Black Mountain flora boring? *Never!*

Text and photos by Rosemary Purdie

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Further information

For more information about Friends of Black Mountain, what it has to offer and what you can do to help protect and restore this valuable area:

- **Visit our website:** www.molonglocatchment.org.au/friends_of_black_mountain.htm
- **Email** friendsofblackmountain@gmail.com
- **Write to:** Friends of Black Mountain**,** GPO Box 1777, Canberra City ACT 2601

More information about ParkCare, Canberra Nature Park, and Black Mountain is also at: www.tams.act.gov.au

ACT Government

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Background

Black Mountain is located just west of the Civic Centre in Canberra, and forms a prominent local landmark topped by the Telstra Tower. Part of Canberra Nature Park, the Black Mountain reserve is bounded by highways on the north, west and south sides, and abuts the Australian National Botanic Gardens (ANBG) and CSIRO on its eastern lower slopes. The northern and southern annexes of ANBG together with uncultivated buffer areas adjacent to the Gardens' southern and western boundaries complement the native vegetation within the reserve, and with the latter, cover an area of about 5 km^2.

The highest point on Black Mountain is 812 m above sea level (asl). It drops to around 625 m asl on the north side of the reserve and 560 m asl on the south side. The mountain itself is characterised by steep western and southern slopes, and distinct north and south facing aspects on either side of gullies on the eastern side. To the north-east, Little Black Mountain forms a minor peak 722 m high. Most of the remaining northern parts of the reserve are gentle slopes and undulating topography.

Geology

Black Mountain and Little Black Mountain are comprised predominantly of Black Mountain Sandstone, a quartz sandstone deposited 435–430 million years ago (Ma) in a marine environment. Outcrops of it are especially prominent on the steep slopes of Black Mountain. Shale and siltstone from State Circle Shale (formed c 435 Ma) occur in the south-eastern part of the reserve, and in a narrow south-west / north-east oriented band to the north-west of Black Mountain and Little Black Mountain. The western and northern areas of the reserve are predominantly sandstone, siltstone and shale from the Pittman Formation, deposited 460–445 Ma in a deep marine environment (Abel 2007; Finlayson 2008).

The lower eastern and western slopes of Black Mountain exhibit 2–3 million year old erosional features such as frost-shattered rock accumulations which have formed alluvial fans with deep conglomerate (Finlayson 2008). A feature of these fans is small caves eroded out of the conglomerate in deeply incised creek lines. Distinct scree slopes are also present on the southern steep lower slopes of the mountain.

Dry sclerophyll forest

Vegetation

In the early days of Canberra's settlement, many parts of Black Mountain were a major source of firewood, and gentler slopes on the south-west were partly cleared for grazing. Photos of the south-eastern slopes of the mountain dating from around 1870 and 1920 show much of these slopes to be open grassy or lightly timbered areas. They contrast with current photos of the same area, in which most of the slopes are densely covered in trees. The forest vegetation seen today is thus the result of decades of disturbance followed by natural regeneration.

Apart from two small areas of grassy woodland and grassland derived from it, the majority of the Black Mountain area is covered by dry sclerophyll forest (often also called low open forest).

Dry sclerophyll forest

The dry sclerophyll forest is dominated by a mixture of Red Stringybark (*Eucalyptus macrorhyncha*), Scribbly Gum (*E. rossii*) and Brittle Gum (*E. mannifera*) trees. Although these three species occur in mixed stands, Red Stringybark tends to be more frequent on the cooler, moister southern slopes, while the two gums predominate on the exposed, drier western slopes. Scattered trees of

Eucalyptus mannifera

Broad-leaved Peppermint (*E. dives*) and Red Box (*E. polyanthemos*) are often present with the stringybark and gums, and in some north-facing areas Red Box forms almost pure stands. Three other tree species are often associated with the eucalypts. Native Cherry (*Exocarpos cupressiformis*) is frequently present as scattered individuals, while Hickory Wattle (*Acacia implexa*) often occurs on the southern

slopes. Scattered groves of Black Cypress Pine *(Callitris endlicheri)* are present in the northern half of the reserve, with isolated trees in southern areas.

The understory of the dry sclerophyll forest varies from being grassy with few shrubs, to having a variable and sometimes dense shrub layer. Long unburnt areas tend to be grassy with scattered shrubs, while shrubs often dominate in the first 10–15 years after fire (especially hot burns).

Red-anther Wallaby grass (*Rytidosperma pallidum*) is generally the dominant grass species, with Snowgrass (*Poa sieberiana*) more common on southern slopes. In some areas, graminoids (ie grass-like plants) replace grass species. They include Long-leaved Matrush (*Lomandra longifolia*) on lower western slopes and flats of Black Mountain, and Narrow Swordsedge (*Lepidosperma gunnii*) on some northern slopes of Little Black Mountain.

Common shrub species include Box-leaved Wattle (*Acacia buxifolia*), Early Wattle (*Acacia genistifolia*), Cauliflower Bush (*Cassinia longifolia*), Sifton Bush (*Cassinia quinquefaria*), Narrow-leaved Bitterpea (*Daviesia mimodoides*), Small-leaved Parrotpea (*Dillwynia phylicoides*), Hopbush (*Dodonaea viscosa* subsp. *cuneata* and subsp. *spatulata*), Mountain Grevillea (*Grevillea alpina*), Bushy Needlewood (*Hakea decurrens*), Burgan (*Kunzea ericoides*), Silver Teatree (*Leptospermum multicaule*), Prickly Broom Heath (*Monotoca scoparia*), Rigid Geebung (*Persoonia rigida*) and Heathy Bushpea (*Pultenaea procumbens*).

Lomandra longifolia

Daviesia mimodoides

Acacia genistifolia

Dodonaea viscosa

Monotoca scoparia

Hakea decurrens

Persoonia rigida

Pultenaea procumbens

The abundance of some shrub species is influenced by aspect, for example Cauliflower Bush, Sifton Bush and Burgan are most abundant on the southern slopes of Black Mountain, while the presence and abundance of many species often reflects past fire history. Most shrub species regenerate after fire through a combination of vegetative regrowth and seed germination.

However individual plants of Early Wattle, Hopbush, Small-leaved Parrotpea and Slender Riceflower *(Pimelea linifolia*) are killed by fire and post-fire regeneration relies on the germination of seed stored in the soil. Over time, these four fire-sensitive species can be eliminated from the vegetation if the time between successive fires is less than the time taken for the species' soil seed stores to be replenished. The germination of Hopbush seeds, and the seeds of acacias and pea-flowered plants (eg Bitterpea, Small-leaved Parrotpea and Heathy Bushpea) is stimulated by high intensity fires, and can lead to a very dense shrub layer. Frequent low intensity fires can result in a sparse shrub layer and favour ground species such as matrushes (*Lomandra* spp) and Spreading Flax Lily (*Dianella revoluta*).

Although the shrubs on Black Mountain tend to visually dominate the vegetation, especially in spring, a diverse array of forbs and subshrubs is also present, including at least 66 species of orchid. Species common during spring include Hornet Orchid (*Diuris sulphurea*), Wax-lipped Orchid (*Glossodia major*), Musky Caps (*Stegostyla moschata*), Ivy Goodenia (*Goodenia hederacea*), Common Raspwort (*Gonocarpus tatragynus*), Guineaflowers (*Hibbertia calycina*, *H. obtusifolia* and *H. riparia*), Thyme Spurge (*Phyllanthus hirtellus*) and Grass Triggerplant (*Stylidium graminifolium*).

Grassy woodland and derived grassland

Small areas of grassy open woodland, and grassland formed where the trees have been cleared through historical use, occur on the south-western lower slopes of Black

Goodenia hederacea

Hibbertia obtusifolia

Stegostyla moschata

Stylidium graminifolium

Mountain and the northern lower slopes of Little Black Mountain. The tree layer is dominated by Yellow Box (*Eucalyptus melliodora*), Apple Box (*E. bridgesiana*) and Blakeley's Red Gum (*E. blakelyi*), with Red Box (*E. polyanthemos*) and Broad-leaved Peppermint (*E. dives*) sometimes also present.

The ground layer has a high species diversity and includes many orchids and forbs with underground organs such as rhizomes, bulbs, corms and tubers that help the plants survive in dry conditions. Prominent herbaceous species that are widespread in this vegetation include Nodding

Chrysocephalum semipapposum

Microseris lanceolata

Thysanotus tuberosus

Chocolate Lily (*Arthropodium fimbriatum*), Bulbine Lily (*Bulbine bulbosa*), Clustered Everlasting (*Chrysocephalum semipapposum*), Australian Bindweed (*Convolvulus angustissima*), Cut-leaved Goodenia (*Goodenia pinnatifida*), Scaly Buttons (*Leptorhynchos squamatus*), Fringed Lily (*Thysanotus tuberosus*), Yellow Rush Lily (*Trichoryne elatior*) and Common Sunray (*Triptilodiscus pygmaeus*). Uncommon species include Lanky Buttons (*Leptorhynchus elongatus*), Wild Flax (*Linum marginale*) and the Yam Daisy (*Microseris lanceolata*).

How well known is the Black Mountain flora?

Based on the records of the Australian National Herbarium (ANH), which includes the collections of the former separate ANBG and CSIRO herbaria, approximately 4000 specimens of flowering plants have been collected on Black Mountain since the earliest record in 1931. This is a very high number for an area only 5 km^2 in size, and undoubtedly reflects the location of the herbaria on the eastern foot slopes of the mountain. Collecting effort since 1931 has been very variable, with peaks of 150 specimens or more collected in

1949, 1960, 1964, 1969, 1975, and 2014. Staff from ANBG, CSIRO and ANH are responsible for at least 75% of the collections. Major collectors to March 2015 include Roy Pullen (569 specimens from 1960–1983), Max Gray (320 specimens from 1962–1994), Hugh McKee (302 specimens from 1960–1964), Rosemary Purdie (294 specimens from 2006–2015) and Erwin Gauba (290 specimens from 1949–1956).

A total of 683 species has been recorded to March 2015, including those indigenous to the mountain, native weeds (ie native Australian plants not occurring naturally there that have become naturalised), and exotic weed species (see Table 1). This total excludes native species within ANBG and its two annexes that have naturalised from cultivated plants, and native species used for landscaping associated with Black Mountain reserve that have not naturalised.

Table 1. Number of plant species recorded on Black Mountain

Plant group	No. of species
Ferns	18
Gymnosperms	4
Monocotyledons	230
Dicotyledons	431
Total	**683**
Indigenous to BM (%)	406 (59%)
Total not indigenous (%)	277 (41%)
• Native weeds	38
• Exotic weeds	239

Trees comprise about 5% of the flora, shrubs and subshrubs about 20% of the flora, and herbaceous plants (forbs, grasses and graminoids) almost 75% of species (see Table 2).

Table 2. Life form of plant species on Black Mountain

	No. of species		
Life form	**Non-native**	**Native**	**Total**
Tree	15	18	33 (4.8%)
Shrub/ subshrub	50	83	133 (19.5%)
Mistletoe	0	4	4 (0.6%)
Climber/ twiner	4	4	8 (1.2%)
Forb	140	135	275 (40.3%)
Grass	61	52	113 (16.5%)
Graminoid (grass-like)	7	110	117 (17.1%)
Total	**277**	**406**	**683 (100%)**

How important is the Black Mountain flora?

In 2014 ACT Government ecologists prepared a list of rare plant species present in Canberra Nature Park (CNP). When compared with other CNP component areas, the report said:

> "Black Mountain … stands out as a particularly important rare plant habitat. It supports many plant species with disjunct locations in the ACT; it is the only known location within the ACT of at least

> eight plant species and is an ACT stronghold for many other rare plants, and overall contains a very high diversity of rare plant species" (Mulvaney 2014, page 7)

The rare species listed for Black Mountain included eight orchids for which the Mountain is their only known habitat; one species for which Black Mountain is its ACT stronghold; 20 species (including 16 orchids) rare in the ACT with significant populations on Black Mountain; and the habitat of seven other rare species.

In addition, 14 species known from five or fewer locations in the ACT that had not been collected in the Territory for 30 years or more had also been recorded from Black Mountain. Four of these species — *Centrolepis strigosa*, *Stylidium despectum*, *Hypoxis hygrometrica* and *Pellaea falcate* — were re-located in Black Mountain reserve in late 2014/early 2015. The first two species there are now known to occur in restricted habitats where they are abundant after the right environmental conditions.

Enigmatic plants on Black Mountain

The presence and distribution of some plants on Black Mountain is puzzling, as illustrated by the following examples.

Wire Lily (*Laxmannia gracilis*)

The Wire Lily is one of many rare species in the ACT. Two herbarium specimens of it had been collected

Stylidium despectum

in the Black Mountain area in the early 1960s, one from the adjacent suburb of O'Connor in 1960, and the other at the north-eastern base of the mountain in 1962. It was not recollected until 2011, when it was found in several locations on the north-east slopes of Little Black Mountain within and outside the reserve.

In 2015, it was also found growing in two separate areas on the western and south-western slopes of Black Mountain. Despite extensive searches, most of its known locations in the reserve are on road verges or only 1–2 metres away. This raises the question: is the species' distribution on Black Mountain natural, or have its seeds been spread at some stage by vehicles such as graders?

Einadia hastata

Saloop (*Einadia hastata*)

Saloop, another rare species in the ACT, was first collected there in 1949, from the Molonglo River. The first record on Black Mountain was a 1979 specimen from a plant cultivated in ANBG, with the herbarium label noting that the species was spreading. A subsequent ANBG collection in 2007 indicated it was continuing to spread there. Today the species is abundant in many parts of ANBG, usually in highly disturbed areas.

Outside the ANBG, it only occurs in the ANBG Southern Annex and on the upper slopes of a nearby ridge above the Gardens, again mostly in highly disturbed areas. It thus appears uncertain whether Saloop is indigenous to Black Mountain, or is a native weed there.

Rough Treefern *(Cyathea australis)* and **Rasp Fern** *(Doodia australis)*

Both these species are known from one location on the south-western upper slopes of Black Mountain, downslope of Black Mountain Drive. There are three plants of Rough Treefern (a rare ACT species), the tallest of which is about 2 m, and one plant of Rasp Fern. The location and habitat is much drier than other occurrences of the species in the Territory. The presence of both species in this location thus raises questions

like: are the species indigenous to Black Mountain? have they been dumped there from garden refuse at some time in the past? or have their spores been transported there from plants cultivated in ANBG?

Lacy Wedge Fern *(Lindsaea microphylla)*

In 2014 a solitary Lacy Wedge Fern plant was collected from a road cutting on the upper side of Black Mountain Drive. According to the online Flora of NSW, the species grows naturally in damp places in woodland, open forest and along rainforest margins in coastal regions of NSW. As the plant found on Black Mountain was growing in a man-made habitat, it is clearly not native to the ACT, but how did it get there? Were spores dispersed from a passing vehicle that had recently been to the coast, or have they been blown there from the ANBG where it has been cultivated in the Sydney Basin garden?

Conclusion

Black Mountain is an often undervalued 'jewel' in the ACT in terms of the plants that grow there. While we may never be able to resolve the questions about the enigmatic species, one thing is certain: Black Mountain's plants may look dull at some times of the year, but its flora is never boring.

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Acacia implexa