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The Management of Small Reserves: Implications for Small Marsupials

Philip Milner

Introduction

The conservation and biodiversity values of our numerous smaller reserves was highlighted in the recent informative leaflet "The Importance of Small Reserves" written by Sarah Lloyd and published by our group.

Many people have their favourite local reserve which they frequent regularly. They are often involved as volunteers with "friends" groups that help to care for and maintain the natural values of the reserve. More often than not these reserves are small remnants of native vegetation located either within suburbia or on the urban fringe. In effect they have become 'islands' or 'isolates' surrounded by human developments with an associated loss of connectivity with larger parcels of natural vegetation. Remnant 'islands' with connectivity issues are also found in agricultural areas surrounded by paddocks and arable land, and in eucalypt and pine plantations. Such isolated remnants of vegetation present challenges for the on-going survival of the flora, fauna and fungi in these reserves, particularly those with specific habitat requirements.

Definition of a Small Reserve:

From a conservation perspective any reserve up to 100 ha could be termed a small reserve although the suburban reserves are generally much smaller. For example, the Don Reserve in Devonport is about 45 ha, the Reid Street Reserve in Ulverstone is just 2.6 ha, the more rural Brushy Rivulet Reserve near Westbury is 70 ha and the French's Road Reserve near Wynyard is 40 ha. Hawley Nature Reserve near Port Sorell is about 49 ha while the nearby Pitcairn Street Reserve is only 4.7 ha.

Don Reserve, Devonport

Small Reserves as 'Islands' and 'Isolates'

These reserves have all become isolated to varying degrees from larger areas of natural vegetation. For example, the Don Reserve in Devonport (Figure 1) is a relatively narrow strip of land along the eastern shoreline of the Don River estuary that itself forms a natural barrier for terrestrial species. The reserve is hemmed in by suburbia along its eastern boundary; Don College, some suburbia and Bass Strait to the north; and an almost complete wildlife barrier with the dual-lane Bass Highway to the south. The only connectivity remaining is the extremely narrow corridor of the river banks where the Don River passes under the highway. The Hawley Nature Reserve in Port Sorell is also becoming isolated by the on-going development of housing

estates in the adjoining areas. Although the developments are generally low density 'environmental' living, the flow-on effects and impacts on the reserve are certainly evident.

Shape, Fragmentation and Edge Effects

The overall shape and outline of a reserve has an effect on its environmental integrity and stability, as disturbances around the edges reduces the core area of stable habitat. A reserve that is square in outline has a larger core area compared to a reserve with a narrow rectangular shape, even though they may both have the same area in hectares.

Many of our smaller near-urban reserves are popular and well used. The necessary associated infrastructure such as a network of paths and tracks results in fragmentation of habitat, and the slashed firebreaks around the boundary of most of these reserves also reduces the area of intact original vegetation. The recent proliferation of mountain bike tracks has resulted in further fragmentation.

Management Issues in Small Reserves:

Small reserves face many threats to their on-going viability and integrity including inappropriate developments, encroachment by suburban gardeners, weed invasion—often from garden escapes—dumping of garden and other waste, and roaming domestic cats and dogs.

Management and maintenance regimes undertaken by the relevant reserve management agencies potentially threaten the integrity of reserves. Slashing and clearing of ground layer vegetation for fire breaks around the perimeter, and random clearings throughout a reserve can reduce the available habitat for species which depend on that layer of vegetation. The remov-

Long-nosed Potoroo Photo (also on front cover) Photo: Philip Milner

al of larger mature habitat trees particularly those with hollows, due to perceived safety risk can have serious consequences for the hollow-dependent wildlife such as the threatened (endangered?) Swift Parrot.

Burning

Burning seems to have increased in frequency in our reserves over recent years. Our small marsupials, Long-nosed Potoroo (*Potorous tridactylus*), Eastern-barred Bandicoot (*Parameles gunnii*), Southern Brown Bandicoot (*Isoodon obesulus*) and Tasmanian Bettong (*Bettonga gaimardi*) are very dependent on the cover and security of dense, intact ground level vegetation. They require and benefit most from a mosaic of vegetation comprising a patchwork of various post-fire aged ground level vegetation.

Post fire observations in a number of reserves clearly show that excessively large areas are being burnt at any one time, and are usually followed by further large patches in following seasons, very clearly without adequate (if any) consideration of the potential impacts on biodiversity values for example at the Kelcey Tier Green Belt near Devonport and the Hawley Nature Reserve.

A mixed age mosaic should be the prime objective of sound vegetation and biodiversity management using fire. This is even more important in small largely land-locked reserves.

Too frequent burning also prevents the taller understorey from regenerating and maturing, effectively destroying important habitat for arboreal marsupials such as the Ring-tailed Possum that require dense mid storey vegetation in which to construct their dreys. This has occurred in the Henry Somerset Orchid Reserve near Railton.

The timing of fire management is also important to the wildlife in these reserves. Spring is the breeding season for much of our

Eastern Barred-Bandicoot Photo: Pam Doyle

wildlife, particularly nesting birds and it is the very worst time to be conducting fuel reduction burns.

Impact on fauna and flora

Use of the reserves inevitably has an impact on wildlife. Most of the small ground-dwelling nocturnal mammals appear to have adapted reasonably well to walkers and other users. As most people walk in the daytime when marsupials are resting in their hideaways, the impact appears to be limited providing they are not flushed out or disturbed. By far the main disturbance is by unrestrained dogs that severely disrupt the daily rest routine of these animals, along with the risk of actual predation, which has occurred at Don Reserve.

Roaming domestic and feral cats are a significant predation risk to the small mammals and birds, and a disease risk to the marsupials.

Plants are under pressure too. The small shrub Northern Pink Bells *Tetratheca ciliata* is listed as threatened. It once occurred in the Don Reserve but has not been seen for many years and is now almost certainly locally extinct. The Hawley Nature Reserve contains the western most population of another threatened plant, the endemic Creeping Dusty Miller *Spyridium obcordatum*, on two localised patches of rocky outcrops. This plant too would have been locally extinct if not for the conservation work of the Central North Field Naturalists over many years. A combination of sequential drought seasons and the persistent browsing mainly by pademelons is considered to be the cause of the decline. (Pademelons have benefited from the fragmentation and modification of the surrounding forests and woodlands with housing developments and the associated increase of grassed areas.)

Southern Brown Bandicoot Photo: Sarah Lloyd

Habitat Requirements of Small Marsupials

The small ground dwelling marsupials that still occur in these largely land-locked reserves are totally dependent on the habitat and resources which occur for their every need, be it foraging for food, shelter and security as well as suitable habitat for breeding. Furthermore, they require connectivity of habitat to enable them to disperse beyond the particular reserve. They have nowhere else to go.

The Eastern-barred Bandicoot, the Southern Brown Bandicoot and the Long-nosed Potoroo are the small ground layer inhabiting marsupials that are most likely to be impacted by management and maintenance practices in small reserves. Appropriate and longer term management of our small reserves is critical for their on-going existence.

Specifically, the bandicoots and potoroo require connectivity of the ground layer vegetation, the low shrubs, clumping plants such as grasses, matrush (*Lomandra longifolia*), bracken and other ground ferns. The ground layer plants are the first to go in a slashing program or in a fuel reduction burn.

Ringtail Possums are dependent on fairly dense understorey vegetation, the smaller trees which make up the understorey such as Paperbarks *Melaleuca* spp, Teatree *Leptospermum* spp. and Prickly Box *Bursaria spinosa* which are sufficiently dense for the Ringtails to construct their dreys. This understorey is also often cleared on the basis of fuel reduction without consideration of habitat retention.

Conclusions

Small reserves wherever they occur are a very important part of our reserve network, often conserving remnants of vegetation and wildlife habitat that have been lost to developments in surrounding areas.

The various agencies that are responsible for the management and stewardship of our small reserves need to be more mindful of the biodiversity values they contain, and every management decision should first and foremost fully consider the potential impacts

Tasmanian Bettong Photo: John Simmons

on the biodiversity values prior to any implementation. Failing to do this will undoubtedly result in further decline of biodiversity and local extinctions of habitat specific flora, fauna and funga.

In summary what is needed for our small reserves is:

'**Best Practice Environmental Management, with full consideration of biodiversity values'**.

References

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thelist database, www.thelist.tas.gov.au

Pygmy Possums in a box - not their usual habitat! Photo: Sarah Lloyd

Fire regimes
Ian Ferris

I recently read a draft paper, "Fire regimes that cause biodiversity decline", and found it a useful and interesting document. It is a lengthy (50p) document, and some might not wish to plough through it. Here I attempt to summarise and simplify the findings, although I recommend the main paper to gain a better understanding. The paper describes various fire regimes, fire management and related matters that may have an effect on Threatened Species and Ecological Communities throughout Australia.

Fire can naturally recur relatively frequently in some ecosystems such as heathlands, or be almost completely absent in others such as alpine moorlands. In Australia, the great majority of current fires are caused by humans, either deliberately or accidentally. Species and communities that have survived the depredations of human activity for around 50,000 years have more recent additional pressures due to increased population and technological developments. Some ecosystems, landscapes and even climates have been altered more or less permanently. Of course, fire has been a factor in forming Australia's vegetation systems for many millions of years, regulated by climate and geography.

Fire regimes under Aboriginal management varied widely, and are generally known only by indirect evidence, especially in the south of the country. Much of the deliberate burning likely resulted in the decline of some species, in order to increase animals for food. Fire frequency has increased substantially in most ecosystems since European settlement.

The nature of fire is defined by frequency, intensity, season, type (above or below surface), and severity (related to intensity), extent, patchiness and ignition type. It is apparent that the changing climate will strongly affect the interaction of these factors, but agriculture also has a strong effect. For example, unconnected woodland fragments burn less frequently, but grasslands burn more intensely due to flammable weeds, stronger winds etc.

In addition to the fire mechanisms above, other interactions are present. These include:

Biotic:

- Habitat loss or gain (e.g. tree hollows, peat loss, grassland formation, grassland shrub invasion),
- Predator effects (e.g. increased prey visibility, but fewer prey survivors),
- Herbivore effects (e.g. forage loss, population pressures on surrounds)
- Competitors: (e.g. fire-tolerant plant regrowth crowding, reseeding, canopy shading)
- Disease: (e.g. increased susceptibility to Phytophthera for stressed plants)

Abiotic

- Drought (before or after fire),
- Hydrology, (e.g. increased runoff, erosion, stream turbidity/chemistry)

Landscape:

- Clearing (agriculture, urban)
- Logging (selective, clear-fell, plantation)

Fire Suppression:

- Disturbance (clearing of firebreaks)
- Chemical retardants (some are plant-toxic due to high Nitrogen and/or Phosphorus levels)

The paper expands on these factors in some depth, with examples based on research. It notes that there are various responses to the

these factors, for example, some species are aided by high or low frequency fires to the detriment of other species, which obviously affects the Ecological Community fabric. A balance of the interacting natural factors clearly has resulted in ecological diversity and relative longer-term stability, but attempts at landscape 'management' by humans has disturbed this balance.

This draft paper does not include recommendations for a managed fire regime. It provides ample examples where inappropriate fire management processes by humans have resulted in species and communities to become threatened, not least the Koala. Very significantly, it illustrates the fact that there are distinct and varied regimes for each and every ecosystem in each and every locality, as opposed to a 'one size fits all' approach.

In my opinion, what it does NOT do is point to the anthropological bias that our society appears to hold, which is a very distinct focus on protection of human structures, crops and lives as a principal priority over the natural environment. Whilst there are some attempts at 'ecological burns' and 'vegetation management', there does not appear to be a well defined nationally coordinated program, with location-specific aims.

The entire concept seems to be that we humans have to manage the natural world, as though it cannot look after itself, and as though we are not just a part of it. One wonders who managed the land before humans turned up such a short time ago. Based on those few remaining bits that have not had human interference to any large degree (apart from a change in climatic circumstance), it seems to have done fairly well on its own.

It might be an idea to repair the damage we have done, and let it all look after itself. It will probably do a much better job.

Reference

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Could fire be a factor in the Dusky Robin's decline? See Robins 2020 (page 10) for other possible causes of their decreasing population. Photo: Sarah Lloyd

Robins 2020 - update

Sarah Lloyd & Hazel Britton

A big thank you to members who have sent in records of Flame and Dusky Robins over the last two years.

The project was started because of the apparent difference in movements and flocking behaviour between Flame Robins in the north and the south of Tasmania. It had also become obvious to many of us that Flame and Dusky Robins were becoming more scarce. Some members had noticed their absence in areas where they used to see them regularly; others mentioned that they were seeing fewer birds.

In 'The Tasmanian Naturalist' Vol 143 2021 p.61-64, Els Wakefield and Peter Vaughan reported on the ongoing monitoring of Flame Robins along regular transects in the south of the state during 2020 and 2021. They compare recent records with earlier monitoring from 2009 to 2014. Under Results they say 'Counts in 2021 were consistently approximately half those observed in 2010, and slightly below those observed in 2020.'

The sightings we have recorded in the last two years have been random rather than along fixed transects, so it is difficult to report on what the sightings infer. However, the observations of Dusky Robins recorded by Sarah during a long-term study at Connorville Station supports the justification for their being considered Vulnerable in the The Action Plan for Australian Birds 2020.

Robins at Connorville Station

Since 2006 I (Sarah) have been conducting bush bird surveys in remnant vegetation at Connorville Station, a large farming property south of Cressy, and at The Den, in 'production' forest on the slopes of the Great Western Tiers. I use Birdlife Australia's recommended methodology, i.e. 2 hectare search areas are surveyed for 20 minute.

Dusky Robins have been recorded at two of the six search areas on the farm that I regularly monitor: they were present at 'Back Forest' in 2006 and 2015; and at 'Red Hill' where they were recorded annually (except 2009) between 2008 - 2015 with breeding records in 2008 and 2010. Dusky Robins have not been seen at Connorville since 2015.

At the non-farm—i.e. forested—sites, Dusky Robin were recorded at 'Red Shipping', on Lake River Road between 2006 and 2015 (except 2007, 2011 and 2012), and at 'Production Forest' between 2009 and 2017 (except 2011) with a breeding record in 2012. They have not been recorded at 'Red Shipping' or 'Production Forest' since 2015 and 2017 respectively.

The Duskies first disappeared from the search area on the farm that is on the southern end of eucalypt woodland. The surrounding woodland is in poor condition but the search area itself was in reasonable condition when the surveys began with a corresponding healthy bird population. During the study the understorey became more fragmented and degraded by feral deer and the domestic stock that occasionally graze the site. Many of the old silver wattles fell and the young wattles, which provided dense mid-storey cover especially for fledgling birds, were partially or completely defoliated by fireblight beetles (*Pyrgoides orphana*) in 2013, leaving the site more exposed. The search area is also visited weekly by shooters who camp there during weekends to undertake game management on the property, i.e. controlling feral deer, bennetts wallaby, pademelons and possums. They invariable cut fallen logs for firewood, and have generally 'cleaned up' the site.

The Dusky Robin's disappearance from the forested slopes of the Great Western Tiers is more disturbing and more difficult to explain but for the industrial scale forestry

activities that have seen large swathes of forest clearfelled or selectively harvested.

Flame Robins have not been seen regularly at any of the search areas at Connorville or The Den, but have been seen while driving around the property after the morning surveys.

The Action Plan 2020

In the Action Plan for Australian Birds 2020, the Flame Robin's conservation status is Least Concern. There have been localised declines in the past ten years, but no rapid species-wide population loss. The 2010 Action Plan status was Near Threatened, but the change in 2020 status is genuine with reporting rates no longer meeting the criteria for listing.

In contrast, the Dusky Robin's status in the Action Plan 2020 is Vulnerable. (The status in the 2010 Action Plan was Least Concern.) The 'Justification of the vulnerable status' states that there have been steep unexplained declines in reporting rates in many parts of the species' range, i.e. Tasmania, Maria, Bruny and Flinders Island and other islands in the Furneaux group. Threats include land clearing—40 ha of native vegetation can now be cleared without a permit; fire, with fire frequency and intensity likely to increase with climate change; changes in abundance of Tasmanian Devils, which may affect predation rates by other predators such as cats and quolls; cats; and drought.

The intensification of agriculture, which has seen the loss of small and large patches of remnant bush and isolated paddock trees to make way for pivot irrigation, as well as the associated increase in chemical use, is not listed as a threat in the Action Plan.

The decreases we are seeing now may have started to occur many decades ago and we are only now seeing the results of historical land clearing.

In his book The Fauna of Tasmania: BIRDS, Bob Green informs us that the Dusky Robin was once called 'Stump Robin' because of its habit of perching on logs and stumps. It was a favorite companion of early homesteaders because it would appear whenever soil was disturbed to feed on the exposed insects and other invertebrates.

He laments:

'Unfortunately today [1995] such pleasantries are not so often enjoyed, the cleared farmlands and modern methods of broad-scale farming being dissuasive to the Dusky Robin'

And that was before irrigated agriculture!

Please continue sending records

We have decided to ask members to continue sending in records of Flame Robins until the end of 2022. Also, if you have records in notebooks that you have not sent us please include them. Where winter flocks are concerned, if you can include any notes on the numbers of 'brown birds' and adult males (or moulting birds showing signs of colour) please include these details.

We are also very interested in any records of Dusky Robins.

References:

Garnett, ST & Baker GB (Eds)(2021) The *Action Plan for Australian Birds 2020*, CSIRO Publishing, Melbourne.

Green, R (1995) *The Fauna of Tasmania: BIRDS*, Potoroo Publishing, Launceston.

Walks and other events

All walks are scheduled for the first Sunday of the month unless otherwise stated. Meeting time is usually 10am. Please check the disjunct e-news for details.

Bring food, water, clothes for all weather, hand lens, binoculars, note book & curiosity.

September 4th – Don Reserve and Don Head. Leader: June Hilder (0424350183)
October 2nd – Brushy Rivulet Reserve. Leaders: Sarah Lloyd and Ron Nagorcka (63961380)
November 5th - 7th – Tasman Peninsula (weekend). Leader: Mary McConnell (0409 900476)
December 4th – Four Springs Lake. Leader: Rod McQueen (63932121)

Congratulations Phil Collier

A huge congratulations to Phil Collier for reaching level 7 'Outstanding' in the Botanical Society of Britain and Ireland's (BSBI) Field Identification Skills Certificate (FISC). He is the only botanist ever to have reached Level 7 in the history of the Society's qualification that started in 2015. An incredible achievement after only 4 ½ years in Britain! The field test is described in this booklet on the BSBI website:

https://bsbi.org/wp-content/uploads/dlm_uploads/2021/05/FISC-booklet-2021.pdf

After the Field Test, Phil had to answer some extra questions:

Q: Had he found a new species for the county and published the findings?

A: Yes, he discovered Jersey Pink, *Dianthus gallica*, a first on the UK mainland (see BSBI News April 2021, p.12—14).

Q: Had be made a mistake in public and corrected it publicly? (an interesting criterion!)

A: Yes, he showed a group of people some (infertile droughted) *Matricaria discoidea*, telling them it was *Cotula sessilifolia*, which he retracted on the next visit.

He also verifies iRecord reports for South Hampshire and has conducted a two-year survey of Barton-on-Sea Common which he is writing up. He also told the adjudicators about describing the endangered pallid leek orchid *Prasophyllum abblittiorum* and writing Tasmanian Identikit books and reports for Threatened Plants Tasmania.

Many thanks to Robin Garnett for providing this information about Phil's outstanding achievement. We look forward to Phil and Robin's return to Tasmania and increasing the botanical skills of members of CNFN.