148.6811	1992	Nebo M.E.B. substation shed	Pollock (Unpubl. data)	qld Mam database
109	-21.9247	148.7086	1990	1km N Yard Ck Dam, Dipperu NP	Pollock (Unpubl. data)	qld Mam database
108	-21.9401	148.7011	1971	Dipperu National Park	Not Available	qld Mam database
107	-21.9775	148.5864	1991	Valkyrie HS	Pollock (Unpubl. data)	qld Mam database
106	-22.1500	150.0625	1992	Stanage Bay (Broad Sound), N of Yeppoon	G. Porter	M Oakwood
103	-22.2567	150.1453	1990			Qld Historical Fauna database
104	-22.2667	150.1483	1993	Broome Head: Lot 33 on Ps 135 Parish of Torilla	G. Porter, B. Chippendale, D. Raymond	qld Mam database

QuollID	rev_LAT	rev_LONG	YEAR	LOCALITY	OBSERVER	SOURCE
105	-22.2833	150.1500	1972	Shoalwater Bay Training Area (approx 1972)	Schodde et al.	M Oakwood
102	-22.3625	150.1125	1929	Couti Uti, 100ml N of Rockhampton	Finlayson (1934)	qld Mam database
101	-22.4985	145.0012	1923	Forest Hills, Torrens Ck (Forest Den NP?)	Not Available	qld Mam database
99	-22.5000	147.3800	1940	Clermont, <1940	QLMU	M Oakwood
100	-22.5000	147.6333	0	Clermont	Queensland Museum, Watt (1993)	qld Mam database
98	-22.6333	150.4500	1991	Shoalwater Bay Training Area	IBIS,LST,SWBAFA1,Richard Schodde	qld Mam database
97	-22.6568	148.9719	1969	Langham (Langley) 161km NE Rockhampton	Not Available	qld Mam database
	-22.6826	149.6191	2006	Bruce Highway, on rise just N of Tooloomba Ck Servo, c. 35-36km n Marlborough	Kevin Rankine	S. Burnett (public feedback)
96	-22.8612	146.8955	1998	Narrien Range NP: Rocky outcrop approx. 1km NE of site N01 - western boundary.	M.Fletcher, P.Hales, D.Hannah, N.Thurgate	qld Mam database
95	-22.8750	148.2278	1975	Lowestoft peaks, alt=500m	Emerald Shire Fauna Survey (Gordon Unpubl.data)	qld Mam database
94	-22.8782	146.9300	1998			Integrated Biological Information System (IBIS)
93	-22.8787	150.6277	1997	Bayfield - Byfield Range	J. Clarke, B. Busk	qld Mam database
92	-22.9333	147.4000	1960	Nr Drummond Range SE (SW) of Clermont	Fleay (1962)	qld Mam database
	-23.0931	150.7044	c. 1950s	Adelaide Park Rd, 3.5mi. From Yeppoon	Enid Wilson	S. Burnett (public feedback)
	-23.0931	150.7044	e. 2000s	Adelaide Park Rd, 3.5mi. From Yeppoon	Enid Wilson	S. Burnett (public feedback)
91	-23.1317	150.7428	1948			Qld Historical Fauna database
90	-23.1333	150.0500	1965	Rockhampton, 24km N	0	Nquoll Records 081106
89	-23.1568	150.4553	1996	Mt Etna Caves NP	Unknown	qld Mam database
88	-23.1569	150.4606	1966	Mt Etna & Limestone Ridge	Dwyer (1970)	qld Mam database
87	-23.2100	150.3600	1940	Berserker range: Yeppoon, <1940	QLMU	M Oakwood
83	-23.2200	150.3200	1961	ROCKHAMPTON	D. Fleay	M Oakwood
84	-23.2200	150.3200	1964	ROCKHAMPTON	MVZB	M Oakwood
85	-23.2200	150.3200	1966	ROCKHAMPTON	AUMU	M Oakwood
86	-23.2200	150.3200	1969	ROCKHAMPTON	SAM	M Oakwood
82	-23.2300	150.3000	1940	Rockhampton District, <1940	QLMU	M Oakwood
81	-23.3000	150.4000	1932	Lower Fitzroy Valley, Fitzroy River (nr Rockhampton). <1932	SAM	M Oakwood
80	-23.3207	147.6628	1975	Mt Ball mountain, alt=450m	Not Available	qld Mam database
79	-23.3292	150.6083	0	Mt Archer NP	IBIS,LST,ARCHFA1,Volunteers	qld Mam database
78	-23.3500	150.6000	0	Berserker Ra, Yeppoon	0	Nquoll Records 081106
	-23.3556	147.4784	e. 1970s	mining lease on Reklaw Park Station, north-west of Rubyvale	Peter Malone	S. Burnett (public feedback)

QuollID	rev_LAT	rev_LONG	YEAR	LOCALITY	OBSERVER	SOURCE
77	-23.3667	150.5333	1966	ROCKHAMPTON	E WORREL	Nquoll Records 081106
75	-23.3667	150.5333	1915	ROCKHAMPTON	Australian Museum	qld Mam database
76	-23.3667	150.5333	1965	ROCKHAMPTON	Australian Museum	qld Mam database
74	-23.3667	150.5167	1929	Rockhampton outskirts	Finlayson (1934)	qld Mam database
73	-23.3750	150.5208	1960	Rockhampton area	Fleay (1962)	qld Mam database
	-23.3780	150.5140	Dec-07	Rockhampton	Bart Vandermeer via John McCabe	S. Burnett (public feedback)
72	-23.3900	150.2300	1974	"Struck Oil" Mt Morgan,SW of Rockhampton?	A. Horsup	M Oakwood
	-23.4178	147.6980	e. 1970's	Rubyvale	Peter	S. Burnett (public feedback)
	-23.4210	147.5040	e 1970s	Carbine Springs, c 5mi staightline s of Reklaw Park	Peter Malone	S. Burnett (public feedback)
71	-23.4300	147.1200	1961	Drummond Range, SE of Clermont	D. Fleay	M Oakwood
	-23.4364	150.4556	1960's	Gracemere	Wayne A J McDonald	S. Burnett (public feedback)
	-23.4364	150.4556	e.2000s	sandstone quarry on way to Gracemere	Wayne A J McDonald	S. Burnett (public feedback)
	-23.4364	150.4556	1973-74	rock quarry nw of Gracemere	Ray Ohl	S. Burnett (public feedback)
70	-23.5000	150.6667	0	Fitzroy River, Lower Fitzroy Valley	0	Nquoll Records 081106
	-23.5084	150.3192	over past 30 years	Stanwell Power Station	Wayne A J McDonald	S. Burnett (public feedback)
	-23.5084	150.3192	2008	Stanwell Power Station	Josh Lobodin	S. Burnett (public feedback)
69	-23.5484	150.6011	0	Mt Archer NP	Volunteers	qld Mam database
68	-23.5704	150.4694	1997	Bouldercombe	B. Busk	qld Mam database
67	-23.5901	150.4205	2000	Burnett Hwy adj to Mt Nagrom Nature Refuge, NNE of Mount Morgan	Not Available	qld Mam database
	-23.6089	151.1432	1950s	Curtis Island	Sue (Mt Morgan kennells)	S. Burnett (public feedback)
66	-23.6318	150.5011	1994	Dee Range	I. Herbert, C. Herbet	qld Mam database
65	-23.6333	150.4625	1994	Struck Oil	IBIS,ACQ,STRU_AN,I. Herbert, C. Herbet	qld Mam database
	-23.6667	150.0333	1956	gogango	Ray Ohl	S. Burnett (public feedback)
	-23.6667	150.0333	1957	Gogango	Ray Ohl	S. Burnett (public feedback)
	-23.6738	150.4003	2003	cnr of Murray Rd and Burnett Highway, Mt Morgan	Sue (Mt Morgan kennells)	S. Burnett (public feedback)
	-23.7087	150.3807	2006	Mt Morgan Range, between Mt Morgan and Dululu	Ken Border	S. Burnett (public feedback)
	-23.7250	151.1030	c. 1940s	Targinnie near gladstone	Frank Lenz	S. Burnett (public feedback)
63	-23.8651	149.5678	1903	Coomooboolaroo Stn	Not Available	qld Mam database
64	-23.8651	149.5678	1905	Coomooboolaroo	Not Available	qld Mam database
	-23.8778	151.2394	1995	Cosers Hill, Gladstone	Frank Lenz	S. Burnett (public feedback)
62	-23.9250	147.9778	1975	Mt Helmet, alt=360m	Emerald Shire Fauna Survey (Gordon Unpubl.data)	qld Mam database
61	-23.9342	147.9681	1975	Mt Elizabeth, alt=440m	Emerald Shire Fauna Survey (Gordon Unpubl.data)	qld Mam database
60	-24.0600	148.0500	1975	Mt Zamia: via Springsure	QLMU	M Oakwood

QuollID	rev_LAT	rev_LONG	YEAR	LOCALITY	OBSERVER	SOURCE
	-24.0765	151.1174	1980's	used to see regularly on Tableland Rd, west of Calliope when commuting to work	Frank Lenz	S. Burnett (public feedback)
59	-24.0847	148.0361	1975	Mt Zamia head of gorge in gorge, alt=480m	Emerald Shire Fauna Survey (Gordon Unpubl.data)	qld Mam database
58	-24.1000	148.0833	1990	Mt Zamia, via Springsure, Environmental Park	0	Nquoll Records 081106
57	-24.1036	148.0617	1975	Mt Boorambool caves & general, alt=550m	Emerald Shire Fauna Survey (Gordon Unpubl.data)	qld Mam database
	-24.1370	149.9970	1957	Kokatunga?, baralaba area	Ray Ohl	S. Burnett (public feedback)
56	-24.3200	151.2200	1992	Manypeaks, SW of Gladstone	C. James	M Oakwood
55	-24.3529	151.0206	1998	Head of Diglum Creek, Kroombit Tops National Park, southwest of Gladstone, SEQ	Brent Dadds and Woo O'Reilly	qld Mam database
54	-24.3800	148.2200	1968	Rewan Station, 80km SW Rolleston	QLMU	M Oakwood
53	-24.3979	150.9589	0	Kroombit Tops	Dnr Forest Wildlife Section	qld Mam database
52	-24.3979	150.9589	1900			Integrated Biological Information System (IBIS)
51	-24.4000	149.0000	1992	Expedition ranges	G. Porter	M Oakwood
50	-24.4111	150.9575	1995	Kroombit Creek, Kroombit Tops SF316	QFRI Database	qld Mam database
	-24.4433	149.8327	1960s	Denby Station about half way between Baralaba and Moura	Barbara and Douglas McLean	S. Burnett (public feedback)
49	-24.4484	149.8011	1961	Denby in Dawson R valley	Not Available	qld Mam database
	-24.4541	149.7637	1970s	Denby Station about half way between Baralaba and Moura	Barbara and Douglas McLean	S. Burnett (public feedback)
48	-24.4662	148.6292	1997	Comet River	Ppk Pty Ltd	qld Mam database
47	-24.5600	150.1600	1966	Dawson Valley	QLMU	M Oakwood
45	-24.6333	148.3667	1968	Rewan Stn, 80Km SW Rollston	0	Nquoll Records 081106
46	-24.6333	150.9667	1978	Cania Gorge	0	Nquoll Records 081106
44	-24.7167	149.9667	1926	DAWSON R VALLEY 65 MLS N OF TAROOM S E QLD	F FERRIER-HAMILTON	Nquoll Records 081106
43	-24.8556	147.1881	1970	Rocky outcrop N of Pluto TR	CSIRO (1972)	qld Mam database
42	-24.8596	147.4105	1999	3.3 kilometres south of the turnoff to Bunbuncundoo Springs along the main track Site=T089, Ka Ka Mundi NPW490	Not Available	qld Mam database
41	-24.8597	147.1899	1999	Approx 200m E of the gate at Major Mitchell Springs, up ridge directly above carpark Site=S043, Salvator Rosa NPW490	EPA-BBS Fauna Survey (1999)	qld Mam database
40	-24.8612	147.4094	1999	3.3 kilometres south of the turnoff to Bunbuncundoo Springs along the main track Site=T089, Ka Ka Mundi NPW490	EPA-BBS Fauna Survey (1999)	qld Mam database

QuollID	rev_LAT	rev_LONG	YEAR	LOCALITY	OBSERVER	SOURCE
39	-24.8654	147.4111	1999	4.5 kilometres past the turn to Bunbuncundoo Springs along main track Site=T090, Ka Ka Mundi NPW490	EPA-BBS Fauna Survey (1999)	qld Mam database
38	-24.9333	150.2667	1966	Dawson Valley	0	Nquoll Records 081106
37	-24.9600	147.9200	2000	1st Bluff Nth of Marlong Arch, Mt Moffatt	M.Oakwood	M Oakwood
36	-25.0100	147.5700	1992	Kenniffs Cave, Mt Moffat, Carnarvon	G. Porter	M Oakwood
35	-25.0250	147.9500	0	Mt Moffatt area, Carnarvon NP	Plowman (1994)/DEH (1989)	qld Mam database
34	-25.0333	148.1833	0	Carnarvon NP	IBIS,LST,CARNFA1,Volunteers	qld Mam database
33	-25.0400	148.1500	1994	Carnarvon	C. James	M Oakwood
32	-25.0401	148.1761	1972	Carnarvon NP (gorge section)	Not Available	qld Mam database
31	-25.0417	148.1750	1970	Carnarvon Gorge NP, 50ml E of Pluto TR	CSIRO (1972)	qld Mam database
30	-25.0500	148.0500	1986	Mt Moffat NP, Dargonelly Rockholes	0	Nquoll Records 081106
29	-25.1000	147.8500	2000	Duchess, Mt Moffatt NP	M. Oakwood	M Oakwood
28	-25.2500	149.0000	0	Expedition NP	WildNet (30/4/99 extract)	qld Mam database
27	-25.2625	150.1500	1993	Broome Head	IBIS,LST,BROMFA1, Porter et al.	qld Mam database
26	-25.2734	149.1261	0	Gorge, Robinson Gorge NP	Not Available	qld Mam database
	-25.5049	148.8042	1999-2000	75km N o Injune	Malcolm Grout	S. Burnett (public feedback)
25	-25.5500	152.0667	2000	Maryborough, cnr Groth St and Woongool Rd	0	Nquoll Records 081106
24	-25.5833	151.3000	1922	Mundubbera	Queensland Museum, Watt (1993)	qld Mam database
23	-25.6667	151.2833	1892	Burnett River-Boyne River area	Romer (1903)	qld Mam database
22	-25.7000	151.6083	1988	10km S of Gayndah	Watt (1993)	qld Mam database
21	-25.7568	151.4011	1892	Tim Shey's Ck camp	Not Available	qld Mam database
20	-26.1484	152.6177	1955	Chatsworth nr Gympie	Not Available	qld Mam database
19	-26.1833	152.0667	1944	Goomeri	Queensland Museum, Watt (1993)	qld Mam database
18	-26.2833	152.6833	1945	Lagoon Pocket, Dagun, Mary Valley line	Queensland Museum, Watt (1993)	qld Mam database
17	-26.5667	152.9542	1923	Maroochy River, Yandina	Queensland Museum, Watt (1993)	qld Mam database
16	-26.6984	152.9038	1989	Montville-Maleny Rd, 1.3km S of Palmwoods	Not Available	qld Mam database
15	-26.7000	152.9000	1991	Montville	Watt (1993)	qld Mam database
14	-26.7276	152.7177	1991	Conondale	Not Available	qld Mam database
13	-26.7901	152.7302	1985	Harpers Ck Rd, Conondale	Not Available	qld Mam database
12	-26.7917	152.7292	1988	Harpers Ck Rd, Conondale	Watt (1993)	qld Mam database
11	-26.7942	152.7969	1984	Stanley River, 10km NW Peachester	Not Available	qld Mam database
10	-26.8151	151.6011	1990	Edge of Bunya Mountains NP	Not Available	qld Mam database
9	-26.8333	151.7333	0	15km from Maidenwell (somewhere W)	Watt (1993)	qld Mam database
8	-26.8500	151.5667	0	Bunya Mountains NP	Watt (1993)	qld Mam database
7	-27.0167	152.7042	1991	Delaney Ck, Mt Delaney	Watt (1993)	qld Mam database
6	-27.0375	151.6917	1990	Maclagan North	Watt (1993)	qld Mam database
5	-27.2583	152.0750	1960	Road 2km E of Crows Nest	Watt (1993)	qld Mam database

QuollID	rev_LAT	rev_LONG	YEAR	LOCALITY	OBSERVER	SOURCE
4	-27.3583	151.8833	1965	Farm 20km SW of Crows Nest	Watt (1993)	qld Mam database
3	-27.3625	152.1583	1966	Ravensbourne	Watt (1993)	qld Mam database
2	-27.4667	153.0000	1952	Within 60ml of Brisbane	Lee & Mackerras (1955)	qld Mam database
1	-27.9417	151.9542	1985	Farm 5km E of Clifton	Watt (1993)	qld Mam database

Appendix B. Details of sites sampled during this survey, with relevant recent site information. (i) south-eastern Queensland sector.

Site No.	Locality	lat	long	Recent records	This survey	Northern quoll recorded this project	Habitat
1	Curra S.F - Gympie	-26.104546	152.661552	Last recorded by David Fleay, at Chatsworth in 1955, approximately 6km from this site. Quolls never recorded from this exact site. No known targetted quoll survey conducted here previously.	Along either side of internal forestry road, on south-side of Wood Rd, east of township of Curra.	No	Even-aged stand of *C. maculata* with stringybarks with patchy shrub layer and open grassy ground layer. Very narrow ribbon of wet sclerophyll/vine forest along creekline. Sandy/stony metamorphic derived ridges and gullys.
2	Mt Moffat N.P - Mailbox	-25.04856	147.879013	Last recorded at Mt Moffat 2000 but at least one targetted survey (Amber Hooke) failed to locate quolls here since then.	Either side of main access rd within the park, from the entrance in.	No	Open woodland with patchy ground cover of tussock grasses on sandys soils at base of sandstone escarpments
3	Mt Moffat N.P - Marlong Arch	-24.971812	147.905078	Last recorded at Mt Moffat 2000 but at least one targetted survey (Amber Hooke) failed to locate quolls here since then.	Along either side of Marlong Arch access Rd.		Open forest to open woodland, Ironbark, Angophora, very sparse shrub layer and dense ground layer of tussock grass and fire regenerating Eucalypt on sandstone derived soils between 40m and 1km from nearest escarpment.
4	Lonesome N.P - Candlesticks	-25.517877	148.838208	Seen by property owner, 1999-2000. No known targetted quoll survey conducted here previously.	Along either side of Candlesticks Rd.	No	Ironbark, Stringybark, Cypress woodland with dense stands of cypress in the shrub layer and patchy tussock grasses on sandstone derived soils between 100 and 150m from nearest escarpment.
5	Lonesome N.P - Gaswell	-25.552767	148.943323	Seen by property owner, 1999-2000. No known targetted quoll survey conducted here previously.	Along either side of Gas Well Rd.	No	Ironbark open forest to woodland with very sparse shrub layer and dense layer of tussock grass on sandstone derived soils between 250 and 500m from escarpment line.

Site No.	Locality	lat	long	Recent records	This survey	Northern quoll recorded this project	Habitat
6	Brooyar	-26.14405	152.520485	Last recorded by David Fleay, at Chatsworth in 1955, approximately 10km from this site. Quolls never recorded from this exact site.No known targetted quoll survey conducted here previously.	Along either side of internal firebreaks to the east (above) the main escarpment line, access via Wide Bay Highway	No	Mixed stringybark/bloodwood open forest with sparse shrub layer and dense ground layer of tussock grasses and yound Xanthorrhea on sandstone derived soils between 40m and 2km from nearest escarpment.
7	King Forest	-26.175033	152.561662	Last recorded by David Fleay, at Chatsworth in 1955, approximately 3km from this site. Quolls never recorded from this exact site. No known targetted quoll survey conducted here previously.	Along either side of internal firebreaks through the centre of the area, access via Gympie - Woolooga Rd.	No	Mixed Eucalypt open forest to woodland with Acacia and Xanthorrhea shrub layer over dense tussock grass on sandstone derived soils between 35 and 300m from the nearest escarpment edge.
8	Kroombit - Boxflat	-24.352242	150.935428	Last recorded in Kroombit Tops in 1988. No known targetted quoll survey conducted here previously.	Along either side of internal firebreaks within the area, access via Gladstone.	No	Mixed Eucalypt woodland with sparse Allocasuarina, Xanthorrhea and Eucalypt shrub layer over sparse tussock grass and patchy bracken ferm groundlayer on sandstone derived soils at base of escarpments.
9	Kroombit - Razorback	-24.418648	150.917108	Last recorded in Kroombit Tops in 1988. No known targetted quoll survey conducted here previously.	Along either side of internal firebreaks within the area.	No	Ironbark and stringybark woodland, dense shrub layer of regenerating Eucalypts and sparse and patchy grasses on sandstones and metasediments between 5 - 750m from escarpment lines.

Site No.	Locality	lat	long	Recent records	This survey	Northern quoll recorded this project	Habitat
10	Bania 1	-24.932613	151.568515	No known records. No known targetted quoll survey conducted here previously.	Along either side of internal firebreaks within the area.	No	Open forest of Bloodwoods, Lophostemon and Stringybark, dense shrub layer formed by Allocasuarina, regenerating Eucalypts, and Lantana in places, dense tussock and blady grass ground layer on granite soils on high ranges.
11	Bania - Cattleyards	-24.951497	151.582563	No known records. No known targetted quoll survey conducted here previously.	Along either side of internal firebreaks within the area.	No	Open forest of Bloodwoods, Lophostemon and Stringybark, dense shrub layer formed by regenerating Lophostemon in places, dense tussock and blady grass ground layer on granite soils on high ranges.
12	Berserker Range - Moores Ck	-23.313267	150.568308	Confirmed record is an undated museum specimen indicating pre 1970's, and possibly well before then. Unsubstaniated records in Rockhampton town, as recently as 2007.	Along either side of the internal N.P firebreak accessed from the end of Sunset Drive, Rockhampton.	No	Open Eucalypt woodland with sparse shrub layer of Macrozamias and Xanthorrheas, dense grasses and areas of dense lantana. Lower slopes of volcanic ranges and valley bottom.
13	Berserker Range - New Zealand Gully	-23.34114	150.631952	Confirmed record is an undated museum specimen indicating pre 1970's, and possibly well before then.Unsubstaniated records in Cawarral (about 10km straight line distance), as recently as 2007.No known targetted quoll survey conducted here previously.	Along either side of the internal firebreak accessed from the end of New Zealand Gully Rd.	No	Open woodland of Corymbias, Stringbarks and Ironbarks with dense shrub layer of post-fire regenerating Eucalypts and Lophostemon; also Xanthorhhea. Volcanic soils on ranges and ridges.

Site No.	Locality	lat	long	Recent records	This survey	Northern quoll recorded this project	Habitat
14	Mt Morgan	-23.60831	150.487793	Last known record a road kill 2006 (photographed).No known targetted quoll survey conducted here previously.	Along either side of the eastern and northern internal firebreaks of Belgamba Nature Refuge, end of Struck Oil Rd, Mt Morgan.	Yes -public appeal	Variable grassy and shrubby Eucalypt open forest to woodland of E. citriodora, E. acmenoides and E. erythrophloia on volcanic soils on high ranges.
15	Mt Morgan 2	-23.612522	150.504612	Last known record a photographed road kill 2006. No known targetted quoll survey conducted here previously.	Along either side of the western and southern internal firebreaks of Belgamba Nature Refuge, end of Struck Oil Rd, Mt Morgan.	Yes -public appeal	Variable grassy and shrubby Eucalypt open forest to woodland of E. citriodora, E. acmenoides and E. erythrophloia on volcanic soils on high ranges.
16	Stanwell - Tongs Corner	-23.528873	150.322548	Last known record a decayed animal trapped in power building, March 2008. Said by informants to have been common in the 1960's (pre-Cane Toad). No known targetted quoll survey conducted here previously.	Along either side of the internal and boundary firebreaks in the western portion of Stanwell Energy Park, via Gracemere.	Yes -public appeal	Mixed Eucalypt/Acacia woodland with dense shrub layer and dense to sparse tussock grass, on sandstone derived soils, minor sandstone outcropping
17	Stanwell - Mercy East	-23.499965	150.362685	Last known record a decayed animal trapped in power building, March 2008. Said by informants to have been common in the 1960's (pre-Cane Toad). No known targetted quoll survey conducted here previously.	Along either side of the internal and boundary firebreaks in the eastern portion of Stanwell Energy Park, via Gracemere.	Yes -public appeal	Open Iron bark Eucalypt woodland with dense tussock grass ground cover (including Buffell grass in places). Little shrub layer due to intense burning regime. Low hills and ranges, rocky, volcanic soil.

Site No.	Locality	lat	long	Recent records	This survey	Northern quoll recorded this project	Habitat
18	Ka Ka Mundi - Carnarvon Station	-24.879082	147.410147	Last known record 1999.	Along either side of a contiguous section of the Ka Ka Mundi N.P main access track via Tanderra Station and the boundary track between Carnarvon Station and the National Park.	No	Eucalypt woodland with dense mixed shrubland and grassland on shallow sandstone derived soils and bare rock on top of escarpment.
19	Ka Ka Mundi - Mt Ka Ka Mundi	-24.813432	147.476822	No known records. No known targetted quoll survey conducted here previously.	Along either side of a contiguous section of the Ka Ka Mundi N.P main access track via Tanderra Station, and Mt Ka Ka Mundi access track.	No	Eucalypt open woodland with patchy but often dense shrubs, including Brigalow, and sparse and patchy tussock grasses, on sandstone derived soils on gentle slopes below escarpment lines
20	Ka Ka Mundi - Bunbuncundoo	-24.850887	147.43243	Last known record 1999. No known targetted quoll survey conducted here previously.	Along either side of a contiguous section of the Ka Ka Mundi N.P main access track via Tanderra Station, and Bunbuncundoo camp ground access track.	No	Eucalypt open woodland with patchy but often dense shrubs and sparse and patchy tussock grasses, on sandstone derived soils on gentle slopes below escarpment lines

Appendix B. Details of sites sampled during this survey, with relevant recent site information. (ii) north Queensland sector.

A substantial population of the Northern Quoll was confirmed to occur on the western slopes of the coastal ranges between Herberton in the south and Cooktown in the north, a distance of approximately 200 km. The southern end of this population was in the upper reaches of the Walsh and Dry Rivers to the west and south-west of Herberton. Numerous record localities between Tolga in the south and the Mount Carbine township area to the north, and between Tinaroo in the east and Dimbulah in the west indicated a continuous population both in modified woodland and agricultural land. At the northern extremity of the north Queensland population records were obtained from Lakeland Downs, Mt Poverty, Shiptons Flat and Cooktown. The lack of records between Lakeland Downs and Mt Carbine, a distance of approximately 50 km, is attributed to survey deficiencies rather than a discontinuity in the quoll population.

South of Herberton there appears to be a real discontinuity in the Northern Quoll population. No records are known between the upper reaches of the Dry River and the Townsville area, a distance of approximately 270 km despite some targeted sampling in the area. Although present in the upper reaches of the Dry River, quolls appeared to be absent downstream of Newelton as long-term residents queried had not seen quolls and no records came from the Innot Hot Springs and Mt Garnet area. In the present survey apparently suitable quoll habitat was targeted in this gap at Mt Zero and Taravale, but failed to find the animal.

On Cape York Peninsula north of Lakeland Downs the disappearance of the Northern Quoll in the 1980/90s is attributed to the arrival of the Cane Toad (Burnett 1997). In the present survey, two localities with known populations of the quoll before the arrival of the toad, were targeted, Mapoon and Batavia Downs/Embley Range, but with no sign of the quolls. However, sightings of the Northern Quoll on the Portland Roads Road north of Lockhart in 2001 and a possible sighting from Jawalbina, west of Laura, in 2000 provide some hope that a residual population may still exist on Cape York Peninsula.

All the sampling localities in the present project where the Northern Quoll was recorded supported long established toad populations. From anecdotal evidence it would appear that Northern Quolls coexisting with Cane Toads ignore the toad.

Site No.	Locality	lat	long	Recent records	This survey	northern quoll recorded this project	Habitat	tenure & land use	comment on occurrence of toads
1	Mapoon, Red Beach, orchard road	-12.026806	141.87825	Last recorded at Mapoon in 1981	Along a mine survey road from the township of Red Beach, west past the orchard then south over a distance of apporximately 6 km	No	Very tall grassy eucalypt woodland, characterised by *Eucalyptus tetrodontona,* on aluminous laterite forming the flat plateau surface of the Weipa Plateau	Aboriginal freehold	Common
2	Mapoon, Big Swamp, Cullen Point Road	-11.979326	141.88596	Last recorded at Mapoon in 1981	Sub-site A each side of the Cullen Point road approximately 5-6 km north of Red Beach township	No	Clumped deciduous vine forest patches interspersed with shrubs and open grassy areas on old beach ridge of the Mapoon Plain	Aboriginal freehold	Common
2	Mapoon, Big Swamp, swamp track	-11.997572	141.87907	Last recorded at Mapoon in 1981	Sub-sites B-D along the vehilce track from the Cullen Point Road west to the Big Swamp over a distance of approximately 3 km	No	Mixed dunefield woodland with patchy ground cover of shrubs, vines and grass on sandy soils of the Mapoon Plain	Aboriginal freehold	Common
3	Batavia Downs Road	-12.706306	142.60119	Last recorded in general area in 1985	Sub-site A along the Batavia Downs to Sudley Road on the northern footslopes of the Embley Range	No	Mixed eucalypt woodland with sparse understorey and dense grass ground cover on north side of road, burnt on south side, on rolling metasediments of the Merluna Plain	Leasehold	Very dry, one only seen

Site No.	Locality	lat	long	Recent records	This survey	northern quoll recorded this project	Habitat	tenure & land use	comment on occurrence of toads
3	Batavia Downs Road	-12.70779	142.58948	Last recorded in general area in 1985	Sub-site B along the Batavia Downs to Sudley Road straddling the north-west ridge of the Embley Range	No	Tall messmate woodland with sparse understorey and burnt ground cover on laterite of the Embley Range	Leasehold	Very dry, one only seen
3	Batavia Downs Road	-12.719562	142.56854	Last recorded in general area in 1985	Sub-sites C & D along the Batavia Downs to Sudley Road between the Embley Range and Arthur Creek	No	Mixed eucalypt woodland with sparse understorey and recently burnt ground cover on rolling metasediments of the Merluna Plain	Leasehold	Very dry, one only seen
4	Embley Range, plateau	-12.722862	142.60464	Last recorded on the summit plateau in 1985	Sub-sites C-A from the northern edge of the Embley Range summit plateau south to the boundary fence between Batavia Downs and Sudley and south along the fence	No	Very tall messmate woodland with sparse understorey and sparse grassy ground cover, on laterite surface on an outlier of the Weipa Plateau	Leasehold	Very dry, none recorded
4	Embley Range, lower slopes	-12.710333	142.61175	Last recorded in general area in 1985	Sub-site D from the northern edge of the Embley Range summit plateau, north down the gentle escarpment to the Batavia Downs to Sudley Road and east along the road	No	Medium to tall messmate and mixed eucalypt woodland on lateritic edges of the Embley Plateau	Leasehold	Very dry, several concentrated along spring gutter

Site No.	Locality	lat	long	Recent records	This survey	northern quoll recorded this project	Habitat	tenure & land use	comment on occurrence of toads
5	Tinaroo Falls, Danbulla Road	-17.154537	145.5514	Known to be in the area	Sub-site A along the Danbulla Road skirting Tinaroo Falls Dam, starting about 1.5 km north of the dam wall and then onto the peninsula of Camp Barrabadeen		Medium to tall eucalypt woodland of *E. reducta* and *C.intermedia* on granite hillside with numerous large boulders		Common
5	Tinaroo Falls, "River Road"	-17.166289	145.5288	Known to be in the area	Sub-sites B & C along 'River Road' along the northern bank of the Barron River for approximately 3 km from the gate at the Danbulla Road end	1	Medium eucalypt woodland of *E.reducta*, ironbark and bloodwood with thickets of lantana and interveening grassy ground cover on low rolling hills of granite		Common
6	Brooklyn, Mt Spurgeon Road	-16.514266	145.15693	Known to be on the slopes of the ranges - several trapped by Alex Kutt and Brooke Bateman c. 10 km to SE	Sub-sites A-C up the Mount Spurgeon Road from Manganese Creek at the base to the 'Lookout' rock, a distance of approximately 4 km	No	Low to medium mixed eucalypt woodland of ironbark and stringybark (*E. portuensis*) on steep to very steep hillside of granite with numerous boulders	Leasehold - Australian Wildlife Conservancy	Common

Site No.	Locality	lat	long	Recent records	This survey	northern quoll recorded this project	Habitat	tenure & land use	comment on occurrence of toads
7	Brooklyn, Pump Crossing Road	-16.561884	145.12675	No record on flat here but one at Luster Creek on flat c. 18 km SE in 1995	Sub-sites A-C along the Pump Crossing Road from the gate near the Mt Carbine township, west towards the Mitchell River over a distance of approximately 4.5 km	No	Medium grassy eucalypt woodland predominantly of Malloy Box (*E. leptophleba*), sparse understorey and dense grassy ground cover	Leasehold - Australian Wildlife Conservancy	Common
8	Tinaroo Creek Road, Emu Creek	-17.110655	145.53697	Known to be in the area	Sub-sites A-C along the road through the natioal park from the 3-ways at the top of the hill, down the steep hill to Emu Creek. Over a distance of approximately 4 km.	1 + 1 recapture	Very tall wet slcerophyll forest at the upper end of the transect grading into dryier mixed woodland at the bottom, on granite	National Park	Common
9	Tinaroo Creek Road, Douglas Creek	-17.081516	145.50521	Known to be in the area	Sub-sites A-C along the road from the National Park boundary back toward Mareeba over a distance of approximately 5 km	3 + 1 recapture	Eucalypt woodland predominantly of ironbark at Site A, along the river flat of Douglas Creek at Site B and eucalypt woodland with *Eucalyptus platyphylla* dominant, on metamorphics	Leasehold	Common

Site No.	Locality	lat	long	Recent records	This survey	northern quoll recorded this project	Habitat	tenure & land use	comment on occurrence of toads
10	Tolga, Vollert's, between Rocky Cr and Barron River	-17.133592	145.44677	Known to be in the area	Sub-sites A-C along a farm road through the northern end of the Vollert's property	2	Eucalypt woodland with *Eucalyptus leptophleba* the dominant tree, on slightly incised basalt surface	Freehold	Common
11	Silver Valley Road, Dry River catchment	-17.454466	145.28572	Two or three records from the Newelton area (Site A) over the past few years	Sub-sites A-C along the road from Lime Creek north toward Herberton over approximately 4.5 km	No	Eucalypt woodland with ironbarks the dominant tree, on metamorphosed metasediments grading into conglomerate at the northern end	Leasehold	Common
12	Silver Valley Road, Wild River catchment	-17.418582	145.33723	Curent records from houses at Site B	Sub-sites A-C along the road from a high point at the southern edge of Western Creek catchment nearly to the Herberton-Petford Road, a distance of approximately 5.5 km	No	Eucalypt ironbark woodland on granite at Site A changing to a mixed woodland of lemon-scented gum and bloodwoods on rhyolites at Sites B and C	Leasehold	Common
13-14	Mt Zero, Deception Creek Road	-19.071635	146.00737	Possible old record from Puzzle Cr area, but could be *D. maculatus* (see Scott Burnett)	All sub-sites along the road parallel to the creek from the Hut waterhole downstream for 7 km	No	Eucalypt woodland predomintly ironbark with various proportions of lemon-scented gum, yellowjacket and bloodwoods, on granite often with boulder piles nearby	Leasehold - Australian Wildlife Conservancy	Common

Site No.	Locality	lat	long	Recent records	This survey	northern quoll recorded this project	Habitat	tenure & land use	comment on occurrence of toads
15-16	Taravale, Hellhole Creek Road	-19.170103	146.06214	No known records	All sub-sites along the road parallel to Hellhole Creek from the turn-around above the falls north towards the homestead over a distance of approximately 8 km	No	Eucalypt woodland predominantly ironbark with varying amounts of yellow jacket and bloodwoods, on granite with small patches of basalt	Leasehold - Australian Wildlife Conservancy	Common
17	Brooklyn, Pom Pom Mine Rd	-16.657541	145.26098	Trapped by Kutt et al. the month before	Sub-sites A-C along the steep Pom Pom Mine track from the upper end down to the main road a distance of 3 km	No	Eucalypt woodland predominantly ironbark with varying numbers of *Eucalyptus platyphylla* and bloodwoods. Site A at the upper end on granite the lower two sites on metamorphics	Leasehold - Australian Wildlife Conservancy	Common
18	Brooklyn, Luster Creek Rd, lower	-16.678498	145.24336	Record by Russell, 1995, on the flat by Luster Creek	Sub-sites A & C along the power line from the main road west to Rifle Creek, sub-site B down a side track to the south, east of Luster Creek,	No	Eucalypt woodland with *Eucalyptus leptophleba* dominant and scattered *E.platyphylla* and Corymbia *tessellaris*, on flat alluvial flood plain of the Mitchell River	Leasehold - Australian Wildlife Conservancy	Common
19	Shiptons Flat Road	-15.782209	145.22931	Numerous sightings and regularly trapped by J.Nelson	Sub-sites A-C along the road between Little Forks and Adams (Leswell) Creek	No	Eucalypt woodland, Site A with dense acacia shrub layer, the other two more open and more heavily grazed, all on metamorphics	Leasehold	Common

Site No.	Locality	lat	long	Recent records	This survey	northern quoll recorded this project	Habitat	tenure & land use	comment on occurrence of toads
20	Mount Poverty Road	-15.853489	145.21112	Known to be present	Sub-sites A-C along the road between the bottom crossing of Stoney Creek and the highest point in the road	2	The two lower sites A&B in grassy eucalypt woodland with either *Corymbia nesophila* (Site A) or *C.clarksoniana* (B) dominant, Site C in very tall open forest (wet sclerophyll). A on metamorphics, B & C on granite	Leasehold	Common

Appendix C. Field data sheet for quoll records.

NORTHERN QUOLL DATA SHEET

Qld surveys 2006/2007

Date...../...../..... Surveyed by: .....
Site .....Trap no.:.....
Trap type: treadle/hook Bait: PBRO + tuna/PBRO + chicken stock

Quoll fully enclosed in bag
Weight:.....(total) - .....(bag) = ...g
Head Length:.....(cm)
Micro-chip: Y/N/not checked If yes, number:.....

Expose relevant bits of quoll for measurements and observations:
Sex: M /F
Tail circumference:.....(cm) Tail Length:.....(cm)
Hindfoot length:.....(cm)

General health: (any sores, injuries? If so, give location on body.....
.....
.....

MALES: Testes width.....(cm)

FEMALES: Pouch check.
Pouch area colour: white/stained pink/stained yellowish brown
Number of teats: Total number:.....Number elongated:.....

If pouch young, how many?:..... Crown-rump length:.....
Stage: pink/half furred/fully furred

Collections:
DNA sample taken? Y/N Ear: Right/left

Parasites collected? Y/N If yes: ticks/lice/fleas/other
Location on body: .....
Number: one/two/three/moderate infestation/heavy infestation

Scats collected?. Y/N

Other comments?.....
.....
.....
.....
.....
.....
.....
.....
.....

Appendix D. Habitat Survey Sheet

N QUOLL HABITAT SURVEY ***Queensland***

Site radius = 100m

Site/sub-site No.:…….. **Date**……/……./…….

Bioregion……..Locality……

……

General Site Description:……

……

Map code:…….. **Map name**:……

AMG: E: ___ ___ ___ __N: ___ ___ ___ ___ __ Precision _____(m)

Datum AGD66/WGS84 How determined GPS/Map If map what scale? _____

Land tenure: Nature Res. | Nat. Park | Flora Res. | Leasehold | State Forest | Aboriginal Freehold/ Private/ Other_____

Topo. Position: Ridge | Midslope | Gully | Flat **Aspect (degrees)**:.....**Slope (degrees)**:.....**Altitude (m)**:……

Landform pattern (300m radius) >300m 90-300m 30-90m 9-30m <9m

Soil depth: Deep | Shallow | Skeletal **Soil Type**: Clay | Loam | Sand

Dominant shrub form: Mesic |Sclerophyll | Mixed | Heathy | | Grasstree | none **Litter Depth (cm):** 0 | <2 | 2-10 | >10

Dominant veg. ground layer: Tussock grass | Blady Grass | Other Grass | Bracken | Fern | Herb | Vine | Sedge | Moss | Lantana | Bitou | Other Weeds (specify)

Growth stage: Old Growth | Disturbed Old | Mature | Disturbed Mature | Young

Resources:

Allocasuarinas	None | Few | Moderate | Many	Stags (>10cm)	None | Few | Moderate | Many
Banksias	None | Few | Moderate | Many	Trunk hollows	None | Few | Moderate | Many
Acacias	None | Few | Moderate | Many	Branch hollows	None | Few | Moderate | Many
Litter	None | Few | Moderate | Many	Decortic. Bark	None | Few | Moderate | Many
Rock	None | Few | Moderate | Many	Mistletoe	None | Few | Moderate | Many
Logs (>10cm)	None | Few | Moderate | Many	Epiphytes	None | Few | Moderate | Many
Log piles	None | Few | Moderate | Many	Flowers (nectar)	None | Few | Moderate | Many
Bare Soil Patches	None | Few | Moderate | Many	Fleshy fruit	None | Few | Moderate | Many
		Fleshy fruiting spp.	" " " "
Termite mounds	None | Few | Moderate | Many		

Disturbance:

Logging	None | Light | Moderate | Severe	Goats	None | Light | Moderate | Severe
Grazing	None | Light | Moderate | Severe	Pigs	None | Light | Moderate | Severe
Fire	None | Light | Moderate | Severe	Rabbits	None | Light | Moderate | Severe
Weeds	None | Light | Moderate | Severe	Other ferals	None | Light | Moderate | Severe

Last fire 0-6mth 6-12 mth 1-3yr >3yr ?

Structure and Dominant Floristics: (Dominant species: >5% cover only)

Strata	Crown Cover %	Height Range (m)	Dominant Species 1	Dominant Species 2	Dominant Species 3
Emergent					
Upper					
Mid 1					
Shrub 1-5 m					
Lower (<1m) 1					
Lower (<1m) 2 (if present)					

Additional measures (relevant to northern quolls).

*** Trees** (Four quarters from trap point – nearest tree over 30cm dbh in each quarter)

Tree	Distance (m)	dbh	Height (m)	Species	No. Hollows? Small<5cm	Large>5
1						
2						
3						
4						

Basal area (Prism 1 or 5, count……..)……..m^2/ha

*** Logs** (Four quarters from trap point – nearest log with "dbh" over 30cm in each quarter)

Log	Distance (m)	"dbh"	Total Length (m)	Useful length (ie over 30cm "dbh")(m)	No. Hollows?	Description
1						
2						
3						
4						

*** Rock cover (%) (Tick one in each row)**

	0	<2	2-10	10-20	20-50	50-90	>90
Rocks (20-60cm)							
Big Rocks (60cm-2m)							
Boulders							
Outcrop							

Distance to nearest cliff/escarpment (if any):

*** Rock type:** (Circle one)

Sandstone | Laterite | Metasediment | Limestone | Basalt | Granite/Other (inc. none)_____

* **Structural Formation** (upper storey) (Circle one)

Closed forest | Open Forest/woodland/open woodland/ST/none

(Closed forest: >70% cover, overlapping crown. Open Forest: 30-70% cover, 0-0.25 % overlapping crown, woodland 10-30% cover 0.25-1, open woodland <10% cover >1, ST scattered isolated trees, none ground layer only)

Perm water 0 <50m 50-500m 0.5-5km >5km: stream/billabong/lake: bank steep/shelving

Curr water 0 <50m 50-500m 0.5-5km >5km: stream/billabong/lake: bank steep/shelving

Appendix E. Cane toad record sheet.

Cane Toad Survey Sheet (for Qld Northern Quoll survey)

Date...../...../..... Surveyed by.....
Time commenced: ..... Time finished:.....
Rainfall: fine/overcast but not raining/light rain/medium rain/heavy rain
Temperature:..... Humidity:.....

Quoll Site Name:..... Date:...../...../.....

Road/fire trail/track name (s):.....

GPS AMG ..... Start: E.....N.....
Finish: E.....N.....

Road/track surface: bitumen/gravel/dirt/two wheel tracks
Road/track width:.....(m)
Other traffic: heavy/medium/light/none

Toad survey
Toadpoles sighted in the area? Y/N
Toadlets sighted in the area? Y/N If yes: very abundant/abundant/uncommon/rare
Cane toads calling? Y/N
Cane toad counts:

	Number sighted		**Comments or other species observed**
Kilometre "transects"	**Live**	**Dead**	
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
Total Live and dead			
TOTAL			

Appendix F. Media release for seeking information from the public.

Media Enquiries: Mackay and south: Dr Scott Burnett, 54969266, 0408 963350
Mackay and north: Dr John Winter, 40970048

Northern quoll. Bruce Thomson/Scott Burnett

Saving an Aussie battler from Cane Toads

Three wildlife ecologists have banded together to save the Northern quoll. The three independent researchers, Drs Scott Burnett, John Winter and Meri Oakwood, are investigating the survival of Northern quoll populations when cane toads invade their habitat.

With funding from the Natural heritage Trust Strategic Reserve Fund, the team will be looking at how well quoll populations are doing by conducting surveys for quolls and measuring different aspects of the environment in areas where they find quolls compared to areas where quoll have disappeared. They'll also be counting quoll numbers in each population.

"Quolls have lived with Cane Toads in some areas of Queensland for many years. We are looking to see what it is that makes some populations more resilient than others" said Dr Burnett. "To do this, we need public help to locate quoll populations, and to locate areas where they have disappeared" added Dr Winter. Can you tell the team anything about quolls in your district?

Quolls are carnivorous marsupials which can be recognized by the white spots on their coat.

Recent experiences in the Northern Territory show that when cane toads arrive in an area, they quickly send predator populations spiraling to extinction. Quolls, goannas and other predators try to eat toads and die from their poison. Dr Oakwood has studied what happens to quolls when cane toads first arrive and has found that most quolls die, and local populations become extinct.

"Despite the bleak picture coming from the Northern Territory at the moment, quolls have survived in some areas of Queensland, we want to know what is special about these

populations, and then see if we can find similar populations in the Northern Territory, where quolls are currently disappearing at an alarming rate' said Dr Oakwood. "No one is better equipped to help us out than landholders who share their country with quolls" she added.

If you live in the Mackay to the Gulf and Cape York area and are able to help with your quoll sightings, or stories of quoll declines, please contact John Winter on 40970048, jw.winter@bigpond.com, PO Box 151, Ravenshoe 4872.

If you live in the Mackay to southern Queensland area, please contact Scott Burnett, 54969266, 0408 963350, burnettscott@hotmail.com, PO Box 394, Glasshouse Mtns, 4518.

No one knows as much as everyone, so drop us a line and help to save this Aussie battler from the cane toad menace.

Appendix G. Trap events for other fauna species.

Region	Site no	Site	Subsite	zone	Eastings	Northings	Date	Species
North	3	Batavia Downs	A	54	673983	8594676	xx.12.06	Isoodon macrourus
North	5	Tinnaroo Falls	A	55	346158	8102502	xx.1.07	Chaunus marinus
North	5	Tinnaroo Falls	A	55	346158	8102502	xx.1.07	Chaunus marinus
North	5	Tinnaroo Falls	A	55	346082	8102691	xx.1.07	Isoodon macrourus
North	5	Tinnaroo Falls	A	55	345937	8102805	xx.1.07	Chaunus marinus
North	5	Tinnaroo Falls	A	55	345772	8102634	xx.1.07	Bettongia tropica
North	5	Tinnaroo Falls	A	55	345640	8102426	xx.1.07	Bettongia tropica
North	5	Tinnaroo Falls	A	55	345651	8102468	xx.1.07	Zyzomys argurus
North	5	Tinnaroo Falls	B	55	344893	8101808	xx.1.07	Uromys caudimaculatus
North	5	Tinnaroo Falls	B	55	344754	8101594	xx.1.07	Zyzomys argurus
North	5	Tinnaroo Falls	B	55	344754	8101594	xx.1.07	Zyzomys argurus
North	5	Tinnaroo Falls	B	55	344622	810513	xx.1.07	Chaunus marinus
North	5	Tinnaroo Falls	B	55	344438	8101467	xx.1.07	Melomys sp
North	5	Tinnaroo Falls	B	55	344314	810326	xx.1.07	Chaunus marinus
North	5	Tinnaroo Falls	C	55	343869	8101364	xx.1.07	Chaunus marinus
North	5	Tinnaroo Falls	C	55	343877	8101390	xx.1.07	Chaunus marinus
North	5	Tinnaroo Falls	C	55	343671	810318	xx.1.07	Chaunus marinus
North	5	Tinnaroo Falls	C	55	343652	8101339	xx.1.07	Chaunus marinus
North	5	Tinnaroo Falls	C	55	343525	8101456	xx.1.07	Chaunus marinus
North	6	Brooklyn, Mt Spurgeon Rd	A	55	302139	8172939	xx.2.07	Chaunus marinus
North	6	Brooklyn, Mt Spurgeon Rd	C	55	303753	8174067	xx.2.07	Chaunus marinus
North	7	Brooklyn, Pump Crossing Rd	B	55	300235	8168142	xx.1.07	Chaunus marinus
North	7	Brooklyn, Pump Crossing Rd	B	55	299841	8167694	xx.1.07	Chaunus marinus
North	7	Brooklyn, Pump Crossing Rd	C	55	299337	8167220	xx.1.07	Chaunus marinus
North	8	Tinaroo Ck Rd, Emu Ck	A	55	345472	8107841	xx.3.07	Rattus fuscipes/leucopus
North	8	Tinaroo Ck Rd, Emu Ck	A	55	345228	8107501	xx.3.07	Uromys caudimaculatus
North	8	Tinaroo Ck Rd, Emu Ck	A	55	344955	8107289	xx.3.07	Chaunus marinus
North	8	Tinaroo Ck Rd, Emu Ck	B	55	344319	8108003	xx.3.07	Trichosurus vulpecula
North	8	Tinaroo Ck Rd, Emu Ck	C	55	343720	8108439	xx.3.07	Bettongia tropica
North	8	Tinaroo Ck Rd, Emu Ck	C	55	343720	8108439	xx.3.07	Bettongia tropica
North	8	Tinaroo Ck Rd, Emu Ck	C	55	343552	8108543	xx.3.07	Bettongia tropica
North	8	Tinaroo Ck Rd, Emu Ck	C	55	343372	8108648	xx.3.07	Chaunus marinus
North	8	Tinaroo Ck Rd, Emu Ck	C	55	343192	8108843	xx.3.07	Uromys caudimaculatus
North	8	Tinaroo Ck Rd, Emu Ck	C	55	343192	8108843	xx.3.07	Uromys caudimaculatus
North	8	Tinaroo Ck Rd, Emu Ck	C	55	343192	8108843	xx.3.07	Uromys caudimaculatus
North	9	Tinaroo Ck Rd, Douglas Ck	B	55	340564	8110986	xx.3.07	Uromys caudimaculatus
North	9	Tinaroo Ck Rd, Douglas Ck	C	55	339330	8110942	xx.3.07	Trichosurus vulpecula
North	9	Tinaroo Ck Rd, Douglas Ck	C	55	339267	8111133	xx.3.07	Chaunus marinus
North	10	Tolga, Vollerts	A	55	335331	8103801	xx.3.07	Chaunus marinus
North	10	Tolga, Vollerts	A	55	335154	8104516	xx.3.07	Uromys caudimaculatus
North	10	Tolga, Vollerts	C	55	334884	8106786	xx.3.07	Trichosurus vulpecula
North	10	Tolga, Vollerts	C	55	334954	8106946	xx.3.07	Isoodon macrourus
North	11	Silver Valley, Dry River	B	55	317785	8068980	xx.4.07	Isoodon sp
North	11	Silver Valley, Dry River	C	55	318817	8070636	xx.4.07	Trichosurus vulpecula
North	12	Silver Valley, Wild River	A	55	321949	8072456	xx.4.07	Chaunus marinus
North	12	Silver Valley, Wild River	B	55	323185	8073104	xx.4.07	Trichosurus vulpecula
North	12	Silver Valley, Wild River	B	55	323185	8073104	xx.4.07	Isoodon sp
North	12	Silver Valley, Wild River	B	55	323185	8073104	xx.4.07	Isoodon sp
North	12	Silver Valley, Wild River	B	55	323249	8073254	xx.4.07	Trichosurus vulpecula
North	12	Silver Valley, Wild River	B	55	323249	8073254	xx.4.07	Isoodon sp

Region	Site no	Site	Subsite	zone	Eastings	Northings	Date	Species
North	12	Silver Valley, Wild River	B	55	323595	8073389	xx.4.07	Aepypyrmnus rufescens
North	12	Silver Valley, Wild River	B	55	323787	8073463	xx.4.07	Trichosurus vulpecula
North	13	Mt Zero, Deception Creek	B	55	399491	7890528	xx.4.07	Rattus rattus
North	13	Mt Zero, Deception Creek	C	55	398186	7890758	xx.4.07	Chaunus marinus
North	14	Mt Zero, Deception Creek	A	55	396385	7890939	xx.4.07	Chaunus marinus
North	17	Brooklyn, Pom Pom Mine Rd	A	55	314447	8158210	xx.5.07	Chaunus marinus
North	17	Brooklyn, Pom Pom Mine Rd	A	55	314447	8158210	xx.5.07	Chaunus marinus
North	17	Brooklyn, Pom Pom Mine Rd	C	55	314721	8156874	xx.5.07	Chaunus marinus
North	17	Brooklyn, Pom Pom Mine Rd	C	55	314851	8156733	xx.5.07	Trichosurus vulpecula
North	18	Brooklyn, Luster Ck	B	55	312613	8155608	xx.5.07	Rattus sordidus
North	18	Brooklyn, Luster Ck	C	55	311953	8155512	xx.5.07	Chaunus marinus
North	19	Shiptons Flat	C	55	310009	8255676	xx.5.07	Melomys sp
North	20	Mt Poverty	B	55	308488	8246649	xx.6.07	Melomys sp
North	20	Mt Poverty	B	55	308439	8246454	xx.6.07	Melomys sp
North	20	Mt Poverty	C	55	308120	8245526	xx.6.07	Melomys sp
North	20	Mt Poverty	C	55	307967	8245565	xx.6.07	Uromys caudimaculatus
Central	1	Byfield Atherton	D	56	266883	7477822	25.5.07	Melomys sp
Central	1	Byfield Atherton	A	56	265050	7480774	27.5.07	Melomys sp
Central	1	Byfield Atherton	D	56	266586	7478067	27.5.07	Melomys sp
Central	1	Byfield Atherton	D	56	266595	7478083	27.5.07	Melomys sp
Central	1	Byfield Atherton	D	56	266883	7477822	27.5.07	Melomys sp
Central	1	Byfield Atherton	D	56	266740	7477947	27.5.07	Melomys sp
Central	2	Byfield Stoney Creek	A	56	256510	7466300	26.5.07	Melomys sp
Central	2	Byfield Stoney Creek	A	56	256540	7466297	26.5.07	Isoodon macrourus
Central	2	Byfield Stoney Creek	A	56	255850	7466105	27.5.07	Isoodon macrourus
Central	2	Byfield Stoney Creek	B	56	255925	7467206	27.5.07	Melomys sp
Central	2	Byfield Stoney Creek	B	56	255986	7467013	28.5.07	Melomys sp
Central	2	Byfield Stoney Creek	B	56	255925	7667206	28.5.07	Melomys sp
Central	2	Byfield Stoney Creek	D	56	258725	7468608	28.5.07	Isoodon macrourus
Central	3	Rangemore	A	55	644116	7742572	31.5.07	Isoodon macrourus
Central	3	Rangemore	B	55	645044	7743060	31.5.07	Rattus sordidus?
Central	3	Rangemore	C	55	645970	7743422	31.5.07	Chaunus marinus
Central	3	Rangemore	D	55	646496	7743979	31.5.07	Rattus tunneyi
Central	3	Rangemore	D	55	646630	7744111	31.5.07	Isoodon macrourus
Central	3	Rangemore	B	55	645044	7743060	1.6.07	Rattus sordidus?
Central	3	Rangemore	D	55	646496	7743979	1.6.07	Rattus tunneyi
Central	3	Rangemore	D	55	646630	7744111	2.6.07	Isoodon macrourus
Central	4	Dittmer	A	55	646700	7738447	2.6.07	Chaunus marinus
Central	4	Dittmer	A	55	646126	7738142	2.6.07	Trichosurus vulpecula
Central	4	Dittmer	B	55	645938	7737836	2.6.07	Trichosurus vulpecula
Central	4	Dittmer	C	55	647192	7738337	2.6.07	Rattus sordidus
Central	4	Dittmer	D	55	646269	7737713	2.6.07	Felis catus
Central	4	Dittmer	A	55	646710	7738442	3.6.07	Chaunus marinus
Central	4	Dittmer	B	55	645961	7738130	3.6.07	Trichosurus vulpecula
Central	4	Dittmer	B	55	645938	7737836	3.6.07	Trichosurus vulpecula
Central	4	Dittmer	D	55	646269	7737713	3.6.07	Trichosurus vulpecula
Central	5	Silver Creek	D	55	652943	7729162	6.6.07	Chaunus marinus
Central	6	Goldcreek Rd	A	55	649049	7733578	7.6.07	Trichosurus vulpecula
Central	6	Goldcreek Rd	B	55	648992	7733626	7.6.07	Trichosurus vulpecula
Central	6	Goldcreek Rd	B	55	648992	7733626	7.6.07	Trichosurus vulpecula
Central	6	Goldcreek Rd	B	55	649075	7733513	7.6.07	Trichosurus vulpecula
Central	6	Goldcreek Rd	A	55	649049	7733578	8.6.07	Trichosurus vulpecula
Central	6	Goldcreek Rd	B	55	648992	7733626	8.6.07	Trichosurus vulpecula

Region	Site no	Site	Subsite	zone	Eastings	Northings	Date	Species
Central	6	Goldcreek Rd	B	55	648978	7733568	8.6.07	Trichosurus vulpecula
Central	6	Goldcreek Rd	B	55	649075	7733513	8.6.07	Trichosurus vulpecula
Central	6	Goldcreek Rd	C	55	648962	7733481	8.6.07	Trichosurus vulpecula
Central	6	Goldcreek Rd	C	55	648964	7733483	8.6.07	Trichosurus vulpecula
Central	6	Goldcreek Rd	C	55	648943	7733447	8.6.07	Trichosurus vulpecula
Central	6	Goldcreek Rd	D	55	648827	7733831	8.6.07	Trichosurus vulpecula
Central	6	Goldcreek Rd	B	55	648992	7733626	9.6.07	Trichosurus vulpecula
Central	6	Goldcreek Rd	B	55	648992	7733626	9.6.07	Trichosurus vulpecula
Central	6	Goldcreek Rd	B	55	648992	7733626	9.6.07	Trichosurus vulpecula
Central	6	Goldcreek Rd	B	55	648978	7733568	9.6.07	Trichosurus vulpecula
Central	6	Goldcreek Rd	B	55	648978	7733568	9.6.07	Trichosurus vulpecula
Central	6	Goldcreek Rd	B	55	649075	7733513	9.6.07	Trichosurus vulpecula
Central	6	Goldcreek Rd	B	55	649075	7733513	9.6.07	Trichosurus vulpecula
Central	6	Goldcreek Rd	C	55	648926	7733429	9.6.07	Trichosurus vulpecula
Central	6	Goldcreek Rd	C	55	648930	7733417	9.6.07	Trichosurus vulpecula
Central	6	Goldcreek Rd	D	55	648827	7733831	9.6.07	Trichosurus vulpecula
Central	7	Midge Point 1	A	55	679820	7717222	15.6.07	Trichosurus vulpecula
Central	7	Midge Point 1	A	55	679819	7717234	15.6.07	Trichosurus vulpecula
Central	7	Midge Point 1	C	55	679139	7716366	15.6.07	Melomys sp.
Central	7	Midge Point 1	B	55	679561	7717019	16.6.07	Melomys sp.
Central	7	Midge Point 1	A	55	679631	7717134	16.6.07	Melomys sp.
Central	7	Midge Point 1	A	55	679820	7717222	16.6.07	Trichosurus vulpecula
Central	7	Midge Point 1	B	55	679492	7717205	16.6.07	Trichosurus vulpecula
Central	7	Midge Point 1	B	55	679515	7717224	16.6.07	Trichosurus vulpecula
Central	7	Midge Point 1	B	55	679328	7717300	16.6.07	Trichosurus vulpecula
Central	7	Midge Point 1	A	55	679631	7717134	17.6.07	Melomys sp.
Central	7	Midge Point 1	A	55	679819	7717234	17.6.07	Trichosurus vulpecula
Central	7	Midge Point 1	A	55	679850	7717124	17.6.07	Trichosurus vulpecula
Central	7	Midge Point 1	D	55	678622	7715076	17.6.07	Melomys sp.
Central	7	Midge Point 1	D	55	678823	7715067	17.6.07	Melomys sp.
Central	8	Midge Point 2	C	55	677509	7713300	21.6.07	Trichosurus vulpecula
Central	8	Midge Point 2	C	55	677699	7713593	21.6.07	Trichosurus vulpecula
Central	8	Midge Point 2	D	55	676908	7714460	21.6.07	Melomys sp
Central	8	Midge Point 2	D	55	677151	7714181	21.6.07	Isoodon macrourus
Central	8	Midge Point 2	B	55	676216	7714222	22.6.07	Isoodon macrourus
Central	8	Midge Point 2	B	55	676368	7714196	22.6.07	Isoodon macrourus
Central	8	Midge Point 2	C	55	677515	7713294	22.6.07	Trichosurus vulpecula
Central	8	Midge Point 2	C	55	677573	7713079	22.6.07	Isoodon macrourus
Central	8	Midge Point 2	D	55	676908	7714460	22.6.07	Melomys sp
Central	8	Midge Point 2	D	55	677011	7714340	22.6.07	Melomys sp
Central	8	Midge Point 2	D	55	677145	7714172	22.6.07	Isoodon macrourus
Central	8	Midge Point 2	B	55	676216	7714222	23.6.07	Isoodon macrourus
Central	8	Midge Point 2	B	55	676368	7714196	23.6.07	Melomys sp
Central	8	Midge Point 2	B	55	676698	7713996	23.6.07	Isoodon macrourus
Central	8	Midge Point 2	C	55	677589	7713111	23.6.07	Isoodon macrourus
Central	8	Midge Point 2	C	55	677421	7713025	23.6.07	Trichosurus vulpecula
Central	8	Midge Point	D	55	676908	7714460	23.6.07	Isoodon macrourus
Central	9	Ameliavale	C	55	645637	7724432	26.6.07	Chaunus marinus
Central	9	Ameliavale	A	55	643866	7727090	27.6.07	Trichosurus vulpecula
Central	9	Ameliavale	B	55	644350	7725520	27.6.07	Isoodon macrourus
Central	9	Ameliavale	B	55	644929	7725938	27.6.07	Trichosurus vulpecula
Central	9	Ameliavale	A	55	643866	7727090	28.6.07	Trichosurus vulpecula
Central	9	Ameliavale	A	55	643864	7727086	28.6.07	Trichosurus vulpecula
Central	9	Ameliavale	A	55	644027	7727153	28.6.07	Trichosurus vulpecula
Central	9	Ameliavale	A	55	644224	7726914	28.6.07	Trichosurus vulpecula
Central	9	Ameliavale	B	55	644350	7725520	28.6.07	Trichosurus vulpecula
Central	9	Ameliavale	C	55	645104	7724257	28.6.07	Trichosurus vulpecula
Central	9	Ameliavale/Mt Hector	D	55	645874	7723038	28.6.07	Trichosurus vulpecula
Central	9	Ameliavale/Mt Hector	D	55	645993	7723233	28.6.07	Trichosurus vulpecula

Region	Site no	Site	Subsite	zone	Eastings	Northings	Date	Species
Central	10	Conway SF	A	55	681727	7743177	6.7.07	Melomys sp
Central	10	Conway SF	B	55	680941	7744004	6.7.07	Isoodon macrourus
Central	10	Conway SF	C	55	680410	7744297	6.7.07	Melomys sp
Central	10	Conway SF	C	55	680065	7744245	6.7.07	Melomys sp
Central	10	Conway SF	D	55	679101	7744754	6.7.07	Isoodon macrourus
Central	10	Conway SF	C	55	680277	7744199	7.7.07	Perameles nasuta
Central	10	Conway SF	D	55	678950	7744807	7.7.07	Isoodon macrourus
Central	10	Conway SF	A	55	681829	7743353	8.7.07	Melomys
Central	10	Conway SF	B	55	681270	7743831	8.7.07	Isoodon macrourus
Central	10	Conway SF	C	55	680262	7744181	8.7.07	Melomys sp
Central	10	Conway SF	C	55	680065	7744245	8.7.07	Melomys sp
Central	10	Conway SF	D	55	679476	7744600	8.7.07	Melomys sp
Central	10	Conway SF	D	55	678950	7744807	8.7.07	Isoodon macrourus
Central	11	Cape Upstart Station	D	55	586952	7809718	11.7.07	Melomys sp
Central	12	Woodwark Bay (nr Dryander NP)	D	55	671959	7762561	18.7.07	Isoodon macrourus
Central	12	Woodwark Bay (nr Dryander NP)	B	55	671486	7761153	19.7.07	Trichosurus vulpecula
Central	12	Woodwark Bay (nr Dryander NP)	C	55	672717	7762824	19.7.07	Melomys sp
Central	12	Woodwark Bay (nr Dryander NP)	B	55	671486	7761153	20.7.07	Trichosurus vulpecula
Central	12	Woodwark Bay (nr Dryander NP)	B	55	671452	7761124	20.7.07	Melomys sp
Central	12	Woodwark Bay (nr Dryander NP)	B	55	671173	7761641	20.7.07	Isoodon macrourus
Central	12	Woodwark Bay (nr Dryander NP)	B	55	671040	7761535	20.7.07	Melomys sp
Central	12	Woodwark Bay (nr Dryander NP)	C	55	672910	7762400	20.7.07	Melomys sp
Central	12	Woodwark Bay (nr Dryander NP)	C	55	672865	7762521	20.7.07	Melomys sp
Central	12	Woodwark Bay (nr Dryander NP)	C	55	672848	7762516	20.7.07	Melomys sp
Central	12	Woodwark Bay (nr Dryander NP)	C	55	672787	7762696	20.7.07	Melomys sp
Central	12	Woodwark Bay (nr Dryander NP)	C	55	672717	7762838	20.7.07	Melomys sp
Central	12	Woodwark Bay (nr Dryander NP)	D	55	672237	7762670	20.7.07	Melomys sp
Central	12	Woodwark Bay (nr Dryander NP)	D	55	672232	7762681	20.7.07	Isoodon macrourus
Central	12	Woodwark Bay (nr Dryander NP)	D	55	671667	7762638	20.7.07	Isoodon macrourus
Central	13	Cape Gloucester	A	55	650634	7779559	24.7.07	Melomys sp
Central	13	Cape Gloucester	A	55	650708	7779769	24.7.07	Melomys sp
Central	13	Cape Gloucester	A	55	650800	7779887	24.7.07	Isoodon macrourus
Central	13	Cape Gloucester	B	55	651297	7780156	24.7.07	Trichosurus vulpecula
Central	13	Cape Gloucester	B	55	651281	7780151	24.7.07	Melomys sp
Central	13	Cape Gloucester	B	55	651129	7779995	25.7.07	Melomys sp
Central	13	Cape Gloucester	D	55	653752	7780413	25.7.07	Isoodon macrourus
Central	13	Cape Gloucester	D	55	658751	7780422	25.7.07	Melomys sp
Central	13	Cape Gloucester	B	55	651090	7780042	26.7.07	Melomys sp
Central	13	Cape Gloucester	D	55	653920	7780409	26.7.07	Melomys sp
Central	14	Magnetic Island	A	55	486942	7886393	1.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	A	55	486597	7886436	1.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	A	55	486593	7886441	1.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	A	55	486637	7886335	1.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	A	55	486654	7886346	1.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	B	55	486677	7885479	1.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	B	55	486830	7885400	1.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	B	55	486833	7885394	1.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	B	55	486958	7885208	1.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	C	55	486488	7884493	1.8.07	Trichosurus vulpecula

Region	Site no	Site	Subsite	zone	Eastings	Northings	Date	Species
Central	14	Magnetic Island	C	55	486502	7884446	1.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	C	55	486362	7884312	1.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	C	55	486186	7883686	1.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	D	55	485032	7884670	1.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	D	55	485054	7884628	1.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	D	55	485093	7884479	1.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	D	55	485153	7884475	1.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	D	55	485257	7884357	1.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	A	55	486945	7886397	2.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	A	55	486942	7886393	2.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	A	55	486593	7886441	2.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	A	55	486637	2886335	2.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	A	55	486654	7886346	2.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	A	55	486790	7886138	2.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	B	55	486677	7885479	2.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	B	55	486830	7885400	2.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	B	55	486958	7885208	2.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	B	55	486943	7885177	2.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	C	55	486488	7884493	2.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	C	55	486362	7884312	2.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	C	55	486384	7884315	2.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	C	55	486169	7883688	2.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	C	55	485887	7883556	2.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	D	55	485054	7884628	2.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	D	55	485153	7884475	2.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	D	55	485253	7884393	2.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	D	55	485355	7884501	2.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	A	55	486921	7886432	3.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	A	55	486942	7886393	3.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	A	55	486790	7886138	3.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	B	55	486698	7885569	3.8.07	Hydromys chrysogaster
Central	14	Magnetic Island	B	55	486677	7885479	3.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	B	55	486958	7885208	3.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	C	55	486362	7884312	3.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	C	55	486169	7883688	3.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	C	55	485887	7883556	3.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	D	55	485032	7884670	3.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	D	55	485054	7884628	3.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	D	55	485092	7884539	3.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	D	55	485093	7884479	3.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	D	55	485257	7884357	3.8.07	Trichosurus vulpecula
Central	14	Magnetic Island	D	55	485361	7884494	3.8.07	Trichosurus vulpecula
Central	15	Cape Cleveland	B	55	499817	7867371	8.8.07	Isoodon macrourus
Central	15	Cape Cleveland	A	55	499100	7869546	9.8.07	Uromys caudimaculatus
Central	15	Cape Cleveland	B	55	499817	7867371	9.8.07	Isoodon macrourus
Central	15	Cape Cleveland	C	55	500642	7867084	9.8.07	Melomys sp.
Central	16	Cathu State Forest Sth	A	55	660281	7696561	2.9.07	Melomys sp
Central	16	Cathu State Forest Sth	C	55	658609	7697330	2.9.07	Melomys sp
Central	16	Cathu State Forest Sth	C	55	658609	7697330	3.9.07	Melomys sp
Central	16	Cathu State Forest Sth	D	55	657948	7699050	3.9.07	Melomys sp
Central	17	Cathu State Forest Nth	B	55	651666	7702864	1.9.07	Trichosurus vulpecula
Central	17	Cathu State Forest Nth	D	55	650975	7704144	1.9.07	Melomys sp
Central	17	Cathu State Forest Nth	B	55	651666	7702864	2.9.07	Trichosurus vulpecula
Central	17	Cathu State Forest Nth	A	55	652339	7702052	3.9.07	Melomys sp
Central	17	Cathu State Forest Nth	B	55	651658	7702833	3.9.07	Melomys sp
Central	17	Cathu State Forest Nth	D	55	650823	7704685	3.9.07	Melomys sp
Central	19	Eungella Dam	C	55	643487	7661448	12.9.07	Zyzomys argurus
Central	19	Eungella Dam	D	55	643276	7661456	12.9.07	Zyzomys argurus
Central	19	Eungella Dam	A	55	643623	7659752	13.9.07	Chaunus marinus

Region	Site no	Site	Subsite	zone	Eastings	Northings	Date	Species
Central	19	Eungella Dam	C	55	644002	7661952	13.9.07	Zyzomys argurus
Central	19	Eungella Dam	D	55	643276	7661456	13.9.07	Zyzomys argurus
Central	19	Eungella Dam	A	55	643623	7659752	14.9.07	Chaunus marinus
Central	19	Eungella Dam	C	55	644002	7661952	14.9.07	Zyzomys argurus
Central	19	Eungella Dam	C	55	643833	7661654	14.9.07	Zyzomys argurus
Central	4	Dittmer	D	55	646269	7737713	2.6.07	Petrogale inornata/persephone
Central	4	Dittmer	D	55	646269	7737713	3.6.07	Trichosurus vulpecula
Central	5	Silver Creek	B	55	651948	7734829	4.6.07	Trichosurus vulpecula
Central	5	Silver Creek	B	55	651943	7734815	6.6.07	Trichosurus vulpecula
Central	7	Midge Point	Jimmys Rock Rd	55	679316	7717279	15.6.07	Trichosurus vulpecula
Central	7	Midge Point	Jimmys Rock Rd	55	679316	7717279	16.6.07	Trichosurus vulpecula
Central	7	Midge Point	Waynes	55	677631	7713429	16.6.07	Trichosurus vulpecula
Central	7	Midge Point	Waynes	55	677638	7713420	16.6.07	Trichosurus vulpecula
Central		Midge Point	N/A	55	675270	7718175	20.6.07	Trichosurus vulpecula
Central		Midge Point	N/A	55	675170	7718222	21.6.07	Isoodon macrourus
Central		Midge Point	N/A	55	675281	7718170	21.6.07	Trichosurus vulpecula
Central		Midge Point	N/A	55	675283	7718169	21.6.07	Trichosurus vulpecula
Central		Midge Point	N/A	55	675270	7718175	21.6.07	Trichosurus vulpecula
Central		Midge Point	N/A	55	675303	7718188	21.6.07	Trichosurus vulpecula
Central		Midge Point	N/A	55	675270	7718175	22.6.07	Trichosurus vulpecula
Central	8	Midge Point	Waynes - woodland	55	675386	7715052	21.6.07	Melomys sp
Central	8	Midge Point	Waynes - woodland	55	675659	7714809	22.6.07	Melomys sp
Central	8	Midge Point	Waynes - woodland	55	675655	7714838	22.6.07	Melomys sp
Central	8	Midge Point	Waynes - woodland	55	675862	7714448	22.6.07	Melomys sp
Central	8	Midge Point	Waynes - woodland	55	675376	7715061	23.6.07	Isoodon macrourus
Central	8	Midge Point	Waynes - woodland	55	675536	7714987	23.6.07	Isoodon macrourus
Central	8	Midge Point	Waynes - woodland	55	675659	7714809	23.6.07	Melomys sp.
Central	8	Midge Point	Waynes - woodland	55	675862	7714448	23.6.07	Melomys sp.
Central	8	Midge Point	Waynes - woodland	55	677744	7713584	23.6.07	Melomys sp
Central	11	Cape Upstart	Shed	55	587142	7809605	11.7.07	Felis catus
Central	12	Woodwark Bay (nr Dryander NP)	B	55	671130	7761682	18.7.07	Isoodon macrourus
Central	12	Woodwark Bay (nr Dryander NP)	B	55	671135	7761700	20.7.07	Melomys sp
Central	16	Cathu State Forest Sth	extra	55	659314	7697151	2.9.07	Trichosurus vulpecula
Central	16	Cathu State Forest Sth	extra	55	659410	7697045	3.9.07	Melomys sp
Central	20	Gamma State Forest	A	55	649437	7667847	18.9.07	Varanus varius?
Central	20	Gamma State Forest	D	55	646509	7668764	19.9.07	Melomys sp.
Central	20	Gamma State Forest	D	55	646528	7668728	20.9.07	Zyzomys argurus
South	1	Curra SF, Gympie	1	56	466766	7113509	xx.3.07	Chaunus marinus
South	1	Curra SF, Gympie	2	56	466159	7112694	xx.3.07	Chaunus marinus
South	1	Curra SF, Gympie	3	56	465351	7112865	xx.3.07	Trichosurus vulpecula
South	1	Curra SF, Gympie	3	56	465351	7112865	xx.3.07	Rattus fuscipes
South	6	Brooyar	1	56	455356	7107819	xx.4.07	Chaunus marinus
South	6	Brooyar	1	56	455356	7107819	xx.4.07	Chaunus marinus
South	6	Brooyar	2	56	452070	7108275	xx.4.07	Trichosurus vulpecula
South	6	Brooyar	2	56	452070	7108275	xx.4.07	Trichosurus vulpecula
South	6	Brooyar	2	56	452070	7108275	xx.4.07	Isoodon macrourus
South	6	Brooyar	3	56	453336	7109769	xx.4.07	Trichosurus vulpecula

Region	Site no	Site	Subsite	zone	Eastings	Northings	Date	Species
South	6	Brooyar	3	56	453336	7109769	xx.4.07	Trichosurus vulpecula
South	6	Brooyar	3	56	453336	7109769	xx.4.07	Felis catus
South	7	King Forest	1	56	455916	7105161	xx.4.07	Isoodon macrourus
South	12	Berserker Range - Moores Ck	2	56	251324	7419712	xx.11.07	Trichosurus vulpecula
South	13	Berserker Range-New Zealand Gully	1	56	257583	7417840	xx.11.07	Isoodon macrourus
South	13	Berserker Range-New Zealand Gully	1	56	257583	7417840	xx.11.07	Isoodon macrourus
South	13	Berserker Range-New Zealand Gully	1	56	257583	7417840	xx.11.07	Isoodon macrourus
South	13	Berserker Range-New Zealand Gully	2	56	257885	7416732	xx.11.07	Isoodon macrourus
South	13	Berserker Range-New Zealand Gully	2	56	257885	7416732	xx.11.07	Isoodon macrourus
South	13	Berserker Range-New Zealand Gully	2	56	257885	7416732	xx.11.07	Chaunus marinus
South	14	Mt Morgan	1	56	243055	7386222	xx.11.07	Isoodon macrourus
South	14	Mt Morgan	1	56	243055	7386222	xx.11.07	Trichosurus vulpecula
South	15	Mt Morgan2	1	56	244859	7387172	xx.11.07	Isoodon macrourus
South	15	Mt Morgan3	3	56	244794	7386066	xx.11.07	Chaunus marinus
South	15	Mt Morgan4	3	56	244794	7386066	xx.11.07	Trichosurus vulpecula
South	17	Stanwell-Mercy East	2	56	230664	7398660	xx.11.07	Aepyprymnus rufescens
South	17	Stanwell-Mercy East	2	56	230664	7398660	xx.11.07	Isoodon macrourus
South	17	Stanwell-Mercy East	3	56	230537	7397514	xx.11.07	Tiliqua scincoides
South	18	Ka Ka Mundi - Carnarvon Station	3	56	541822	7249455	xx.11.07	Magpie

Summary of all records

Group	Species	Region			Total trap events
		North	Central	South	
Mammals	*Isoodon macrourus*	7	29	10	46
	Perameles nasuta	0	1	0	1
	Aepyprymnus rufescens	1	0	1	2
	Bettongia tropica	5	0	0	5
	Trichosurus vulpecula	8	105	8	121
	Hydromys chrysogaster	0	1	0	1
	Uromys caudimaculatus	8	1	0	9
	Zyzomys argurus	3	6	0	9
	Melomys sp.	5	53	0	58
	Rattus fuscipes	0	0	1	1
	Rattus fuscipes/leucopus	1	0	0	1
	Rattus sordidus	1	3	0	4
	Rattus tunneyi	0	2	0	2
	**Rattus rattus*	1	0	0	1
	**Felis catus*	0	1	1	2
Reptiles	*Tiliqua scincoides*	0	0	1	1
Amphibians	*Chaunus marinus*	26	7	6	39
Birds	Magpie	0	0	1	1
Total trap events		66	209	29	304

*=introduced species