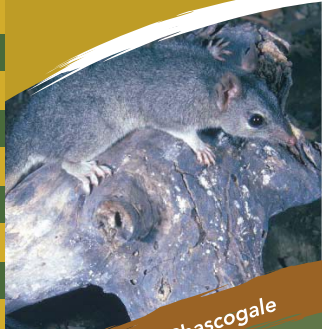


SMALL MARSUPIAL CARNIVORES



Brush-tailed Phascogale



Yellow-footed Antechinus



Subtropical Antechinus



Common Dunnart



Common Planigale

CONSERVATION ACTION STATEMENT

June 2005



Dedicated to a better Brisbane

SMALL MARSUPIAL CARNIVORES

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SMALL MARSUPIAL CARNIVORES



1.0 Introduction

Brisbane is recognised as one of the most biologically diverse capital cities in Australia, supporting some 1500 plant species, 523 vertebrate animal species and innumerable invertebrate species.

Brisbane is also part of one of the fastest growing urban regions in Australia. This growth is placing significant pressure on the ecosystems and wildlife of the city. Population pressures and urban development, resulting in the loss and fragmentation of habitat, continue to be the greatest threats to the protection of biodiversity (Brisbane SOE 2001). Since 1990 the rate of clearing has decreased markedly. However, even with no further loss of habitat, some existing flora populations within the city are at risk of local extinction because the small, isolated, remaining habitat areas cannot support them. Other significant threats include pest animals and plants and inappropriate fire regimes. The challenge is to maintain and restore the city's biodiversity while accommodating urban growth.

Brisbane City Council has responded to this challenge with the Brisbane City Biodiversity Strategy, an important part of Council's *Living in Brisbane 2010* vision for a clean and green city. The strategy outlines a range of initiatives designed to secure the long-term conservation of the city's outstanding biodiversity values using available public, community and industry resources. Conservation Action Statements are among these initiatives.

Conservation Action Statements clearly state Council's management intent for the city's most threatened species, and outline key strategies and actions for their management in Brisbane.

This Conservation Action Statement addresses the following small marsupial carnivores, which are identified as significant species within Brisbane as per Council's Natural Assets Planning Scheme Policy (Brisbane City Council 2000, *Brisbane City Plan*, vol 2, schedule 4):

- ① brush-tailed phascogale (*Phascogale tapoatafa*)
- ② yellow-footed antechinus (*Antechinus flavipes*)
- ③ subtropical antechinus (*Antechinus subtropicus*)
- ④ common dunnart (*Sminthopsis murina*)
- ⑤ common planigale (*Planigale maculata*).

This Conservation Action Statement will be updated every two to five years to reflect new information and progress on conservation actions. For more information about this or any other Conservation Action Statement, visit Council's website at www.brisbane.qld.gov.au or phone Council on 3403 8888.

1.0 Introduction continued...

Aims

This Conservation Action Statement details Council's management intent for long-term protection and conservation of significant small marsupial carnivores within Brisbane by:

- collating **existing information** on the distribution, ecology and management requirements of these species within Brisbane and surrounds
- identifying **key threats** that significantly impact upon these species within Brisbane
- identifying **gaps in existing knowledge** of the habitat and management requirements of these species and research priorities
- detailing **practical and affordable strategies and actions** that support the long-term protection and conservation of these species within Brisbane.

2.0 Conservation Status

The conservation status of a species will influence how it is managed. 'Threatened' species are typically accorded a more stringent management regime than 'common' species. Various conservation registers identify the status of fauna species at local, state and national levels. The current conservation status of the small marsupial carnivores is provided in **Table 1**.

Table 1: Official Conservation Status of Brisbane City's Small Marsupial Carnivores

Species	Brisbane City ¹	Queensland ²	National ³
Brush-tailed Phascogale	Significant	Common	Not listed
Yellow-footed Antechinus	Significant	Common	Not listed
Subtropical Antechinus	Significant	Common	Not listed
Common Dunnart	Significant	Common	Not listed
Common Planigale	Significant	Common	Not listed

¹ Brisbane City Council 2000, *Brisbane City Plan 2000*, Schedule 4 of the Natural Assets Planning Scheme Policy

² *Queensland Nature Conservation (Wildlife) Regulations 1994* under the *Nature Conservation Act 1992*

³ *Environment Protection Biodiversity Conservation Act 1999*

3.0 Distribution¹

National/State

Brush-tailed Phascogale

- Occurs in at least four discrete populations: extreme south-western Western Australia; south-eastern and eastern Australia; far north Queensland and Cape York; the northern region of Western Australia and the Northern Territory.
- Some consider that the northern and western Australian populations comprise separate species (Rhind et al. 2001; Spencer et al. 2001).
- According to Queensland Museum data, the Queensland's populations are:
 - centred on the Atherton Tablelands and Cape York
 - range from Rockhampton to the Qld/NSW border and west to Dalby.
- Most Queensland records are from the south-east corner, south from about Gympie.

Yellow-footed Antechinus

- Most widespread member of its genus; occurs from south-west Western Australia to north Queensland's wet tropics.
- Three discrete populations in Queensland are located:
 - in the wet tropics of north Queensland
 - near the Clarke Range, near Mackay
 - from about Rockhampton south to the NSW border (Queensland Museum database) and widely distributed from about Bundaberg to the NSW border and west to about Roma.

Subtropical Antechinus

- One of the smallest geographical and environmental distributions of its genus (Van Dyck and Crowther 2000).
- Restricted to the wet vine forests and humid tangled gullies in sclerophyll forests of the Great Dividing Range, between Gympie and the Border Ranges (Van Dyck and Crowther 2000).
- Abundant within much of this range.
- Previously regarded as the brown antechinus (*Antechinus stuartii*) from which it differs in its larger size, relatively shorter tail and internal morphological characters.
- Described in 2000 as *Antechinus subtropicus*, (Van Dyck and Crowther 2000).
- All antechinus formerly placed within the species *stuartii* in subtropical Queensland are now *subtropicus*.

3.0 Distribution¹ continued...

National/State continued...

Common Dunnart

- A single discrete population in eastern and southern Australia; distribution extends from Cooktown to eastern South Australia (Queensland Museum database; Menkhorst and Knight 2001).
- Occurs from Rockhampton to the New South Wales border and westwards to beyond Charleville.
- Widely distributed in south-east Queensland.

Common Planigale

- Occurs as two recognised populations:
 - one in the Northern Territory
 - the other from the Archer River on Cape York Peninsula, south to the Upper Hunter River region in New South Wales.
- Occurs from Rockhampton to the New South Wales border, and westwards to about Charleville.
- Widely distributed in south-east Queensland.

Local

The western suburbs, including Brisbane Forest Park, along with southern areas, currently represent 'core' areas for the species within Brisbane. Records held by the Queensland Museum (Low 1994) and Brisbane City Council indicate overall population declines in four out of the five species. It is unclear how local populations of the subtropical antechinus have changed as the marsupial has only been separated recently as a species from the brown antechinus.

3.0 Distribution¹ continued...

Brush-tailed Phascogale

- Records suggest occurrence throughout Brisbane Forest Park and adjacent forested areas in the west. Recent records include areas such as Mt Nebo, Mt Glorious, Kenmore Hills, Bellbowrie, Pullenvale, Anstead, Mt Crosby, Chuwar/Karalee and Lake Manchester. Also recent records at Algester in Brisbane's south, Brisbane City (2001) and Chermside Hills reserves (1998). Historical records indicate the species distribution included Nudgee Beach, Northgate, Kedron/Woolloowin, Alderley and Grovely/Mitchelton.

Yellow-footed Antechinus

- Populations occur throughout Brisbane Forest Park, Enoggera Military Camp, Mt Coot-tha and suitable habitat in surrounding areas including Mt Crosby, Pullenvale and Upper Brookfield. Recent records include areas such as Fitzgibbon, Chermside Hills, Bridgeman Downs/McDowall, Chandler, Burbank, Karawatha and Heathwood. Historical records indicate the species distribution included Camp Hill/Carina Heights.

Subtropical Antechinus

- Abundant in the vine forests of Mt Glorious and Mt Nebo (Wood 1970; Braithwaite 1979; Van Dyck 1982) just outside the Brisbane City area. The species is also probably widespread throughout similar habitat in Brisbane Forest Park and adjacent areas.

Common Dunnart

- Occurs throughout Brisbane Forest Park and adjacent bushland suburbs, Kenmore Hills, and throughout the southern and eastern suburbs. Recent records indicate the species distribution through areas of Mt Coot-tha, Heathwood, Larapinta, Parkinson, Drewvale, Stretton (Karawatha), Rochedale, Burbank, Chandler and Belmont.

Common Planigale

- Occurs throughout Brisbane Forest Park, adjacent bushland suburbs and the southern and eastern bushland suburbs. Recent records indicate the species distribution through areas of Enoggera, Ashgrove, Larapinta, Stretton (Karawatha), Ferny Grove and Burbank (Tingalpa).

Verified records of the small marsupial carnivores are shown on **Map 1**.

4.0 Ecology²

Habitat

Brush-tailed Phascogales

- Prefers dry sclerophyll forest and woodlands with sparse ground cover (Strahan 1995); and is rarely found in wet sclerophyll forest and rainforest.
- In Victoria, favours hollows with small entrances in large living trees for daytime retreat; in rare cases uses dead trees, hollow stumps and the abandoned dome nests of babbler (Traill and Coates 1993; van der Ree et al. 2001). Uses multiple dens (up to 20 in a single year) within its home range (Strahan 1995).

Yellow-footed Antechinus

- Occurs in wet or dry sclerophyll forests, woodland and closed forests from the coastal plains to the mountaintops and westwards into the semi-arid interior.
- Prefers habitat with predominance of hollow-forming tree species (*Eucalyptus/Lophostemon*) and a shrubby, grassy or sparse understorey for denning.
- Adults often nest under sheets of corrugated iron on the ground.

Subtropical Antechinus

- Inhabits wet vine forests and humid tangled gullies in sclerophyll forests.
- Prefers rainforest with a dense understorey, vine tangles and fallen, rotten logs (Braithwaite 1979).

Common Dunnart

- Occupies a wide range of coastal and subcoastal grassy or heathy sclerophyll habitats including wet coastal heaths, wet and dry sclerophyll forests and woodlands and partly cleared areas.
- Prefers *Eucalyptus* and *Lophostemon* species and a grassy or shrubby understorey for denning.
- Appears to have adapted to a mid-successional vegetation complex.
- Rests by day in a nest typically of dried grass and leaves within a hollow log (Calaby 1966), clump of grass or in grass trees (*Xanthorrhoea* sp.) (Fox 1995).
- Often found beneath corrugated iron, logs and bark (Burnett 2002; Queensland Museum database).
- Species can reach high abundance at some sites (Calaby 1966) especially within the first three to four years after fire (Dwyer et al. 1979; Fox 1982).

Common Planigale

- Occupies a wide variety of coastal and sub-coastal habitats including grasslands, woodlands, wet or dry sclerophyll forests, swamps and vine forests.
- Prefers *Eucalyptus*, *Lophostemon* and *Casuarina* species for denning, and a grassy or shrubby understorey.
- Frequently found sheltering under corrugated iron, under rocks, bark and logs (Burnett 2002; Queensland Museum database).

Brush-tailed Phascogale



Common Dunnart



Common Planigale

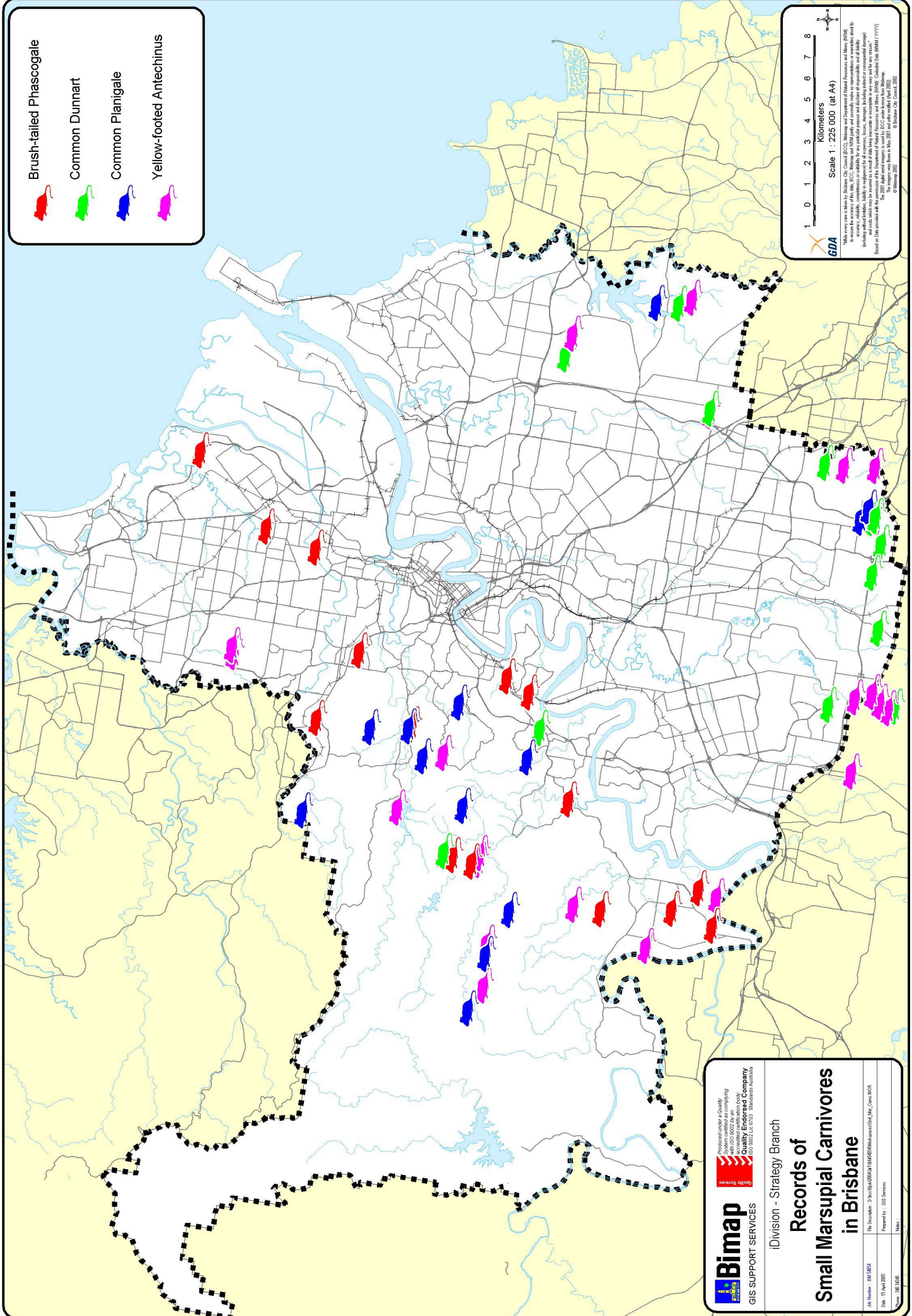


Yellow-footed Antechinus



GDA
Scale 1 : 225 000 (at A4)
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id|vision - Strategy Branch

Records of Small Marsupial Carnivores in Brisbane

Project Number: BIM-2624
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Prepared by: GIS Services
Map:

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4.0 Ecology² continued...

Diet

Brush-tailed Phascogale

- Feeds primarily on invertebrates gleaned from tree trunks and large branches (Scarff et al. 1998; Traill and Coates 1993).
- Also eats small amounts of kino (extruded tree resin) and lerps (sap-sucking insects) from eucalypts and nectar and/or pollen from eucalypts and banksias.
- May feed on carrion and attack domestic poultry (Queensland Museum database; Wakefield 1961).
- Limited data suggests may favour a particular species of *Eucalyptus* for foraging, however these species are unknown in south-east Queensland (Traill and Coates 1993).
- Most arboreal of the dasyurids (small carnivorous marsupials); seldom feeds on the ground preferring to forage on dead branches, moving along major branches in large trees.

Yellow-footed Antechinus

- Forages on the ground, on fallen logs, in shrubs and in the branches of trees.
- Primarily an insectivore that consumes a range of terrestrial and arboreal invertebrates (Van Dyck 1995).
- Also consumes fruit eg. avocado (*Persea americana*), currant bush (*Carissa* sp.).
- Readily scavenges from carcasses, and occasionally consumes small aviary birds and mice (Van Dyck 1982). Readily enters houses to feed on insects and kitchen scraps.

Subtropical Antechinus

- A climbing species that spends most of its time foraging on the ground and among rotten logs for invertebrates including beetles, spiders, amphipods and cockroaches (Wood 1970; Braithwaite 1995).
- Within its vine forest habitat at Mt Glorious it prefers to forage in areas with a high density of rotten logs and dense vine tangles (Braithwaite 1979).
- Also feeds on carrion and live mammalian prey such as house mice.
- Readily enters houses to scavenge (Queensland Museum database).

Common Dunnart

- A terrestrial insectivore that consumes a range of beetles, cockroaches, grasshoppers and crickets, moths and spiders (Fox and Archer 1984).
- Forages on the ground, among leaf litter and among dense grass.
- May also eat carrion.

Common Planigale

- In captivity the species feeds readily on carrion, and consumes grasshoppers, spiders and small skinks (Van Dyck 1979; Burnett 2002).
- Primarily terrestrial, but may also climb amongst dense grass and onto low shrubs while foraging (Van Dyck 1979).
- Forages among leaf litter and dense grass.

4.0 Ecology² continued...

Reproduction

Brush-tailed Phascogale

- Mating occurs over a three-week period between mid-May to early June, varying with locality (**Table 2**).
- Usually mates in a tree hollow.
- Females build spherical nests of bark strips, feathers and fur typically inside large eucalypt cavities with small entrances (Soderquist 1994, 1995a).
- During the breeding season, males may move long distances, sometimes beyond their home range.
- Males typically die after the breeding season at the age of 11-12 months; this is the largest known mammal in which the male dies after its first breeding season. It is believed that the energy expended in competition for mates leaves males susceptible to stress-induced diseases.
- Gestation is approximately 30 days.
- Litter sizes vary from 3-8.
- At seven weeks the young are deposited in a nest. Mortality of the young is highest during these initial lactation periods. At 20 weeks, the mother forages all night returning to the nest at dawn.
- Juveniles disperse in mid-summer, with males moving larger distances than females; phascogales rarely nest together after dispersal.

Yellow-footed Antechinus

- All mating takes place over a two-week period in late August (**Table 2**). Males die at the end of the mating period.
- Shelters in tree hollows, hollow stumps and rock crevices where females typically construct bulky spherical nests to raise young (Menkhorst 1995).
- Litters born from late September into October; up to 10 young have been observed on the 10 teats. Young remain attached to the teats for four to five weeks and are suckled in the nest until weaned in early January.
- Newly independent young nest together for some time after leaving their mother.

Subtropical Antechinus

- Shelter and breeding habitat unknown.

Common Dunnart

- Normally two litters born during the August and March breeding seasons (**Table 2**).
- No known preference for any particular site for breeding.
- Highest recorded species densities for sites burnt within the previous two to four years (Strahan 1995); burnt areas colonised very quickly.
- Short gestation period (12.5 days), reduced parental care, rapid development of the young (which are weaned when about 65 days old) and litters of up to 10 young on 8-10 teats.
- Adult size reached in about 150 days.

4.0 Ecology² continued...

Reproduction continued...

Common Planigale

- Breeding may be restricted to late spring and summer in Queensland; in coastal Arnhem Land breeding occurs year round (**Table 2**).
- Females build a spherical grass nest when with young (Van Dyck 1979).
- Young nest together for some time after leaving their mother.
- A litter of 4-12 (average of eight) follows a gestation period of 19-20 days.

Table 2: Breeding Seasons (green shading indicates breeding months)

Species	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Brush-tailed Phascogale												
Yellow-footed Antechinus												
Subtropical Antechinus												
Common Dunnart												
Common Planigale*												

* In coastal Arnhem Land breeding occurs all year round.

Movement Patterns

Brush-tailed Phascogale

- Intra-sexually territorial (Soderquist and Ealey 1994). Female home ranges do not overlap those of unrelated females. Male home ranges overlap those of both males and females with maximum overlap occurring during the breeding season (Strahan 1995).
- Home range depends on habitat productivity ie. provision of food, nesting sites, etc. In high quality habitat in Victoria, the home ranges of seven radio-collared females ranged from 2.3–8 hectares (van der Ree et al. 2001). In lower quality habitat, also in Victoria, the species home range averaged 37.05 hectares for females and 86.13 hectares for males (Traill and Coates 1993). Soderquist (1995b) found that in the same region, home ranges of males and females ranged from 20–100 hectares.
- Largely arboreal but known to cross up to 200 metres of cleared ground (Cuttle 1982; Traill and Coates 1993; Soderquist 1995a; Scarff et al. 1998; van der Ree et al. 2001).
- Males may move great distances outside of their home range during the winter breeding season (Soderquist 1995b). The Queensland Museum database shows an increase in the reporting rate of brush-tailed phascogales from south-east Queensland during the three months leading up to mating (April-June), and another reporting peak in November and December when juveniles disperse from the nest.

4.0 Ecology² continued...

Movement Patterns continued...

Yellow-footed Antechinus

- Found to occupy home ranges of 1-2 hectares in the rainforests of north Queensland (Watt 1991). Animals from the less productive open forests of south-east Queensland are likely to have larger home ranges than this.
- Movement peaks during the mating season (July–September depending on annual climate) (Van Dyck 1982; Smith 1984, Queensland Museum database).
- Diurnal activity also increases during mating season; otherwise the species tends to be nocturnal.

Subtropical Antechinus

- Three females at Mt Glorious were found to occupy home ranges of 0.32, 0.4 and 0.47 hectares (Wood 1970).
- The breeding season for the subtropical antechinus is unknown; however, the number of records collected between May and September is greater than during the rest of the year, which may indicate that the breeding season is approaching (Queensland Museum database).

Common Dunnart

- No published information on home range or movement patterns.
- Queensland Museum records of sightings of common dunnart show no clear movement patterns.

Common Planigale

- No published information on home range or movement patterns.
- Queensland Museum records of sightings of the common planigale increase from November to January, suggesting an increase in mobility during this time.

5.0 Threats³

Habitat Loss and Fragmentation

- Since European settlement, an estimated 67,000 hectares, or two-thirds of the original woody vegetation in Brisbane, has been cleared. This includes approximately 90% of lowland forests and more than 80% of all lowland vegetation (below 100 metre elevation). Habitat fragmentation is also extensive; around 80% of bushland remnants remaining in the city are less than 20 hectares in area (BCC 2001).
- Smaller remnants of habitat typically present sub-optimal breeding habitat conditions and potentially lead to increased nesting failures, reduced recruitment rates and possible population collapse.
- Degraded and fragmented habitat contributes to greater predation rates by introducing carnivores, altering fire regimes, introducing weeds and changing habitat structure.

5.0 Threats³ continued...

Fire Regimes

- Fire devastates the vine forest habitat of the subtropical antechinus and thus presents a threat to the species itself.
- Fire may offer a competitive advantage to the common dunnart and brown antechinus (*A. stuartii*).
 - Fox (1982) presents a convincing case for the role of fire in facilitating co-existence of populations of the common dunnart and brown antechinus (*A. stuartii*). The high reproductive output of dunnarts gives them a competitive advantage over antechinus during the first 3-5 years after a fire. Otherwise, the larger antechinuses dominate common dunnarts to the point of replacing their populations.
 - The common planigale at the Glasshouse Mountains also appears to reach its highest abundance in grassy bushland within the first five years after burning
- The role of fire in the ecology of the brush-tailed phascogales and yellow-footed antechinus is unknown.

Predation

- Significant predations by domestic cats, dogs, foxes, cane toads (Burnett 2001; Jones and Coman 1981; Robertshaw and Harden 1985).
- Cats are probably the greatest predator of small marsupial carnivores (responsible for almost half of the Queensland Museum specimens that are labelled with cause of death data). Woodland species (brush-tailed phascogale, yellow-footed antechinus, common dunnart and common planigale) are more prone to cat predation than is the vine forest restricted subtropical antechinus.

Drowning

- All species are prone to drowning in uncovered water tanks, swimming pools, toilet bowls and water troughs.

Accidental Trapping

- Subtropical and yellow-footed antechinuses are prone to being trapped in mouse and rat traps set inside houses close to bushland areas.

Deliberate Killing by Landowners/Householders

- Brush-tailed phascogales in the Brisbane region are killed for occasionally attacking poultry.
- Other species of small marsupial carnivore may be mistakenly identified as introduced rodents.

Road Kills

- Road kills account for 14 of the 40 recorded deaths of brush-tailed phascogales in the Queensland Museum database. Otherwise road kills appear to be a minor source of mortality records for the other small marsupials.

Non-target Poisoning

- 1080 baiting for wild carnivores on lands under Brisbane City's control could impact on all five small marsupial carnivores, but these events are not frequent enough to pose a significant threat.
- Secondary poisoning may arise when small marsupial carnivores scavenge the carcasses of rodents killed by household rodenticides.

6.0 Conservation

Several Brisbane City Council biodiversity initiatives are contributing to the protection and management of small marsupial carnivores and their habitat across the city. Key initiatives include:

- Bushland Acquisition Program: Through this program more than 1900 hectares of the city's most significant lowland habitats have been purchased and protected to date.
- Conservation Partnerships: More than 240 private properties have established conservation partnerships with Council, covering some 750 hectares of principally lowland habitats.
- Conservation Reserve Estate: More than 12,500 hectares of parkland, including 7000 hectares of bushland and wetland reserves are managed and protected. This reserve network provides habitat for Brisbane's significant species.
- Natural Assets Local Law: Under the Natural Assets Local Law 42% of the city area is now better protected from pre-emptive clearing.
- Brisbane City Council City Plan: The City Plan designates a green space system throughout the city to recognise and protect the contribution of open space areas to ecological functions. The City Plan's Biodiversity Code and supporting Ecological Assessment Guidelines provide performance criteria and acceptable solutions to protect significant biodiversity values on, or adjacent to, proposed development. The City Plan also includes statutory schedules of flora and fauna species considered significant in Brisbane, recognising species significant at a city-wide or regional level.

7.0 Research

To date, the most significant research of the small marsupial carnivores in Brisbane was the formal identification of the subtropical antechinus as a separate species by Van Dyck and Crowther (2000).

8.0 Management Intent

Strategies

Brisbane City Council intends to contribute to the long-term conservation of the five small marsupial carnivores in the city by:

- adopting and encouraging innovative voluntary and statutory mechanisms that protect important habitats and movement corridors
- ensuring appropriate ecological assessment, reporting and survey procedures are adopted in the development, planning and management activities
- encouraging land management practices that avoid, or minimise, direct and indirect impacts on small marsupial carnivores and their habitats on both public and private lands
- ensuring the timely availability of accurate, adequate and contemporary information for policy, planning and management decisions
- facilitating research that targets priority information gaps and contributes positively to the conservation of Brisbane's small marsupial carnivores and their habitats
- providing the Brisbane community with appropriate information and opportunities to contribute in a practical way to better understanding and protecting Brisbane's small marsupial carnivores.

8.0 Management Intent continued...

Actions

Table 3 describes priority conservation actions that Brisbane City Council will pursue with its partners to address the stated strategies. These priority actions have been drawn from studies undertaken for Council by recognised marsupial experts and from consultation with a range of stakeholders. Actions will be undertaken as funds become available through Council's budgetary process. It should be recognised that Council must consider the timing of these actions against other priorities across the whole of the city.

Table 3: Management Actions

Management Aspect	Action	Timing	Lead Agent and Key Stakeholders
Habitat Protection	Conserve and protect important small marsupial carnivore habitat on privately owned land within Brisbane, through Council acquisition of significant habitat (Bushland Acquisition Program) and through conservation partnerships (Voluntary Conservation Agreements and Land for Wildlife).	Ongoing	Brisbane City Council (BCC)
Habitat Management	Undertake a pilot project in Brisbane Koala Bushlands and Anstead Bushland Reserve for monitoring response of small marsupial carnivores to current management practices.	Commence 2006	BCC; Universities; Community conservation groups
Information Management	Undertake a targeted survey to establish the distribution of the subtropical antechinus in Brisbane.	Commence 2006	BCC; Queensland Parks and Wildlife Service (QPWS); Queensland Museum
	Undertake a systematic survey across Brisbane to establish the current distribution of target species.	Commence 2006	BCC; Queensland Museum; QPWS; Universities
Community Involvement	Support one small mammal ID workshop each year.	Commence 2005	BCC; Queensland Museum

8.0 Management Intent continued...

Guidelines

The habitat protection and management guidelines detailed in **Table 4** are provided to better assist land owners, land managers, the development industry and the broader community in planning and undertaking land use activities that may otherwise disturb small marsupial carnivores and/or their habitat. These guidelines are preliminary and will be refined as more information about these species and their habitat requirements becomes available.

Table 4: Habitat Management Guidelines

Issue	Guideline	Explanatory Notes
Nest Site Protection	Where possible retain trees with hollows, hollow stumps, rock crevices and ground litter in areas identified as known or potential habitat for small marsupial carnivores. Investigate the usage and success of artificial nest box placement in strategic locations to supplement existing nesting hollows.	Secure nest sites are required to ensure successful breeding and protection from predation. The management of edge effects, predators, fire, weeds and human intrusion, are all important management aspects that will influence the suitability of nest sites for these species.
Retention of Habitat and Linkages	Prevent loss of known habitat and habitat linkages.	The primary impact on urban populations of small marsupial carnivores has been from loss of habitat and loss of connectivity between remaining communities.
Edge Effects	Minimise/prevent habitat fragmentation. Where possible, use parkland buffers to soften the transition from bushland to urban landscape.	Edge effects increase the primary threat impacts on small marsupial carnivore populations ie. predation, road death, drowning, accidental trapping and poisoning and deliberate killing. Providing connectivity between habitat areas and minimising the degree to which bushland areas are impacted upon by development may ameliorate edge effects.
Fire Management	Maintain fire regimes within all known core habitat as close to those required for ecological outcomes as possible. Minimise wildfire events.	Fire is known to play a key role in the co-existence of populations of the common dunnart and brown antechinus and probably has a role in the co-existence of populations of the common dunnart and yellow-footed antechinus. Fire presents a known hazard to the vine forest habitat of the subtropical antechinus.
	Carry out slow controlled mosaic burns during times of low fire hazard (ie. rotational burning where only a small part of an area is burnt at a time).	Slow, controlled mosaic burns facilitate the management of fuel load, while allowing the safe migration of fauna from the burn zone into adjacent habitat. The intensity, frequency and timing of managed fires is critical for maintaining the ecological viability of vegetation communities.

9.0 Further Information

Agencies

- Australian Mammal Society (www.australianmammals.org.au)
- Brisbane City Council (www.brisbane.qld.gov.au)
- Department of Environment and Heritage (www.deh.gov.au)
- Environmental Protection Agency/Queensland Parks and Wildlife Service (www.epa.qld.gov.au)
- Queensland Museum (www.qmuseum.qld.gov.au)

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