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Newsletter No.38

Newham & District Landcare Group

Working towards a healthier environment

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Hanging Rock in the spotlight and under threat

It is often said that Hanging Rock is a local icon of enormous importance to tourism in the Macedon Ranges. Recently, much has been said about the challenges it faces — pest plants and animals in particular — even though these same challenges have been present for decades. I say that the greatest threats to Hanging Rock are inappropriate development, changes to Planning Policy and failing to recognize and value the environmental qualities that make it such a unique place.

Hanging Rock Reserve is a key part of the network of native vegetation that is being developed between Macedon Regional Park and the Cobaw State Forest to provide safe passage through the landscape for native animals and it seems timely to focus on the flora, fauna and other qualities that make it such a very special place.

Penny Roberts

End of year BBQ

Saturday 7th. December – Wesley Park from 6pm. Events at 7pmish

Come and join in the fun of our 2 annual sporting events –
the hotly contested Great Scott Wellie Toss and the Egg Throwing championship.
Perpetual trophies to grace any mantel piece!

BYO egg, chair, drinks and a contribution for the shared table [savoury or sweet].

Ball games/childrens activities welcomed.

RSVP: Penny Roberts 5427 0795 or 0418 396837 by December 5th., stating numbers of mouths, veggie or carnivorous, nature of your contribution to the shared table.

Threatened species at Hanging Rock Reserve

In this series we will be profiling species under threat in and around the Reserve

The list below comprises species on the DEPI Advisory List for Threatened Vertebrate Fauna 2013 [Victoria] at present.

This means they are considered threatened, poorly known, near threatened or extinct in Victoria. The information provides details of the conservation status, in a way that is not currently provided for in statutory mechanisms, for use in a range of planning processes and in setting priorities for actions to conserve biodiversity. Together with a range of programs and other resources available, this list serves to increase community awareness of threatened species and may encourage community members to become involved in activities to protect them, thereby reducing the risk of their conservation status worsening.

Vulnerable: Brush-tailed Phascogale, Powerful Owl – listed as threatened under FFG[1]. Greater Glider.

Endangered: Barking Owl – listed as threatened under FFG. Swift Parrot – endangered under EPBC[2], threatened under FFG.

Near threatened: Lathams Snipe – nominated for threatened status under FFG. Brown Tree Creeper.

[1] Flora and Fauna Guarantee Act, 1988, Victoria.
[2] Environment Protection and Biodiversity Conservation Act 1999, Commonwealth.

Threatened species at Hanging Rock Reserve

Introducing the Powerful Owl and Greater Glider

By Tanya Loos

Imagine a giant flying possum or glider, one that can glide for 100 metres or more, and use its extraordinarily long tail as a rudder to change direction mid-glide. The Greater Glider has huge fluffy ears, and large eyes. It uses scent marking to communicate, and has very distinct and regular pathways through the trees as it moves silently about its eucalypt forest home.

Like the koala, the Greater Glider's diet is solely the tender young tips of eucalypt leaves and has a very long caecum, or appendix-like structure, filled with bacteria to help digest the leaves.

The Greater Glider weighs about the same as a cat. What kind of predator has the might and power to capture and carry a large glider? The Powerful Owl, of course! The Powerful Owl lives up to its name – this 60cm high owl is the largest owl in Australia.

Both of these special animals have been recorded in Hanging Rock Reserve, and occur in a patchy distribution across the Wombat Forest to the west, and the Macedon Ranges to the east.

Greater Gliders are one of the Powerful Owl's favourite foods – along with sugar gliders and ringtail possums. When plenty of these prey species are available, the home range of one pair of owls is about 1,000 hectares.

In more degraded areas, such as the Box-Ironbark forests around Newstead, these crucial elements of the habitat have been lost, and subsequently the prey that the owls need is now missing from the landscape. The hungry owls then specialise in capturing sleeping parrots such as corellas, rosellas and cockatoos. On this poor diet, the home range of a pair is over 5,000 hectares, as the owls must travel far and wide to get the food they need to raise their chicks.

The Hanging Rock owls would have a much better time of it! The area is blessed with intact understory in the form of wattles such as blackwoods, and plenty of large old trees that provide hollows for the gliders.

There has been a breeding pair of Powerful Owls at the Rock for many years. According to Guido Bigolin, Head Ranger, they originally roosted on lower south west slope of the Rock. After a prescribed burning operation that got out of hand, they were not seen for several years – but more recently they have been roosting on the north east of the Rock, fairly close to the base (seen on the 21/9/2013 bird walk). Powerful Owl chicks were seen and photographed in 2012. The exact location is a secret for the safety and privacy of the owls!

A thousand hectares, 5,000 hectares; Powerful Owls are top level predators who would view Hanging Rock as one part of their patchwork

landscape of food and shelter availability. Very different to the home range of the Greater Gliders who tend to stick to a very small area of just 2–3 hectares!

Thanks to this habit of having a tiny home range, the Hanging Rock Reserve has two family groups of gliders. One group is near the racecourse facility, and the other south west of the Rock. Greater Gliders come in many colour forms, ranging from pure snow white, to grey-brown to almost black, and the Hanging Rock glider families each have different colours.

Greater Gliders are regarded as regionally significant, as the Wombat Forest, Hanging Rock and Macedon population is the most western distribution of this animal in Australia. Most Greater Gliders occur in the tall forests east of Melbourne, and indeed 'our' gliders may even be genetically distinct as the population has been cut off by the open gaps around Broadford for hundreds of years. This is speculative, as no genetic studies have been done as yet.

The presence of such a tasty and nutritious prey animals such as the Greater Glider, Sugar Glider and various possums, makes for happy and healthy Powerful Owls, and better breeding success for their chicks.

The proposed development would shatter this predator/prey relationship at Hanging Rock Reserve. One group of gliders live in the area marked for a 'nature adventure facility' on the development plan. The development of this facility would directly impact on their hollow trees used for dens and their feeding sites.

Overall, the owls and the gliders rely completely on the abundance of large, hollow-bearing trees at the Hanging Rock Reserve. The owls use the hollows to nest in, and the gliders and possums each have several dens in various hollows that they use at different times of year and in different weather conditions.

The proposed development would result not only in the direct removal of these precious home sites, the increased number of people and traffic would mean that the development owners and the arborists would continually remove these trees due to potential limb dropping and other safety concerns, resulting in a continual and inexorable removal of habitat.

The Greater Gliders, those fluffy fliers of the night, and the Powerful Owls with their deep impressive hoots, would not persist at the Reserve if this development goes ahead.

Tanya Loos is a local field naturalist, who is also the facilitator of the Upper Campaspe Landcare Network.

The significance of Hanging Rock as a bird sanctuary

By Bruce Donaldson

The Woodend Bird Observers, the local branch of Birds Australia, has been observing in detail the occurrence of birds within the Hanging Rock Reserve for over twenty years. This is a group that is in a unique position to compare the birdlife occurring there with other areas within the Macedon Ranges as well as areas on the periphery of the shire.

The group has always been pleasantly surprised, even astounded, at what it has observed there over the years compared with other forested areas as close as Mount Macedon to its immediate south and the Cobaw Range to its immediate north. One long-standing member has compiled a birdlist for the Rock over the years consisting of 124 species, i.e. about 16% of Australia's resident species. The conclusion has been that the Rock reserve is unique in the area for its repertoire of birds.

Hanging Rock is the permanent home of a nesting pair of Powerful Owls, Australia's biggest owl and classified as 'vulnerable'. This pair of owls successfully rears two chicks at the Rock every year, much to the delight of visitors. Other birds such as the White-winged Triller, the Red-browed Treecreeper and the white morph of the Grey Goshawk are uncommon in the Macedon Ranges in general but are frequently seen at Hanging Rock. The Peregrine Falcon is another permanent resident that nests here; nesting pairs of Peregrines are believed to be extremely few in number in Victoria. Given that these birds require cliffs to feel at home, and cliff faces are not at all common in the Macedon Ranges, the Rock offers this falcon a rare commodity that it has been keen to adopt, but significantly only since the banning of abseiling from the Rock.

Despite the extent and high quality of the forest on near-by Mount Macedon, the birdlife there is markedly less prolific and diverse than at Hanging Rock, which gives some indication of the importance of the Rock reserve to the local avian fauna. Birdlife is often more prolific on a forest periphery than deep in a forest itself. This could go part way to explaining why Hanging Rock is so rich in birds. The Rock is also absolutely integral to the bio-link being worked on by the community of Newham to join Mount Macedon to the Cobaws.

The fact that habitation and development of the immediate environs of the reserve have been kept to a minimum will inevitably have played a role in the occurrence of such a diversity of birds at the Rock. Thus preservation of that policy is imperative to guarantee the future well-being of the area's birdlife.

Our iconic neighbours

By Brigitte Kny

The koala is probably the most recognised and loved symbol of Australia. A survey by the Australian Koala Foundation found that koalas rated the number 1 tourist attraction while visiting Australia, and estimated that the 'koala experience' contributed an unbelievable 1 billion dollars to the tourism industry and added an estimated 10,000 jobs to the economy.

Our unique animal is used to advertise chocolates and reading glasses; politicians cuddle this icon to promote political sincerity, and shires and promoters use the koala to present various attractions and projects.

Yes – the koala is undoubtedly a unique and special animal.

Did you know that:

- the closest relative to the koala is the wombat. Both have backwards facing pouches. That is great for the wombat joey as it does not get dirty when mum is digging. But the koala mum has to have strong pouch muscles so that the joey does not fall out.
- Koalas are not 'drunk' but they have a low energy lifestyle due to their low energy food.
- Early this century koalas were hunted for their skin and over 2 million were killed. To make sure that the species survived, 18 animals from Victoria were brought to Kangaroo Island in 1920.
- Koala is a Koori (Aboriginal) word and means 'No Drink'.

However all is not that well with our exceptional and irreplaceable icon, the koala. Drought, illness, human expansion and development in traditional koala habitat have taken their toll.

Ask any oldtimer near-by or the rangers at Hanging Rock and they will tell you that there used to be stacks of healthy koalas in our area – not just Newham and Hanging Rock but the whole Mt. Macedon area and Romsey as well.

Current counting proves that there is a definite and disturbing decline in koala numbers in recent years in our area.

Chopping down traditional koala 'home trees', domestic animals like dogs and cows, cars and increased human activity and housing developments does have a negative impact on the koalas' survival in the wild. And while us landholders and Shire Councillors have certain rights to live and work here in our beautiful shire – koalas and wildlife *ALSO* have rights.

We are here to be guardians to assure their rights.

How much habitat is enough?

In 1993 Loder & Bayly, the consultants preparing a management plan for Hanging Rock Reserve, noted that 'the vegetation of Hanging Rock Reserve constitutes one of the few remnant pockets on the plains between the Macedon and Cobaw Ranges and it is of great importance as it forms part of a movement corridor for indigenous fauna.'

This situation came about through extensive land clearing for agricultural use at a time when the value of the existing native vegetation was not appreciated. Inappropriate sub-division of land has made the situation worse – the price of human activity, domestic animals etc is a heavy toll on native vegetation and wildlife.

Over the past 20 years the situation has changed:

- Macedon Ranges Shire Council (MRSC) recognized the importance of increasing and linking native vegetation in the local Planning Scheme with the Cobaw biolink Vegetation Protection Overlay (VPO8) and also gives a pro-rata rate reduction for land protected by a covenant.
- Melbourne Water has invested heavily in riparian zone revegetation through its Stream Frontage Management Program.
- Newham & District Landcare Group has actively sought funding support for landowners doing environmental works, re-branding the biolink as the Campaspe-Maribyrnong Headwaters Biolink along the way. Grant related works worth about $0.5m have been undertaken over an 8 year period.
- Many individual landowners have undertaken works that add value to the wildlife corridor.

All of these activities have improved the situation, but there is so much more that could be **and should be** done.

In South Eastern Australia Grassy Woodlands are in danger of being lost – only about 20% of this vegetation type remains and much is in poor condition. Most remnant patches have lost native species diversity and are severely degraded by weed invasion. As a result all remnant, even if degraded, is highly significant.

How much habitat is enough?

by Ian Higgins, co-ordinator of the Kyneton Woodlands Project.

Hanging Rock's slopes and summit are still clothed in native vegetation. The surrounding flatter country is heavily cleared and from a nature conservation perspective, quite degraded due to weed infestation and other issues.

Consequently, the Hanging Rock Reserve is for many native species an isolated 'island' of habitat surrounded by inhospitable or uninhabitable country. This renders some of the species of Hanging Rock Reserve at greater risk of local extinction from events like wildfire, drought, or disease.

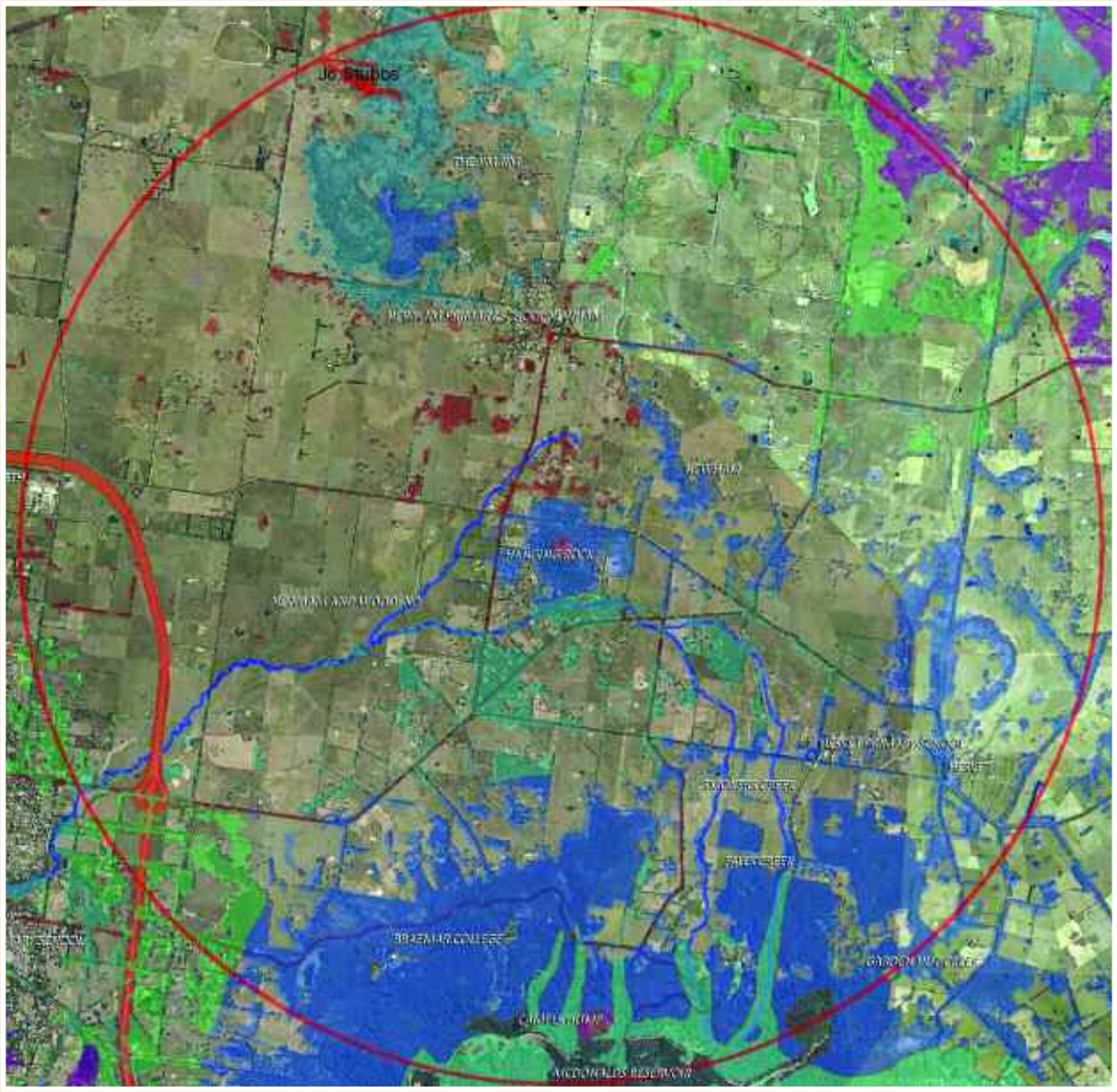
A good example is the Greater Glider (listed as vulnerable in Victoria)

To improve the conservation outlook of isolated habitat 'islands', we generally attempt to buffer the island from adjacent land use impacts, increase the area of habitat and connect the 'island' to

nearby other habitat areas with ‘wildlife corridors’. An example of buffering could be to prefer an adjacent land use of native species timber plantation over intensive horticulture.

In cleared landscapes increasing habitat area and creating corridors requires revegetation with indigenous plant species. For forest or woodland habitat types, substantial time for trees to mature is also needed.

How much habitat is enough? Ecological research points to a threshold of around 30% native vegetation cover. Below this proportion, many species cannot persist and become locally extinct. In a 5km radius zone around Hanging Rock (see below) the amount of native vegetation is 24%, well below this threshold figure.



The 5km radius is an arbitrary choice. If a smaller, say 2.5km was chosen the proportion of native vegetation would be even lower as there would be no intersection with Mt Macedon or The Jim.

The calculation is based on DEPI/DSE mapping (modelling really) of extant native vegetation as of 2005. There is no allowance for the 'condition' of the native vegetation. So when a 5km radius circular area around Hanging Rock is found to have 2502ha of remnant vegetation mapped, you should keep in mind that it will be of variable condition, mostly less than 50% of the quality of pristine native vegetation.

Hanging Rock and surrounding area would have once been particularly species rich as the area contains varied topography and geology with a consequent diversity of vegetation types. DEPI (DSE) has mapped four different vegetation types (Ecological Vegetation Classes, see map below) in the vicinity. As these inter-grade over short distances, the transition zones or 'edges' between the vegetation types would also have occupied a significant proportion of the area. Transition zones are where some of the features of both 'pure' adjoining vegetation types occur together. This usually results in greater species diversity in the edges due to the extra habitat resources available.

All are within Central Victorian Uplands bioregion. These are the vegetation types that are thought to have existed prior to European settlement. Where it still exists, remnant vegetation in the area is most likely to be classed as of these types.

EVC	Location	Threat of extinction
Montane Grassy Woodland/Rocky Outcrop Shrubland/Rocky Outcrop Herbland Mosaic	3.2ha on the summit of Hanging Rock	Vulnerable
Herb-rich Foothill Forest	>1,600ha on slopes and the surrounding land to east and west, including the racetrack and the bulk of the eastern paddock	Depleted
Plains Grassy Woodland	Land to the north	Endangered
Swampy Riparian Woodland	Land to the south	Endangered

The threat of extinction categories in Victoria are (Endangered>Vulnerable>Depleted>Least concern). Under Victoria's Native Vegetation Management – a framework for action (2002) policy, the endangered category meant that virtually any remnant native vegetation was considered to be of very high significance and therefore most unlikely to have proposals for clearing granted a permit. 'Significance' = conservation value. The recent revisions to Victorian native vegetation policy by the Baillieu/Napthine government have changed this, and whether this still holds is not certain.

Although also mapped as Herb-rich Foothill Forest, the few remnants of native vegetation of the flatter land surrounding the Rock is clearly different from that on the slopes of the Rock. It has more affinities with woodland vegetation.

Plains Grassy Woodland is considered part of the nationally critically endangered White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland community (Environment Protection and Biodiversity Conservation Act 1999). The Plains Grassy Woodland area north of Hanging Rock is at the extreme southern end of the range of the national community within the Murray Darling Basin. To qualify as the national community, the original native vegetation would have to have been dominated by Yellow Box. Also, the nationally recognised community only applies to remnants retaining substantial ground flora. The land mapped as PGW north of Hanging Rock is heavily cleared and intensively used for agriculture and so is extremely unlikely to retain much native ground flora vegetation.

The remnant native vegetation within the race track is in surprisingly good condition, retaining substantial coverage and diversity of native ground flora, including Kangaroo Grass, perhaps indicating more of a grassy ecosystem rather than Herb-rich Foothill Forest. Whether it constitutes a patch of the nationally critically endangered community is uncertain, but diverse woodland ground flora in good condition is extremely rare. Hence it is an irreplaceable and therefore priceless remnant that deserves preservation and conservation management.

The majority of the 'Eastern Paddock' has lost all native vegetation due to past clearing and agricultural use. There are some small scale plantings of indigenous species, mostly in the southern Swampy Riparian Woodland section which is also the section most likely to retain some native plant species.

The value of the Eastern Paddock to nature conservation is its capacity to buffer Hanging Rock from the impacts of more intensive land use and its potential to become an area of additional habitat, given a substantial revegetation program. At present the northern part of the paddock is used occasionally for car parking. Revegetation and car parking can coexist and in summer, car owners would appreciate the shade.

The proposal for a 'hotel' in the paddock would establish a much more intensive land use and would permanently preclude the building's footprint area from revegetation opportunities. If very sensitively done, design and landscaping plantings could improve the habitat values over what at the moment, as a weedy paddock, provides very few habitat resources or nature conservation values.

Under the previous native vegetation regulations the proposal for cabins amongst the endangered Swampy Riparian Woodland remnants would probably never be permitted as this vegetation would be considered highly significant.

Hanging Rock: An important stepping-stone for landscape-scale conservation

Dr. Sophie Bickford

In Australia, as in the rest of the world, there has been a significant shift in the approach to nature conservation, in response to the limitations of conservation efforts to date, and the enormity of the challenge, given the scale of the current biodiversity extinction crisis and the potential synergistic impacts of climate change.

The shift has been from focusing primarily on protecting a series of often isolated reserves, to 'connectivity conservation'. Connectivity conservation is a 'whole of system' approach to conservation that aims to functionally link and buffer core protected areas in ways that maintain ecosystem processes and allow species to survive and move, ensuring that populations are viable and that ecosystems are able to adapt to land transformation and climate change.

Connectivity conservation is now formally recognised in Australia as being an essential contribution to the conservation of biodiversity with the federal government releasing the *National Wildlife Corridors Plan* (DSEWPC 2012). The Plan recognises that in Australia, a continent characterised by 'boom and bust cycles' of biological productivity large national corridors are needed to retain biodiversity.

One of the largest and most significant continental-scale corridors being established is the Great Eastern Ranges Initiative, extending along the eastern seaboard of Australia from the Grampians in Victoria, to the Atherton Tablelands and beyond in Far North Queensland. This range contains a very great proportion of Australia's biodiversity.

Hanging Rock is an important area of remnant habitat in this significant national corridor. While the Rock in itself is not large in area, it is an important stepping-stone, between the Cobaw Ranges and Macedon Ranges Park. Re-establishing large-scale connectivity is a process of first protecting what remnants are left, enhancing the viability of those remnants by establishing buffers around them and then re-establishing functional connectivity between larger protected areas in the landscape.

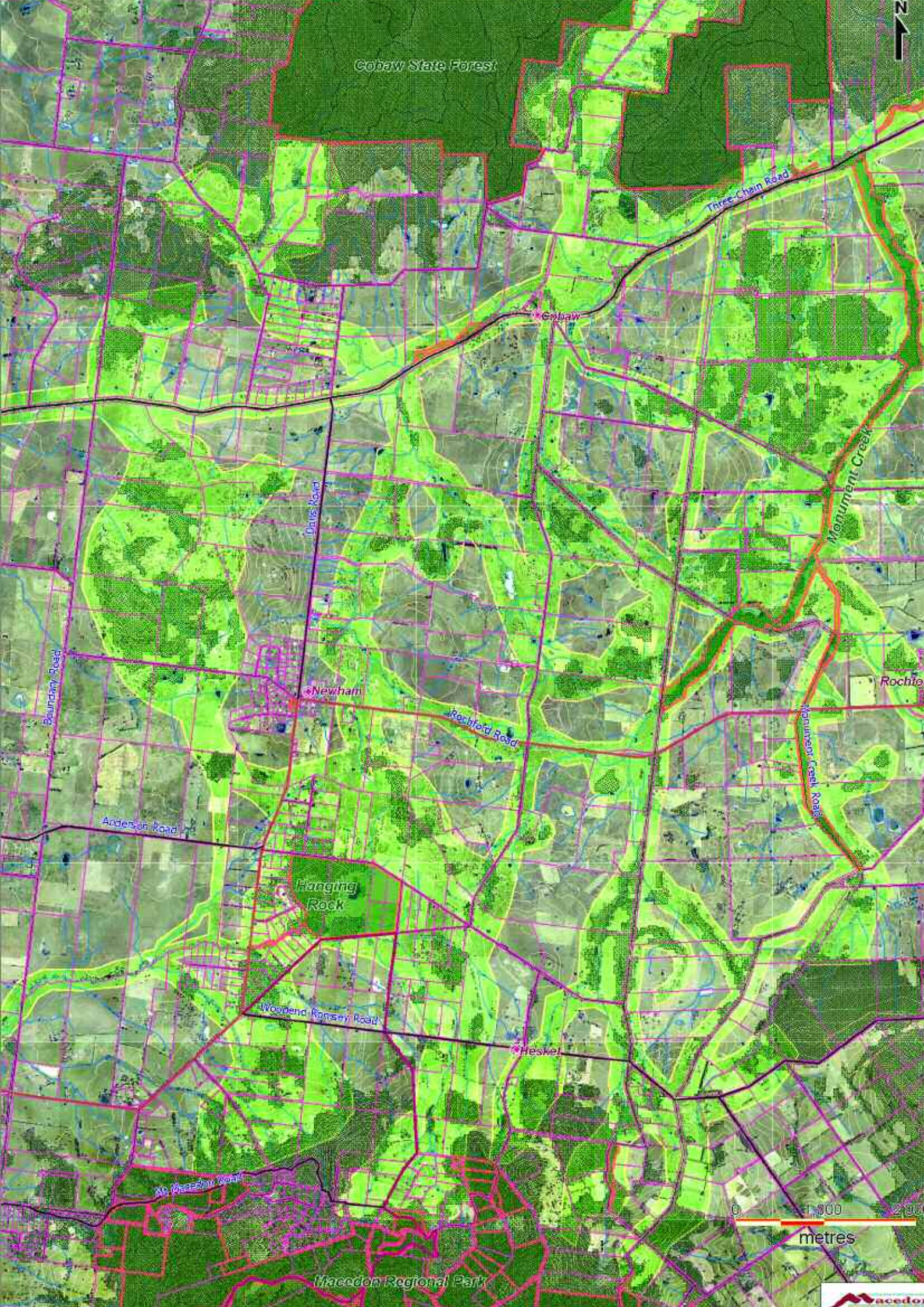
The high significance of these southern Australian highland areas is becoming more apparent as scientists are considering the impacts of climate change on biodiversity. Recent modelling is showing that the higher-elevation areas of Victoria will be very important climate refuges for species (Reside *et al*., 2013). This highlights the added importance of managing these landscapes for their ecological values and enhancing landscape connectivity, so species can move to these refugial areas.

Another great difference between connectivity conservation and earlier approaches to conservation is that it gives much higher prominance to the way people are connected to natural and semi-natural corridor lands. Re-establishing connectivity will necessarily involve community driven conservation actions on private and public land. It will need more people to understand that they can (and need to) play a role in securing the future of biodiversity for future generations.

Newham Landcare's biolink project is an exemplary community driven project that, with the profile and pulling power of Hanging Rock, can be used to inspire others to be a part of this important movement – whose challenge is getting the community to connect to nature and feel empowered to act on its behalf.

National Wildlife Corridors Plan 2012
http://www.environment.gov.au/topics/biodiversity/biodiversity-conservation/wildlife-corridors

Reside *et al*. (2013) Climate change refugia for terrestrial biodiversity; Defining areas that promote species persistence and ecosystem resilience in the face of global climate change. National Climate Change Adaptation Research Facility. Gold Coast pp216.


Cobaw State Forest
Three Chain Road
Cobaw
Monument Creek
Davis Road
Boundary Road
Newham
Rochford Road
Monument Creek Road
Anderson Road
Hanging Rock
Woodend-Ramsay Road
Heskel
Mt Macedon Road
Macedon Regional Park
0
1,000
metres

Riparian planting

Two years ago the Landcare group adopted the Western section of Smokers Creek, in Hanging Rock Reserve. Nick Massie obtained funding through Communities for Nature grants in two successive years, meaning a contractor could be engaged to do the unpleasant woody weed management (think blackberry thickets, broom, holly and laurels) and the planting was left for the volunteers. Over a two year period 2,500 indigenous native tubestock have been planted in the riparian zone, almost all of them understorey or ground level plants as the canopy is established along this section of the creek. The Nickson and Roberts households provided wwoofer volunteers in early Spring 2013 for follow up sessions hand-weeding around plants and pulling blackberry seedlings.

Riparian planting is important – clumping plants filter water running off adjacent areas, plant roots stabilize the banks of the creek and protect them in times of flood. Well vegetated stream banks are more resistant to under-cutting and slumping. Riparian lands act as wildlife corridors, as well as being vital refuges for animals in times of drought or fire and becoming reservoirs from which species can move out and recolonize adjacent areas when better times return. Components of habitat that are important include food, water, shelter from predators and from harsh physical conditions and safe sites for nesting.

Vegetation also plays an important role in stream ecosystems and healthy riparian ecosystems provide a range of benefits – including improved water quality, improved biodiversity, reduced risk of algal outbreaks, retention of nutrients on the land, carbon sequestration as well as aesthetic improvements. If all that still doesn't have you rushing off to spend time in your riparian zone, consider anecdotal evidence from Real Estate agents (Upper Maribyrnong catchment area) which suggests that a well managed riparian frontage can add up to 10% to the market value of a rural property.

Given the inappropriate sub-division to the West of Hanging Rock (dating from the 1960s), and relatively small size of allotments to the North, the riparian zone of Smokers Creek provides the logical link between Hanging Rock Reserve and the extensive remnant vegetation on Mt Macedon to the South. The connection to Cobaw State Forest to the North will be made through riparian plantings downstream along Five Mile Creek and then via corridors up and over the high ground of the Jim Jim that have been established over the last 8 years. These plantings are a long way from maturity but are on their way, and the addition of nesting boxes could dramatically improve the habitat provided in the years before tree maturation.

Each year we plan to revisit the planted sections, completing any necessary maintenance, and then extend the planted area. Ultimately these areas will be self-sustaining and the weeds a rapidly diminishing problem as the ground and understorey layers of native vegetation become established – leaving us free to enjoy them at leisure!

Preliminary assessment of 'grassland' area within the Hanging Rock Racecourse – Hanging Rock Community Recreation Reserve

Report for Newham Landcare Group, 10/11/13

Paul Foreman, Consultant Botanist and Ecologist, Blue Devil Consulting, Castlemaine

The 'grassland' area in question occupies the northern half of the central part of the Hanging Rock Racecourse (in the eastern half of the reserve) immediately to the north and east of a large dam and covers a total area of ~7 ha. It occurs on a flat to gently undulating and sloping newer volcanic lava plain at the foot of Hanging Rock merging (downslope) into lower-lying dissected colluvium associated with Smokers Creek that is subject to seasonal inundation and water logging. A large dam now blocks the course of a minor drainage line (now channelized) running through the eastern margin of the 'grassland' area which originally emptied into Smoker Creek immediately to the south of the racecourse, but north of South Rock Road (Figure 2).

The area supports scattered very large old trees (LOTs) including: River Red-gum; Swamp Gum; Snow Gum; Narrow-leaf Peppermint; Candlebark; and Manna Gum (*Eucalyptus camaldulensis, E. ovata, E. pauciflora, E. radiata, E. rubida,* and *E. viminalis*) at a density of ~2/ha. The Swamp Gum was mostly observed in the minor channelized drainage line and the Red Gum, close to the dam. It is unclear if the Red Gum is a remnant of the original spring soak or has invaded in more recent times following construction of the dam. There are also scattered taller shrubs (esp. Silver Wattle and Blackwood - *Acacia dealbata* and *A. melanoxylon*) and relatively young patches of canopy regrowth close to the LOTs (Figure 1).

The Newham Parish Plan 1867 indicates a 'spring' just to the west of the dam that may indicate this area was once a natural spring soak supporting groundwater dependent vegetation. And the Newham Parish Plan 1857 indicates that area along Smokers Creek (both the dissected colluvium and the adjoining volcanic plain) was "*Thickly grassed, moderately timbered land*" suggesting the vegetation at this time may have been some form of grassy woodland presumably dominated by at least some of the canopy species present today. The abundance of remnant eucalypts on similar landsystems throughout the surrounding region plus the likelihood that Aboriginal people used fire to maintain an open grassy structure, suggests the treeless sections of this area is a disclimax grassland (i.e. the original tree cover has been reduced or removed, but otherwise the ground layer retains at least some aspects of its original characteristics). The fact that the better quality patches of ground layer typically occur under and around the LOTs and surrounding regrowth, is further evidence for this conclusion.

Figure 1a: Snow gum (*Eucalyptus pauciflora*) and regrowth

Figure 1b: Australian Buttercup (*Ranunculus lappaceus*) interspersed with Sweet Vernal-grass (**Anthoxanthum odoratum*),

A preliminary botanical assessment suggests the 'grassland' area overall still supports a reasonable diversity of indigenous plants and pockets of relatively species rich remnant grassy vegetation. Nearly 100 species were recorded in about an hour and half search time, including 57 indigenous species. There is no question with further survey more indigenous species will be identified, potentially including formally recognised rare or threatened species.

The more diverse and often abundant life-forms recorded were perennial tussock-grasses (esp. *Poa* spp. and *Rytidosperma* spp.), sedges (*Carex* spp. *Schoenus* spp. and *Isolepis* spp.), rushes (*Juncus* spp.) and perennial native forbs and geophytes including Australian Buttercup (*Ranunculus lappaceus*) and Bulbine Lily (*Bulbine bulbosa*) (Table 1).

A diversity and abundance of exotic species, however, was also high and often dominant especially in the open areas away from the LOTs or close to the margins of the racetrack or other infrastructure. These include serious weeds like: Sheep Sorrel (**Acetosella vulgaris*), Brown-top Bent (**Agrostis capillaris*), Sweet Vernal-grass (**Anthoxanthum odoratum*), Hawthorn (**Crataegus monogyna*), Kikuyu (**Pennisetum clandestinum*), Sweet Briar (**Rosa rubiginosa*), and Blackberry (**Rubus fruticosus* spp. agg.) (Table 1).

Despite the racecourse grassland's modified condition, it is very likely a rarity on the same and similar landsystems throughout the region and as such represents a site of some (at least) local or regional significance. A remnant of this size and diversity with these canopy species on volcanic plains anywhere in the central highlands is important and worthy of formal recognition and protection, as well as ongoing conservation management and restoration. Clearly there are grounds not just for further assessment but also, given the status of the land, a case for developing an appropriate conservation management plan.

Unfortunately, the Ecological Vegetation Class data available through DEPI is of little use for this site as it is either too generic and/or quite inaccurate. Certainly the mapped unit Herb rich Foothill Forest (EVC 23) isn't correct, and while Plains Grassy Woodland (EVC 55) (mapped across similar volcanic plains just to north of the reserve) still isn't a very good floristic match according to the benchmark, it equates well from a biophysical perspective and its "endangered" conservation status would seem appropriate for the racecourse 'grassland'. Currently the area is seriously impacted by a variety of exotic plants and quite heavily grazed by macropods.

Recommendations

Clearly the racecourse is a significant area of remnant vegetation and habitat worthy of closer assessment, recognition and appropriate conservation and restoration management.

The following next steps are recommended:

- Detailed flora survey and condition mapping of the racecourse 'grassland' (including the dam – possibly located near a former natural spring) and comparison with: (1) lower slope vegetation at the base of Hanging Rock elsewhere on the reserve, and (2) the type, condition and extent of similar vegetation within the region, especially on volcanic plains; and
- Assessment of conservation risks and opportunities, and the development of a conservation/restoration management plan.

SCIENTIFIC NAME	COMMON NAME	ORIGIN
Acetosella vulgaris	Sheep Sorrel	*
Agrostis capillaris	Brown-top Bent	*
Aira cupaniana	Quicksilver Grass	*
Aira elegantissima	Delicate Hair-grass	*
Anthoxanthum odoratum	Sweet Vernal-grass	*
Briza maxima	Large Quaking-grass	*
Briza minor	Lesser Quaking-grass	*
Bromus diandrus	Great Brome	*
Bromus hordeaceus subsp. hordeaceus	Soft Brome	*
Cerastium glomeratum s.l.	Common Mouse ear Chickweed	*
Cirsium vulgare	Spear Thistle	*
Crataegus monogyna	Hawthorn	*
Festuca arundinacea	Tall Fescue	*
Holcus lanatus	Yorkshire Fog	*
Hypochaeris glabra	Smooth Cat's-ear	*
Hypochaeris radicata	Flatweed	*
Isolepis levynsiana	Tiny Flat-sedge	*
Juncus capitatus	Capitate Rush	*
Lathyrus spp.	Pea	*
Leontodon taraxacoides subsp. taraxacoides	Hairy Hawkbit	*
Moenchia erecta	Erect Chickweed	*
Myosotis discolor	Yellow-and-blue Forget-me-not	*
Pennisetum clandestinum	Kikuyu	*
Plantago lanceolata	Ribwort	*
Poa annua	Annual Meadow-grass	*
Poa pratensis	Kentucky Blue-grass	*
Romulea rosea	Onion Grass	*
Rosa rubiginosa	Sweet Briar	*
Rubus fruticosus spp. agg.	Blackberry	*
Rumex spp. (naturalised)	Dock (naturalised)	*
Sonchus asper s.l.	Rough Sow-thistle	*
Taraxacum officinale spp. agg.	Garden Dandelion	*
Trifolium dubium	Suckling Clover	*
Trifolium repens var. repens	White Clover	*
Trifolium subterraneum	Subterranean Clover	*
Vicia sativa	Common Vetch	*
Vulpia muralis	Wall Fescue	*
Acacia dealbata	Silver Wattle	
Acacia melanoxylon	Blackwood	
Acaena echinata	Sheep's Burr	
Acaena novae-zelandiae	Bidgee-widgee	
Anthosachne scabra s.l.	Common Wheat grass	
Arthropodium strictum s.l.	Chocolate Lily	
Asperula scoparia subsp. scoparia	Prickly Woodruff	
Bulbine bulbosa	Bulbine Lily	
Carex inversa	Knob Sedge	
Carex iynx	Tussock Sedge	
Carex polyantha	River Sedge	
Carex spp.	Sedge	
Cyperus lucidus	Leafy Flat-sedge	
Dillwynia cinerascens s.l.	Grey Parrot-pea	
Drosera peltata subsp. auriculata	Tall Sundew	
Eucalyptus camaldulensis	River Red gum	
Eucalyptus ovata	Swamp Gum	
Eucalyptus pauciflora	Snow Gum	

Table 1: Species list from preliminary botanical assessment of grassland area at Hanging Rock Racecourse.

Eucalyptus radiata s.l. Eucalyptus rubida	Narrow-leaf Peppermint Candlebark	
Eucalyptus viminalis	Manna Gum	
Geranium sp. 2 Geranium spp.	Variable Crane's-bill Crane's Bill	
Gonocarpus humilis	Shade Raspwort	
Haloragis heterophylla Hydrocotyle laxiflora	Varied Raspwort Stinking Pennywort	
Hypericum gramineum	Small St John's Wort	
Isolepis cernua	Nodding Club-sedge	
Isolepis hookeriana	Grassy Club-sedge	
Juncus bufonius Juncus holoschoenus	Toad Rush Joint-leaf Rush	
Juncus spp	Rush	
Juncus subsecundus Lomandra filiformis	Finger Rush Wattle Mat-rush	
Luzula meridionalis var. densiflora	Common Woodrush	
Lythrum hyssopifolia Microlaena stipoides var. stipoides	Small Loosestrife Weeping Grass	
Oxalis perennans	Grassland Wood-sorrel	
Pimelea humilis Plantago varia	Common Rice-flower Variable Plantain	
Poa labillardieri var. labillardieri	Common Tussock grass	
Poa morrisii Poa sieberiana var. sieberiana	Soft Tussock-grass Grey Tussock-grass	
Poranthera microphylla s.l.	Small Poranthera	
Ranunculus lappaceus	Australian Buttercup	
Ranunculus spp.	Buttercup	
Rytidosperma geniculatum Rytidosperma laeve Rytidosperma spp	Kneed Wallaby grass Smooth Wallaby-grass Wallaby Grass	
Schoenus apogon Schoenus maschalinus	Common Bog-sedge Leafy Bog-sedge	
Senecio spp.	Groundsel	
Solanum laciniatum Solenogyne gunnii	Large Kangaroo Apple Hairy Solenogyne	
Thelymitra spp.	Sun Orchid	
Themeda triandra Veronica gracilis	Kangaroo Grass Slender Speedwell	

Table 1: Species list from preliminary botanical assessment of grassland area at Hanging Rock Racecourse.

Figure 2: Eastern half of Hanging Rock reserve showing the racecourse 'grassland' area within the track and to the north and east of the large central dam.