RANGE EXTENSION AND ADDITIONAL HABITAT TYPE FOR *PLANIGALE TENUIROSTRIS* (MARSUPIALIA: DASYURIDAE) IN CENTRAL QUEENSLAND

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The range of *Planigale tenuirostris* is extended approximately 370km north to Mt Isa (20.4°S, 139.2°E) and 340km northeast to Newlands mine (21.2°S, 147.9°E) west of Mackay into the subhumid tropics. Habitat data from three fauna surveys and nine sites show *P. tenuirostris* associated with cracking clay soils, confirming the pattern found elsewhere. In central Queensland, *P. tenuirostris* was commonly found in association with woodlands on clay soils that had a denser groundcover than that reported for *P. tenuirostris* in other biomes such as semiarid landscapes. Populations of *P. tenuirostris* were found in association with both lightly grazed land and buffer zones adjacent to mined landscapes indicating potential for ecologically sustainable land use. However, three of the four central Queensland Regional Ecosystem types in which *P. tenuirostris* was found are conservation-listed. It is, therefore, of concern that the Central Brigalow Belt had Queensland's greatest rate of clearing during 1997-1999. ❑ *Planigale ecology, range extension, habitat requirements, land clearing, conservation, habitat loss.*

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The Narrow-nosed Planigale (*Planigale tenuirostris*, Troughton, 1928) is a small (4-9g), nocturnally active, insectivorous dasyurid of inland Australia (Read, 1995). Although regarded as a species of arid and semiarid Australia (Morton, 1982), its documented range in Queensland (S of 23° S near Aramac and W of 152°E near Warwick) extended to subhumid sub-tropical climates near Monto (24.6°N, 151.2°E) (Ingram & Raven, 1991). Typically *P. tenuirostris* is found in association with cracking clay soils (Read, 1995). The deeply cracked clay is thought to provide refuge from climatic extremes in winter and summer and shelter from predation (Andrew & Settle, 1982; Denny, 1982). *Planigale tenuirostris* has been found in association with a variety of habitat types including low shrublands and tussock grasslands within arid landscapes (Morton, 1982); vegetated creek flats, grasslands and mallee scrubs (Read, 1995); and river flood plains, lake edges, gibber plains and stony hills with grass, chenopod shrub or woodland (Denny, 1982).

METHODS

Two sources of data were available — unpublished locality data from specimens held by the Queensland Museum and fauna surveys by Central Queensland University (CQU). Both data sources were used to revise the distribution of *P. tenuirostris* while only the latter was used to describe the habitat of this species. All CQU specimens were captured in drift-fence pitfall traps (25-30m fences with 5-6 20litre pitfall buckets at 5m intervals) that were checked twice daily over 10 days. Habitat was described semi-quantitatively by plant community composition and structure, and soil type.

RESULTS

The range of *P. tenuirostris* was extended approximately 370km north to Mt Isa (20.4°S, 139.2°E) and 340km northeast to Newlands mine (21.2°S, 147.9°E) west of Mackay (Table 1). This range encompassed the subhumid tropics (rainfall in the Newlands region averages over 600mm) in addition to arid, semiarid and sub-humid subtropical regions.

All sites where *P. tenuirostris* was found were typified by cracking clay soils (Table 2) and, at the two surveys where comparative data were available (Tick Hill and Newlands, Table 2), *P. tenuirostris* was not found associated with sites lacking cracking clay soils confirming the pattern found elsewhere. Clay soil type of at least two of the five study sites was heavy black clay rather than the red or gray clay indicated by Denny (1982) as typical of the habitat of *P. tenuirostris*.

TABLE 1. Queensland locality records for *P. tenuirostris* derived from unpublished (post-1989) QM records and Central Queensland University (CQU) fauna surveys. [1] Houston et al. (1996); [2] Houston et al. (1999); [3] Houston et al. (2003); [4] Confirmed by hair analysis.

Locality	Latitude (S)	Longitude (E)	Date	QM Registration Number
QM records				
3.5km W of Mt Isa	20.38	139.23	31.4.92	QM JM9322
Durrie Station	25.56	139.56	May 92	QM JM10198
Murphys Ck., Lockyer Valley (subfossilised remains)	27.28	152.05	12.11.92	QM JM10181
10km N of Dulacca	26.30	149.45	June 95	QM JM11212
Lake Broadwater	27.21	151.06	25.8.95	QM JM10988
Diamantina NP	23.46	141.09	Sept. 95	QM JM11136
CQU fauna survey records				
1. Poitrel Mining Lease [1], 30km SE of Moranbah	22.05	148.16	4.10.96	QM JM11504
2. Poitrel Mining Lease, 30km SE of Moranbah	22.05	148.16	6.10.96	Field identification [4]
3. Tick Hill Mining Lease [2], 100km south of Cloncurry	21.65	139.92	7.8.99	QM JM13340
3. Tick Hill Mining Lease, 100km south of Cloncurry	21.65	139.92	7.8.99	QM JM13341
4. Newlands Mining Lease [3], 20km north of Glenden	21.19	147.94	26.6.02	QM JM15060
5. Newlands Mining Lease, 20km north of Glenden	21.23	147.88	26.6.02	Field identification [4]

Grassy woodlands were the dominant vegetation at 3 of the 5 sites where habitat data were available (Table 2), suggesting that where this vegetation type occurs on clay soils it supports *P. tenuirostris*. A fourth woodland site was a Brigalow vegetation type with a grass and shrub understorey and shrubs prevalent along drainage lines. The only grassland site was an alluvial plain with deep cracks in the clay soil. The groundstorey of all 5 sites was dominated by grasses or had a combination of grasses and shrubs (Table 2). Two sites where habitat characteristics were quantified, had a mid-dense to dense (i.e. >30%) groundcover. These high levels of groundcover vegetation were found to persist into the late dry season.

DISCUSSION

Comparisons of subhumid tropics *P. tenuirostris* inhabit with semiarid and arid landscapes suggest a fundamental difference in habitat structure between these landscapes. The vegetation cover of semiarid and arid landscapes of central Australia was regarded either as sparse or seasonally sparse (Andrew & Settle, 1982) or typified by 'at least some vegetative cover' (Denny, 1982). Read (1987), in an investigation of habitat descriptors, found a relationship between *P. tenuirostris* abundance and groundcover height but not percentage cover. The greater availability of groundcover within the sites inhabited by *P. tenuirostris* in central Queensland suggests that in subhumid tropical landscapes a moderately dense groundcover (grass and/or shrub), in combination with cracking clay soils, may be an important component of the species' preferred habitat.

The 2 new records from central Queensland (Poitrel and Newlands) both lie in Province 6 of the Brigalow Belt bioregion and within the Central Brigalow Belt 'Regional Vegetation Management Plan' area (Accad et al., 2001). Three of the 4 Regional Ecosystem types in which *P. tenuirostris* was found in central Queensland are conservation-listed (Table 2). Because the Central Brigalow Belt had Queensland's greatest rate of clearing during 1997-1999 (Accad et al., 2001) there is concern that if these current land clearing practices were to continue at the same rate it could impact adversely on the conservation status of these *P. tenuirostris* populations.

Three of the 5 sites where *P. tenuirostris* was discovered in CQU fauna surveys were grazed (Table 2) suggesting that persistence of *P. tenuirostris* may be possible under light grazing. Whether such a level of land use is ecologically sustainable would require additional information on grazing history and population trends of *P. tenuirostris*. Despite their contribution to land clearing in the region, mined landscapes that incorporate buffer zones offer the potential to provide 'de facto' conservation reserves for vegetation types supporting fauna such as *P. tenuirostris*. These areas may be particularly important for fauna of vegetation associated with

TABLE 2. Description of *P. tenuirostris* habitat at CQU fauna survey sites (Sites sampled using equivalent methods at which *P. tenuirostris* was not found are also shown in the table). [1] Olgers & den Hertog (1968).

Vegetation Description (& RE, EPA, 2002)	Locality	Geology	Soil Type	Notes
Sites at which *P. tenuirostris* was present				
1. *Eucalyptus populnea* open woodland with sparse *Acacia harpophylla* and *Lysiphyllum hookeri* understorey; grassy groundcover. (RE11.9.10 / of concern)	Poitrel	Palaeozoic sedimentary [1]	Texture-contrast and cracking clays	Well grassed gently sloping alluvial terrace bordering riparian creek vegetation on black clay soils
2. Grassy open woodland/forest of *Eucalyptus populnea*, *Corymbia tessellaris*, *Eucalyptus tereticornis*, *Corymbia dallachiana*, *Corymbia clarksoniana* and *Eucalyptus orgadophylla*; grassy groundcover, grazed. (RE 11.3.4 / of concern)	Poitrel	Alluvial or unconsolidated [1]	Cracking clay	Alluvial terrace bordering riparian edge
3. Tussock grassland with scattered trees on a gently sloping plain. Gilgais present, grazed. (RE 1.3.4 / not of concern)	Tick Hill	Alluvial plains over Precambrian rocks	Cracking clay	Flat terrain forming a run-on area
4. *Eucalyptus orgadophylla* and *Corymbia erythrophloia* open woodland over a closed grassland on undulating black self-mulching clay soils, grazed. (RE 11.9.2 / not of concern)	Newlands	Sedimentary rocks forming cracking clay soils	Cracking clay	Undulating plains (basal area $5m^2$ ha^{-1})
5. Low forest of Brigalow (*Acacia harpophylla*) over a sparse midstorey of *Eremophila* and patchy ground cover of *Carissa ovata*, grasses and herbs on clay soils. *Eucalyptus brownii* occurs along ridgelines. Gilgais present. (RE 11.9.1 or 11.9.5 / both endangered)	Newlands	Sedimentary rocks forming clays and cracking clay soils	Cracking clay	Lower to upper slopes of low hills (basal area $12m^2$ ha^{-1})
Sites at which *P. tenuirostris* was absent				
6. Spinifex (*Triodia burkensis*) tussock grassland with scattered low trees and shrubs on the lower colluvial slope of Tick Hill. (RE 1.11.3 / not of concern)	Tick Hill	Pre-Cambrian folded rocks	Skeletal soils and shallow loams	Lower colluvial slope
7. Dense (closed in wet season) shrubland with emergent *Brachychiton* spp. and *Eucalyptus* spp. on well drained red soils. (RE 11.8.13 / endangered)	Newlands	Igneous rocks	Red earths	Hillslopes and tops (basal area $8m^2$ ha^{-1})
8. Tall open woodland of *Eucalyptus tereticornis*, *Casuarina cunninghamiana* and *Melaleuca bracteata* with a midstorey of *Ficus* sp., *Cassia brewsteri*, *Melaleuca bracteata*, and *Santalum* sp. over a mid-dense grass groundcover. (RE 11.3.25 / not of concern)	Newlands	Alluvial	Alluvial soils	Creek banks (basal area $12m^2$ ha^{-1})
9. *Eucalyptus crebra* open woodland over sparse grassland on ridges. (RE 11.11.1 / not of concern)	Newlands	Old sedimentary and metamorphosed rocks	Weathered red soils	Low rises, hills and ranges (basal area $5m^2$ ha^{-1})

lowlands as these are more extensively affected by land clearing than vegetation of hills and ranges within the Brigalow Belt bioregion (Houston & Melzer, 2004).

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