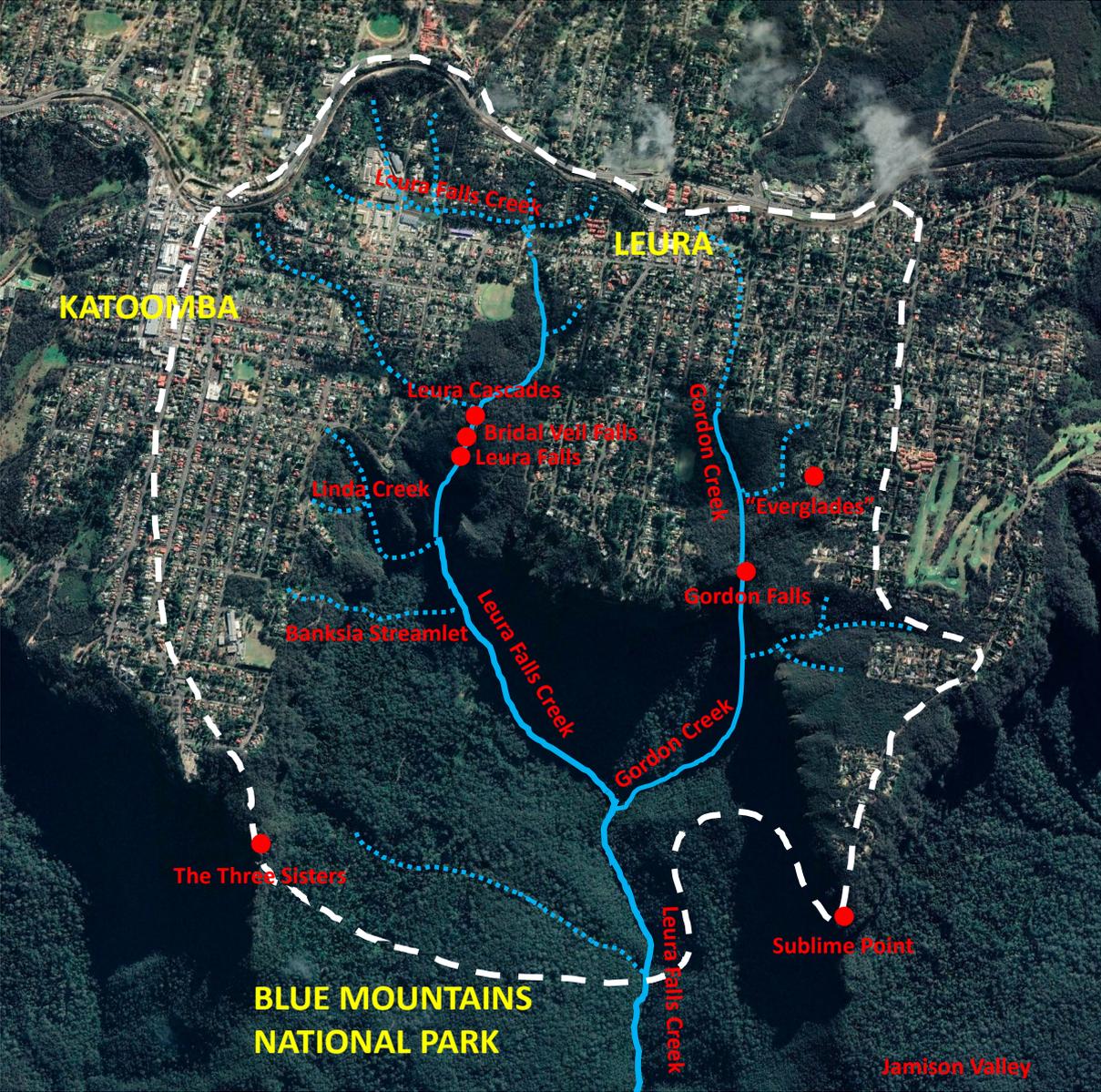


LEURA FALLS CREEK CATCHMENT GROUP STATUS REPORT 2021-22



Leura Falls Creek Catchment

Source: Google Earth Pro 2021 Image © 2021CNES/Airbus

The members of the Leura Falls Creek Catchment Group pay their respects to Traditional Owners and Custodians past, present and emerging.

Their continuous and deep connection to Country, and its great cultural significance to Indigenous Australians both locally and in the region are acknowledged.

We are mindful and respectful of the presence of cultural places and items within the catchment.

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INTRODUCTION

The Leura Falls Creek Catchment Group, formed in February 2012, is an independent environmental conservation planning and advocacy body comprised of local residents and bushcare volunteers who take an interest in the natural areas of the catchment.

The primary aim of the Catchment Group is to conserve the biodiversity of the catchment by protecting, monitoring and where necessary restoring the various indigenous vegetation communities. Accordingly, managing weeds, storm-water erosion and pollution are key concerns, as are their impacts on the World Heritage National Park and on threatened flora and fauna. The intention is to enhance the resilience of the natural areas, further enabling their ability to cope with locally arising degrading impacts and the challenging climate change outcomes generated by global warming.

The Catchment Group collaborates with Blue Mountains City Council (BMCC) environmental managers and NSW National Parks and Wildlife Service (NPWS) managers and other relevant decision-making bodies and organisations. It also appreciates the participation of the National Trust property “Everglades”.

The work undertaken by the Catchment Group reflects the importance of the catchment to local residents, the whole Blue Mountains community and visitors, and highlights the uniqueness of the catchment’s special environmental qualities: the beautiful streams, threatened species (including the Mountain Dwarf Pine and the Blue Mountains Skink) and threatened ecological communities (such as the Blue Mountains hanging swamps).

The group has been involved in DA processes that impact the catchment. They have also commented on BMCC and NPWS initiatives that have the potential to impact the catchment, such as the Great Blue Mountains Trail (a shared-use cycle track), and the Grand Clifftop Walk.

This report aims to succinctly document the diverse values of the catchment and to provide recommendations to the BMCC, NPWS and other key stakeholders on assessed priority areas for weed control and stormwater management. These recommendations are listed in the appendices to this report.

It is recognised that implementation of these recommendations is at the discretion of the relevant landowner/manager agency and will be subject to the availability of resources. Potentially some of the recommended actions can be implemented by the voluntary bushcare and landcare groups with the concurrence of the BMCC and/or NPWS – others may require grant funding in order to proceed.

MISSION STATEMENT

The Leura Falls Creek Catchment Group has the objective of improving the water quality and indigenous biodiversity of landscapes within these catchments. This will be achieved by working with the Blue Mountains City Council and National Parks and Wildlife Service, as well as other agencies and landholders as appropriate, to specifically address environmental issues identified by the group. Cooperation and collaboration with these stakeholders will enable the group to achieve outcomes that are beyond group resources.

The benefits to all stakeholders are a holistic appreciation of the issues and a collaborative approach to solutions. Each of the stakeholders has access to different knowledge and expertise. The community members of the group have a detailed and intimate knowledge of the catchment and access to the broader bush care community. While Council and Parks staff provide knowledge and expertise regarding policy and process.

It is recognised that each of the stakeholders may have different priorities. Differences will be dealt with respectfully to maintain a culture of cooperation.

Our aims are:

- to improve the health of the creeks
- to restore riparian habitats
- to protect broader natural areas in the catchment
- to protect and preserve existing natural ecosystems
- to raise awareness and educate people
- to get more people involved.

THE CATCHMENT

The Leura Falls Creek catchment is complex and often poorly understood.

At a highly simplistic level this catchment drains towards the south from the ridge that carries the Great Western Highway and Blue Mountains railway. A complex system of tiny and often unnamed creeks flow into two major creeks and cascade in waterfalls over the impressive sandstone escarpment into the Jamieson Valley. Below the escarpment they merge and flow into the Kedumba River which in turn flows into the Cox's River Arm of Warragamba Dam, the major water supply for Sydney.

Unlike most mountain communities around the world, this portion of the Blue Mountains is characterised by urban development centred around the ridges. This urban development has a significant impact upon the largely natural environments at lower altitudes.

The South Leura catchment contains areas of cultural and natural heritage and ecological significance including hanging swamps, waterfalls, Crown Reserves and National Park. It is highly urbanised with large areas of residential development, commercial centres (Leura Mall and Katoomba Street), resorts, light industrial, recreational areas, heritage gardens and high tourist visitation sites. The bushland and sedge swamp ecological communities influence the hydrology and water quality of the creeks and provide habitat for a diversity of flora and fauna including several species that are rare, vulnerable and endangered. The total area for the catchment is 447 hectares, with about 2,400 houses.

The catchment is characterised by moderate to steep slopes, and flow is conveyed via a mixture of natural channels, modified grass and concrete lined channels and culverts. These have a high percentage of impervious surfaces and there are several areas that are flood prone. Many of the creeks and streams run through properties or adjacent to them. As such many houses and buildings are located near to or on the overland flow path. The flood hazard levels are predominantly high due to the steep nature of the channels and streams and the high rate of rise of the flood waters.

Above the escarpment, the catchment incorporates two major creek systems, both which have a complex structure. To the west of the Leura Mall is **Leura Falls Creek** and its multiple small tributaries. Leura Falls Creek descends through Leura Cascades, and plunges over the escarpment at Bridal Veil Falls (the upper drop) and Leura Falls (the lower drop) into the Jamieson Valley and is then joined by Linda Creek and Banksia Streamlet.

To the east of the Leura Mall is **Gordon Creek** and its many small tributaries which descends through Lyre Bird Dell and the Pool of Siloam, before descending into the valley at Gordon Falls and subsequently joining Leura Falls Creek.

While both creeks have their headwaters in the townships of Katoomba and Leura, they flow into the Blue Mountains National Park. They are also located within a UNESCO World Heritage Area.

The primary focus of the Catchment Group is the land above the escarpment, the escarpment zone, and the land immediately below the escarpment to the point where Gordon Creek joins Leura Falls Creek.



South Leura Catchment 1966

Source: NSW Government Spatial Services © Department of Customer Service 2020 | Esri, HERE, Garmin, USGS, METI/NASA

INDIGENOUS VALUES

Australian First Nations communities have lived in the *Ngurra*, now referred to as the Blue Mountains, for many thousands of years. Lyre Bird Dell, Gordon Creek was one of many favoured dwelling places throughout this period. Archaeological evidence at Lyrebird Dell suggests that Aboriginal occupation of the region may date back more than 12,000 years, to a time when the climate was far more arid than it is now. Sadly, this early history is poorly researched and documented.

The Gully, at nearby Katoomba Falls Creek, Katoomba, was home to many individuals and families for decades until 1957, when dispossession was abruptly and brutally imposed. It remains a place of cultural significance for contemporary Blue Mountains Indigenous Australians.

For Gundungurra people, *Ngurra* takes in everything within the physical, cultural and spiritual landscape – landforms, waters, air, trees, rocks, plants, animals, foods, medicines, minerals, stories and special places. It includes cultural practice, kinship, knowledge, songs, stories and art, as well as spiritual beings, and people: past, present and future.

“In our earliest days, we were welcoming to strangers we regarded as friends and even built them yam beds and huts. However, things turned down south in 1811 when some of the Aborigines were driven away to complain about unpaid employment by the whites they worked for. This later degenerated to a full-blown war named “the frontier war.”

“It was a war of freedom against discrimination as well as slavery. Lands have always been important to the region’s inhabitants. When the European colonialists attempted to expand their territories and acquire large areas for themselves, the Gundungurra joined forces with her neighbours to fight such a form of colonisation.

“As fearless people, the native people were less scared of the Europeans using Guns on them but instead planned to attack them with spears while reloading their guns. Although many lives were lost, such wisdom is palpable and has never departed from the Gundungurra Tribe. Despite several attempts to destroy the whole community of people, the Gundungurra survived it all and has consistently lived as an organised social group and nation.

“Their foods are borne out of their interactions with nature. They usually caught animals and gather larvae on their way to Jenolan. However, the Gundungurra believe in maximum utilisation of their source of feeding resources and sustenance and, therefore, do not interfere in animal creatures’ growth or reproduction process. They maintain a suitable pattern that allows animals to breed and plants to grow.”

<https://gundungurra.org.au/gundungurra-tribe-history/>

The Leura Falls Creek Catchment is located within Gundungurra Country and is subject to the Gundungurra Indigenous Land Use Agreement (ILUA). This is a 10-year, legally binding agreement under the Native Title Act 1993 between the Gundungurra Traditional Owners and several land managers (including Blue Mountains City Council and the NSW Office of Environment and Heritage) of the Gundungurra Native Title Application Area.

Schedule A to the Gundungurra Indigenous Land Use Agreement: Agreement Area



- Gundungurra I.L.U.A.
- Hawkesbury River Basin
- Hawkesbury River Sub-Catchment Area
- Hawkesbury River Sub-Sub-Catchment Area

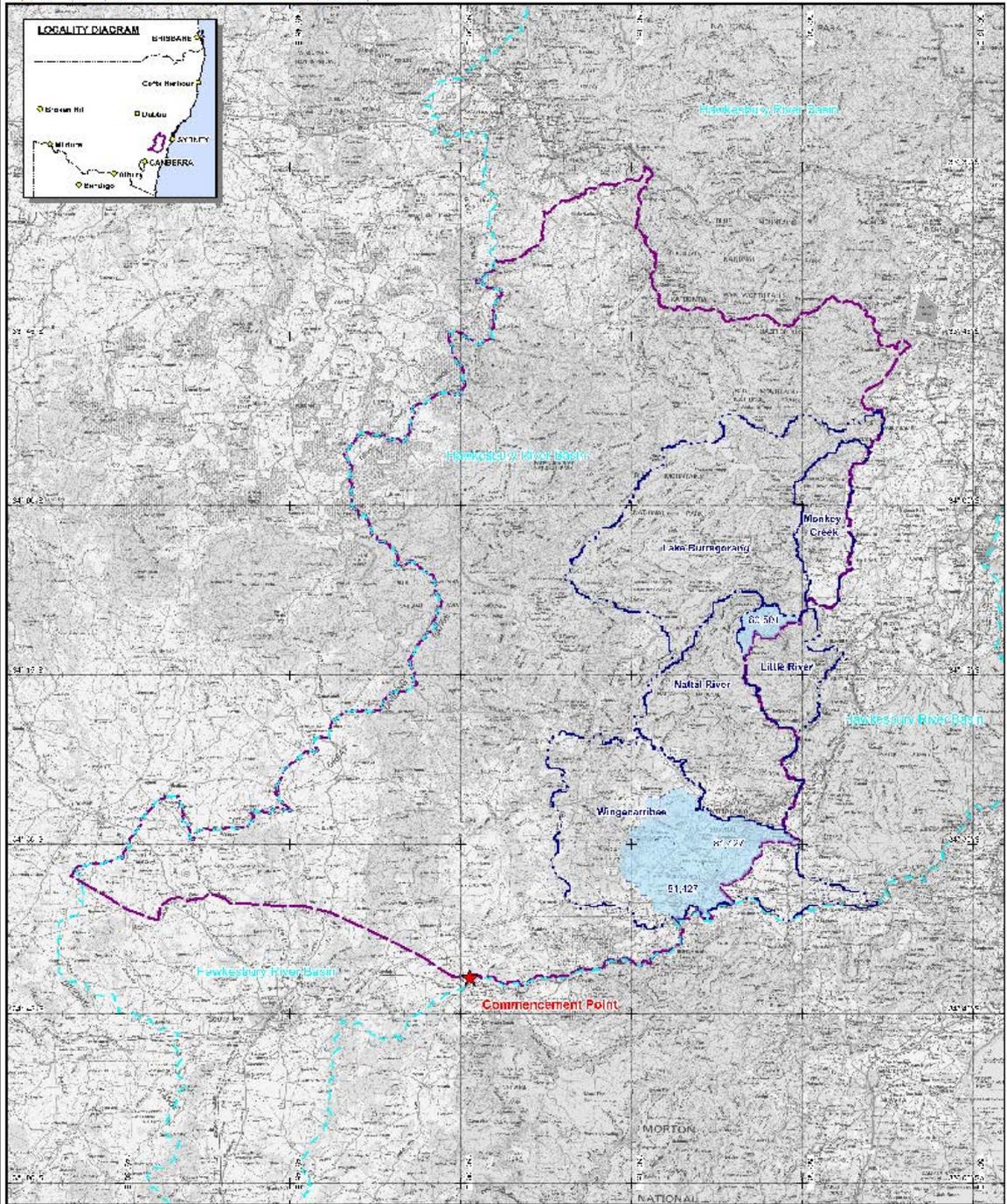


Agreement Area imagery data compiled by the NTA from databases of from 1983-1999.
 NSW Catchment data and sub-catchment area (threshold of 50 square kilometers) created by the Centre for Rivers and Environmental Studies Australia's River Basins 1997 data © Commonwealth of Australia (Geoscience Australia) 1997.
 Topographic image data is © Commonwealth of Australia and is used under license from Geoscience Australia, 2008.
 NNTA Topographic images should be used as a guide only.

KILIMBERRI
 0 15
 Kilometers
 UTM Zone 56 South
 Datum of Australia 1994
 See also
 NTA Summary of I.L.U.A. 2012

The Kingdom of the Netherlands hereby undertakes to all measures and actions that it deems suitable for the purpose of collecting the information necessary to carry out its obligations under the provisions of the Agreement concerning the use and management of the information provided. In doing so, the Kingdom of the Netherlands undertakes to ensure that the information is made available to the public in a timely and accessible manner. The Kingdom of the Netherlands also undertakes to ensure that the information is made available to the public in a timely and accessible manner.

Map created by Geospatial Services, National Native Title Tribunal (14/05/2013)



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 Map Ref: 2013514_NNTA2211_001_Schedule_A_A11.pdf

CONTEMPORARY HISTORY

The first European explorers entered the area in 1813, and the western road from Penrith to Bathurst opened in just two years later. Modest infrastructure developed along this road to support the thousands of travellers who passed to and from the west over the next 50 years.

When the western railway line was constructed across the Blue Mountains in 1867–68, the villages of Leura and Katoomba did not exist. The locality of present-day Katoomba was known as ‘The Crushers’, which was the name of the railway platform and nearby quarry established to supply rail track ballast. The first occupied structure in the locality now known as Leura was a gatehouse where the railway crossed the Western Road near the present Sorensen Bridge. The gatekeepers were the first permanent European residents of the area.

Towards the end of the 1870s this isolated mountain area began to change dramatically. The name ‘Katoomba’ was adopted in 1878. A group of prominent Europeans during a picnic at what is now called Katoomba Falls had asked a local Kanimbla Aboriginal woman what the place was called. She answered 'ka-toom-bah', translated as 'place of many waterfalls'. Recent research now suggests that this is the name for the edible blechnum fern root that was an important Aboriginal plant staple collected from the local valleys.

In 1878 a coal mine was opened at the base of the cliffs near Katoomba Falls and the small settlement of Katoomba began gaining a reputation as an important mining centre. Coal was also discovered in the Jamieson Valley below the present Leura golf course in the early 1880s. Significant infrastructure was constructed to transport the coal from these mines to new sidings on the railway. The Gladstone colliery at Leura closed in 1887, and by 1903 mining operations at Katoomba had ceased. Most of the mining infrastructure above the escarpment has disappeared.

The earliest appearance of the name ‘Leura’ was on a subdivision plan dated 1881, for land south of the railway line. Many theories have been advanced as to the origins of this name, including its derivation from an Aboriginal word, from the name of the daughter of an early landholder, and from the possible business connection of the landowner to a Queensland pastoral property of that name. Though recent research suggests this latter theory to be a strong possibility, the debate has not been settled.

Katoomba Municipal Council was established in 1879. It governed a socially divided community: at one extreme a roaring mining camp with slab and weatherboard cottages and hotels, cableways and horse drawn tramways stretching out into the Megalong and Jamison valleys, and at the other, a fashionable and wealthy resort hotel high on the hill of Katoomba Street.

The visitors of the 1880s and 1890s were primarily from the privileged classes who saw in the area, at just over 1,000 metres above sea level, something resembling an Indian hill station. They stayed in gracious comfort at stylish establishments like *The Great Western Hotel* (later the *Carrington*), the *Leura Coffee Palace* (later *The Ritz*), and the *Balmoral*. They sought the mysteries of nature among the cool fern walks and glens; they had money and leisure and the upper Blue Mountains offered both a retreat from the summer heat and dirt of the city, and relief from the pressures of the political and business world of Sydney.

Travellers on the Western Road availed themselves of more modest establishments such as the hotel, now the *Hotel Gearin*, first licensed in 1881.

By the end of the nineteenth century, economic and social changes were occurring in the wider Australian community which began to produce a more affluent and mobile middle class. Visitors whose preference was less palatial accommodation arrived, and the patronage of the rich and famous moved elsewhere. As the war clouds began to gather in Europe, Katoomba was entering its boom period and in the interwar optimism of the 1920s there were over 60 guesthouses operating in the town.

In 1905 the *Katoomba and Leura Tourist Association* was formed to promote both towns to the burgeoning tourism market. As in Katoomba, the number of small to medium guesthouses and holiday rentals increased along with an influx of more permanent residents. Lookouts and walking tracks around the town were promoted from the late 19th century and the *Gordon Falls Reserve* in became a popular picnic destination for visitors. After World War I a section of this reserve was set aside for a war memorial.

The advent of the motor car also revolutionised tourist activity, and tourist coach firms flourished with some guest houses even maintaining their own fleet. To the holiday makers and honeymooners who flocked there during the 1920s and 1930s, Katoomba was the holiday capital of the state.

In 1925 there was a revival of the abandoned coalmine below the cliffs at South Katoomba. A local syndicate was formed and resumed mining activities on a lease of 160 acres. Coal was sold on the local market, principally to the Katoomba Electric Powerhouse, and in smaller amounts to the hotels, guesthouses, and local residents.

During the 1930s Depression the local market was reduced, but despite its decreasing viability the mine continued to operate until World War II. However, as the company progressed toward liquidation, one aspect of its operation had a parallel rise in fortune and helped to augment the mine's declining income. The rehabilitation work carried out on the coal haulage system up the cliff face opposite Orphan Rock became part of the booming Katoomba tourist industry of the 1920s and 1930s, with the 'Mountain Devil' of the early 1930s eventually becoming the 'Scenic Railway' of today.

Leura's reputation as a 'garden village' was encouraged by the 1965 decision of the owners of several landscaped gardens on large landholdings to open their gardens once a year to raise funds for the local hospital. One of the main attractions was and is the famous 1930's 'Everglades' garden created for a Sydney businessman by his gardener Paul Sorensen.

By the 1960's and 1970's day trippers travelling by car or bus replaced the long stay tourists. With tourism the only industry, the local economy suffered as lower cost overseas travel become possible, and the popularity of the coast drew visitors away. The arrival of supermarkets forced many of the old-style shop keepers out of business, to be replaced by coffee shops, galleries and souvenir shops. The old hotels and guest houses gradually lost patronage and many fell into disrepair. Some were demolished, others were converted to nursing homes and hostels, and a few remain. Yet despite these changes, the economic and other benefits of preserving the extensive original building fabric of the area have finally been acknowledged.

BUSHWALKING

In addition to being a significant contributor to physical and mental health, bushwalking plays a significant role in engendering an appreciation of the natural environment. The development of the conservation movement in Australia was initially driven by bushwalkers in the Blue Mountains.

Bushwalking first developed as a popular activity in the upper Blue Mountains in the 1880s and played a key role in the early tourist industry, however the advent of the motor vehicle deflected interest away from the old walking tracks. During the years of the Great Depression the general decline in prosperity meant that the popularity of walking in the Blue Mountains revived. Hiking guides replaced motoring guides as sources of popular recreation and visitors to the Blue Mountains began to rediscover the bush.

In surveys recently undertaken by the BMCC during development of an Open Space Recreation Strategic Plan, it was confirmed that the three most favoured recreation activities for local residents were walking for exercise, hiking and bushwalking, and dog walking.

The earliest bushwalking tracks in the upper Blue Mountains were constructed by local inn keepers prior to 1832 at Wentworth Falls and Blackheath. However, most track development in the upper Blue Mountains occurred between 1885 and 1910, and during the depression in the 1930s.

The main bushwalking tracks within the South Leura Catchment are:

Tracks at Leura Cascades Reserve

A reserve at Leura Falls was gazetted in 1880. The track to Fossil Rock was constructed prior to 1882 with additional tracks constructed between 1889 and 1894. Floodlighting was installed on the track along Leura Cascades in 1932, four years earlier than the floodlighting at Katoomba Falls.

Federal Pass

A track to the middle levels was in place by 1889, and a picnic area was established at Leura Forest in 1893. There was concern around this time about the competition for tourists with the construction of a new track to the base of Govetts Leap at Blackheath. Attempts to get government funding to improve and extend these local tracks failed. The Federal Pass is the only known example in Australia of a regional walking track fully funded by local community subscription. The Federal Pass was opened in November 1900 by NSW Premier Lyne and named to commemorate the Federation of Australia due to occur in January 1901. It was upgraded in 1908.

Remnant tracks around Sublime Point.

Sublime Point lookout opened in 1894. A loop track was constructed between 1895 and 1909 by the local ranger. This track was affected by subdivision and construction of Sublime Point Road in 1914, leaving it in three fragments.

Track to Lyre Bird Dell

This track was constructed between 1894 and 1898 and reconstructed in 1919.

Dardanelles Pass

This track was constructed in 1915 and named in commemoration of the ANZACs at Gallipoli.

Tracks at Gordon Falls Reserve

Gordon Falls Reserve was proclaimed in December 1884 and gazetted for public recreation in March 1917. The earliest tracks were constructed between 1894 and 1898. The track from the reserve to the Pool of Siloam and Lyre Bird Dell track was constructed by Katoomba Council in 1932. The extension from the Pool of Siloam to Golf Course Lookout was constructed in the late 1930s.

Prince Henry Cliff Walk

This track was constructed in two stages in the mid-1930s and is named after Prince Henry, Duke of Gloucester who visited Katoomba railway station for 20 minutes in 1934. It was a response to attempts dating back to the 1890s to regain public access to the escarpment between the Scenic Railway and Gordon Falls Reserve. Some privately owned land was purchased or resumed to allow construction of the track. Management of this track is complicated because portions sit within the national park, and other portions are under the administration of the BMCC. This will be a major component of the new Grand Clifftop Walk.

Lindeman Pass

This adventurous track from the base of Roberts Pass to the base of the lower Leura Falls was constructed between 1909 and 1911, and partially renovated in 1934 as a depression unemployment relief project, and again in 1985. It was never officially opened.

The BMCC administers around 120km of bushwalking tracks, and the Blue Mountains NPWS is responsible for around 400km of tracks. Sadly, much of this network is currently in a degraded state, however the NPWS has recently been given substantial funding to upgrade existing tracks, and both organisations have funding for the Grand Clifftop Walk, a sizeable portion of which is within the South Leura catchment.

These tracks are important to the Catchment Group and the various Bushcare groups as they provide access for members to conduct their conservation activities. They are also a concern in that in a degraded condition they can exacerbate erosion.

GEOLOGY

The Blue Mountains is geomorphologically complex, with uplifts, igneous activity, erosion, sedimentary deposition and metamorphic changes. These have combined to produce an extraordinarily beautiful landscape well deserving its World Heritage listing.

The catchment is part of the Narrabeen group within the geological formation known as the Sydney Basin.

The lowest part of the geological structure in the catchments called the Caley Formation, which consists of alternate layers of sandstones and mudstones which have created a rubble-strewn slope down from the base of the sandstone escarpments to the creek line.

Above the Caley Formation are two imposing layers of sandstone – the Burra-Moko Head Sandstone, and above it the Banks Head sandstone. These are separated by a narrow belt of Mount York Claystone.

These sandstone layers present as the imposing cliffs for which the Blue Mountains are famed, with the Mount York claystone forming a narrow ledge which now hosts some of the more breathtaking bushwalking tracks. This formation also creates the wonderful two-step waterfalls for which the region is also famed.

The Banks Wall Sandstone is overlaid with the relatively thin Docker Head and Wentworth Falls Claystone Members near its top and is overlain with quartz lithic sandstones, laminates, and shales of the Burrell Formation.

The streams in the region tend to rise in wet heath or swamp on undulating sandstone plateaus and watersheds. The streams merge and descend to plunge over the cliff edges, often creating slot canyons. The altitude difference between the ridges and the deep valleys is hundreds of metres, so the erosion power of water in floods is very great.

This is a fragile landscape and is subject to regular landslides and landslips. In recent years this activity has resulted in closures of the Cliff Drive, Leura Cascades Reserve and sections of the Prince Henry Clifftop Walk.



Geological Map of the Blue Mountains, 1909
 Source: NSW Resources & Geoscience

FLORA

The Leura Falls catchment area is biodiverse, being home to many indigenous (also known as native) vegetation communities, including several eucalypt communities with numerous associated plant species.

***Eucalyptus sieberi* (Silvertop Ash) and *Eucalyptus piperita* (Sydney Peppermint) vegetation community.**

These are dominant tree species in a commonly encountered eucalypt vegetation community in the catchment. As part of this community, dense groves of *Allocasuarina littoralis* (Black She-oak) are often seen along cliff top edges, maybe hosting a family of feeding Glossy Black-Cockatoos (*Calyptorhynchus lathami*).

The eucalypt vegetation communities also feature an understorey of shrub species, and a layer of grasses, herbs and groundcovers. A classified 'Vulnerable' shrub of the eucalypt forests, *Persoonia acerosa* (Needle Geebung) grows in the National Park on the eastern ridges above Gordon Creek.

The Bushcare Officer and bushcarers of NPWS Prince Henry Cliff Walk Bushcare Group work to maintain the habitat of the Needle Geebung. Broom and weedy grasses are removed. *Pittosporum undulatum*, a Blue Mountains rainforest plant species, also colonises damp track edges and disturbed areas, and this behaviour poses an additional threat to the habitat of the Needle Geebung.

***Eucalyptus oreades* (Blue Mountains Ash) vegetation community.**

A tall, distinctive eucalypt, this tree often has long strands of peeling bark trailing down its predominantly white trunk (below). A botanical survey conducted along Leura Falls Creek in 2018 revealed the vegetation complexity of the *E. oreades* community there.

Pultenaea glabra (Smooth or Swamp Bush Pea) is another 'Vulnerable' species found in this vegetation community. The Bushcare Officer and bushcarers of Gordon Falls Reserve Bushcare Group and Prince Henry Cliff Walk Bushcare Group work to restore and maintain this species' natural habitat.

***Eucalyptus radiata* (Narrow-leaved Peppermint) vegetation community.**

The prolific understorey shrubs *Lambertia Formosa* (Mountain Devil) and *Persoonia mollis* (Soft Geebung) can be found throughout the catchment's forests.

Rainforest vegetation community

Growing in the sheltered valleys of the escarpment, the trees *Ceratopetalum apetalum* (Coachwood) and *Doryphora sassafras* (Sassafras) dominate the rainforest community. An understorey of ferns, for example *Cyathea australis* (Rough Tree Fern), *Todea barbara* (King Fern) and *Blechnum nudum* (Fishbone Fern) may also be present. *Clematis aristata* (Traveller's Joy), a climber, grows in the catchment.

Riparian, or stream bank vegetation

The often moist and alluvial soils of the stream banks support dense stands of *Callicoma serratifolia* (Black Wattle), *Blechnum* fern species, *Acacia* (Wattle) species, *Leptospermum*

(Tea-tree) species, and many other trees and shrubs. Healthy riparian vegetation promotes clean stream water and aquatic biodiversity.

Blue Mountains Swamps

A variety of rushes, sedges and ferns are typically found in the swamps, with shrubs such as *Leptospermum juniperinum* (Tea-tree), *Leptospermum trinervium* (Paperbark Tea-tree) and *Grevillea acanthifolia* often growing on the margins. The swamps provide habitat for indigenous animals and regulate water flow. Inappropriate development, erosive stormwater flows, weeds such as blackberry and too frequent fires are major threats to this protected ecological community. For more information see:

<https://www.bmcc.nsw.gov.au/environment/waterways/swamps>

These swamps are considered endangered, and are listed as such on the NSW Biodiversity Conservation Act, and as an *Endangered Ecological Communities (EEC)* under the Federal EPBC Act.

Blue Mountains Escarpment Complex.

A variety of plant species can be observed on the cliff faces, often in seepage areas. *Pherosphaera fitzgeraldiia* (Dwarf Mountain Pine), a conifer, is an endangered species that grows on the damp cliff ledges adjacent to upper Blue Mountains waterfalls. Twenty plants have been recorded at 'Little Gordon Falls' and eighty plants at 'Leura Falls'. Water pollution and weeds such as Ivy and Japanese Honeysuckle are major threats to these plants.

Modified bushland

Some stands of indigenous bushland in the catchment have been overwhelmed by weeds such as Blackberry, Privet and Holly. Local bushcare groups are working hard to recover this valuable bushland.

Plant Survey

Members of the Catchment Group, the Leura Park Bushcare Group and the Plant Study Group of the Blue Mountains Conservation Society undertook a plant Survey within Leura Park in November 2018. See:

<https://sthleuraCatchment.bushcarebluemountains.org.au/wp-content/uploads/sites/33/2021/08/PLANT-SURVEY-LEURA-FALLS-CREEK-CATCHMENT-NOVEMBER-2018-1.pdf>

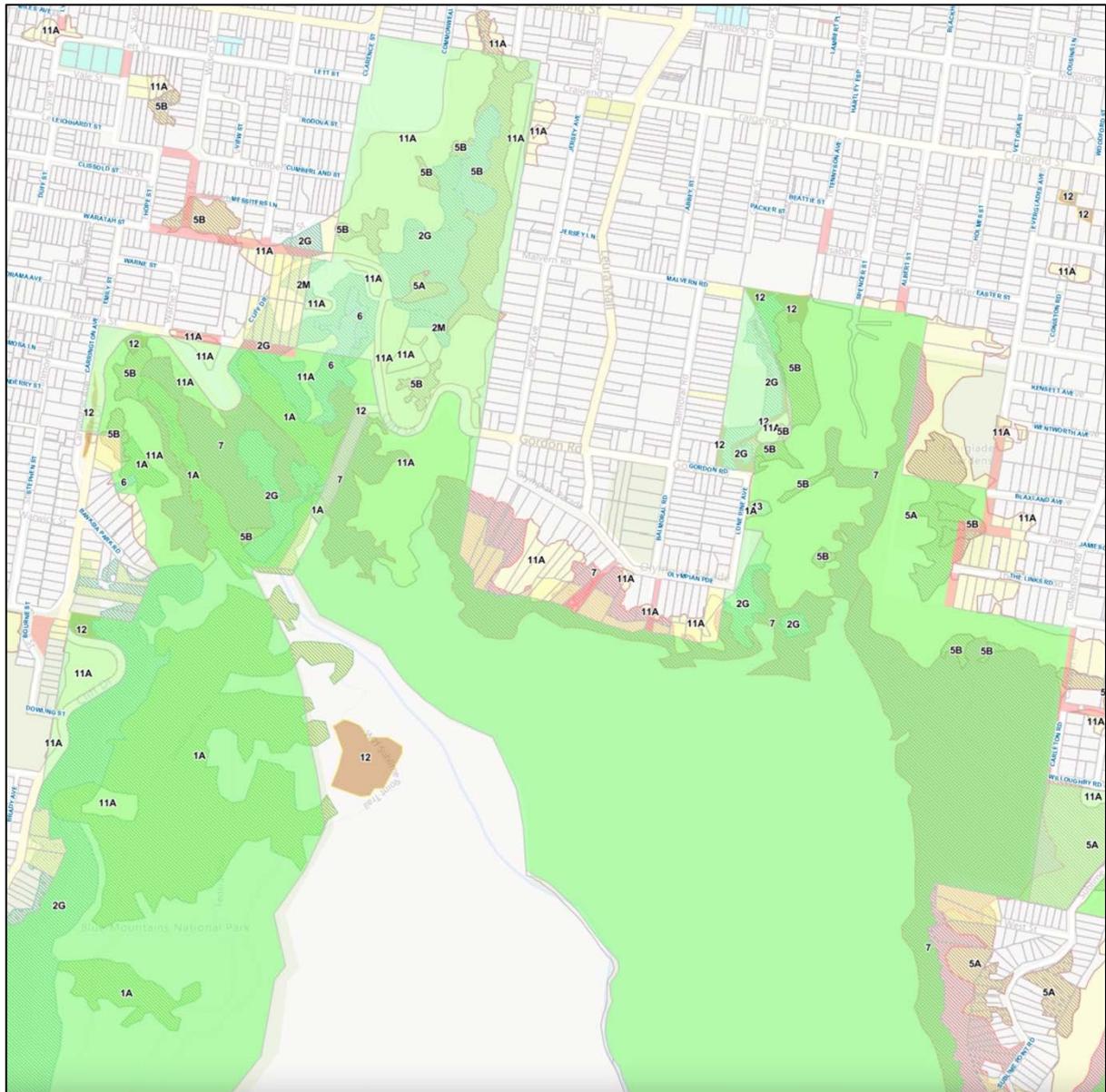
Threatened Flora

The following species found within the Leura Creek Catchment are listed as *endangered* by the Commonwealth and NSW governments:

- *Pherosphaera fitzgeraldiia* (Dwarf Mountain Pine)
- *Epacris hamiltonii*

The following species found within the Leura Creek Catchment are listed as *vulnerable* by the Commonwealth and NSW governments:

- *Persoonia acerosa* (Needle Geebung)
- *Pultenaea glabra* (Smooth or Swamp Bush Pea)



Vegetation Communities in part of the catchment:

Screenshot from:

<http://emapping.bmcc.nsw.gov.au/connect/analyst/mobile/?mapcfq=Locality#/main?mapcfq=Locality>

- 1A —Ceratopetalum apetalum —Rainforest
- 2G —E.oreades Tall Open-forest
- 2M —Eucalyptus radiata ssp. Open Forest
- 5B —Blue Mountains Swamps
- 6 —Blue Mountains Riparian Complex
- 7 —Blue Mountains Escarpment
- 11A —Eucalyptus sieberi E.piperita Open Forest
- 12 —Modified Bushland
- 13 —Introduced Communities



Eucalyptus oreades vegetation community including yellow flowering *Pultenaea glabra* (Smooth Bush-Pea -foreground)
Gordon Creek
Source: M Nugent 2020



Healthy riparian vegetation.

Todea Barbara (King Fern —foreground left)

Gleichenia dicarpa (Coral Fern -centre left)

Leptospermum Tea-tree species (rear)

Source: BMCC 2016

FAUNA

The Blue Mountains are home to an amazing array of amphibians, birds, mammals, frogs, reptiles. A total of 455 different species have been recorded in the Blue Mountains local government area. This figure excludes invertebrates (insects, spiders, butterflies, centipedes, millipedes, worms, slaters, snails, slugs, crayfish, etc.)

A fauna inventory for the Blue Mountains was undertaken by the BMCC in 2019. 255 species were recorded in the region from Katoomba to Wentworth Falls, with some 60 of these species recorded in relatively high numbers.

The recording and conservation of fauna within the catchment is not considered a primary task for the Leura Falls Creek Catchment Group, however the conservation and restoration of the habitats that are critical to the survival of these species is a major concern.

Currently there is no fauna inventory specific to the Leura Falls Creek catchment, however the following species lists drawn from the *Blue Mountains Fauna Inventory 2019* are considered a reasonably reliable guide to fauna to be found within the catchment.

Amphibians

14 recorded species (ground frogs x7; tree frogs x7). Commonly recorded species include:

- *Crinia signifera* (Common Eastern Froglet)
- *Limnodynastes dumerilii* (Eastern Banjo Frog)
- *Limnodynastes peronii* (Brown-striped Frog)
- *Litoria citropa* (Blue Mountains Tree Frog)
- *Litoria dentata* (Bleating Tree Frog)
- *Litoria peronii* (Peron's Tree Frog)

Birds:

181 recorded species (bushbirds x62; martins, swallows & swifts x9; kingfishers x4; large bushbirds x8; pigeons & doves x10, parrots x17; wetland birds x2; waterway birds x36; nocturnal birds x7; diurnal birds of prey x16). Commonly recorded species include:

- *Eopsaltria australis* (Eastern Yellow Robin)
- *Cormobates leucophaea* (White-throated Treecreeper)
- *Ptilonorhynchus violaceus* (Satin Bowerbird)
- *Psophodes olivaceus* (Eastern Whipbird)
- *Acanthorhynchus tenuirostris* (Eastern Spinebill)
- *Phylidonyris novaehollandiae* (New Holland Honeyeater)
- *Anthochaera carunculata* (Red Wattlebird)
- *Caligavis chrysops* (Yellow-faced Honeyeater)
- *Pardalotus punctatus* (Spotted Pardalote)
- *Acanthiza pusilla* (Brown Thornbill)
- *Acanthiza lineata* (Striated Thornbill)
- *Sericornis frontalis* (White-browed Scrubwren)
- *Pachycephala pectoralis* (Golden Whistler)
- *Colluricincla harmonica* (Grey Shrike-thrush)
- *Zosterops lateralis* (Silvereye)

- *Hirundo neoxena* (Welcome Swallow)
- *Dacelo novaeguineae* (Laughing Kookaburra)
- *Corvus coronoides* (Australian Raven)
- *Cracticus tibicen* (Australian Magpie)
- *Cracticus torquatus* (Grey Butcherbird)
- *Strepera graculina* (Pied Currawong)
- *Menura novaehollandiae* (Superb Lyrebird)
- *Alectura lathami* (Australian Brush-turkey)
- *Eolophus roseicapillus* (Galah)
- *Cacatua galerita* (Sulphur-crested Cockatoo)
- *Calyptorhynchus funereus* (Yellow-tailed Black-Cockatoo)
- *Alisterus scapularis* (Australian King-Parrot)
- *Platycercus elegans* (Crimson Rosella)
- *Trichoglossus haematodus* (Rainbow Lorikeet)
- *Chenonetta jubata* (Australian Wood Duck)
- *Anas superciliosa* (Pacific Black Duck)

Reptiles

36 recorded species (dragons x4; gekkota x2; turtles x1; snakes x9; python x1; legless lizards x1; skinks x17; goannas x1). Commonly recorded species include:

- *Pseudonaja textilis* (Eastern Brown Snake)
- *Austrelaps ramsayi* (Highlands Copperhead)
- *Pseudechis porphyriacus* (Red-bellied Black Snake)
- *Notechis scutatus* (Tiger Snake)
- *Morelia spilota spilota* (Diamond Python)
- *Tiliqua nigrolutea* (Blotched Bluetongue)
- *Egernia cunninghami* (Cunningham's Skink)
- *Eulamprus heatwolei* (Yellow-bellied Water-skink)
- *Lampropholis guichenoti* (Pale-flecked Garden Sunskink)
- *Saproscincus mustelinus* (Weasel Skink / Pale-flecked Garden Sunskink)

Mammals

24 recorded species (bandicoots x1; canids x1; carnivorous marsupials x4; kangaroos and wallabies 5; megabats x1; microbats x12). Commonly recorded species include:

- *Dasyurus maculatus* (Spotted-tailed Quoll)
- *Antechinus stuartii* (Brown Antechinus)
- *Antechinus mimetes mimetes* [*Antechinus swainsonii*] (Dusky Antechinus)
- *Wallabia bicolor* (Swamp Wallaby)
- *Pteropus poliocephalus* (Grey-headed Flying-fox)
- *Miniopterus orianae oceanensis* (Large Bent-wing bat)
- *Scotorepens orion* (Eastern Broad-nosed Bat)
- *Chalinolobus gouldii* (Gould's Wattled Bat)
- *Scoteanax rueppellii* (Greater Broad-nosed Bat)
- *Vespadelus darlingtonia* (Large Forest Bat)
- *Trichosurus vulpecula* (Common Brushtail Possum)

- *Pseudocheirus peregrinus* (Common Ringtail Possum)
- *Tachyglossus aculeatus* (Short-beaked Echidna)

For more information see:

<https://www.bmcc.nsw.gov.au/documents/blue-mountains-fauna-inventory>

Feral animals

Introduced species found in the Blue Mountains include dingoes, wild dogs, feral cats, rabbits, horses, foxes and feral deer. Spotted turtledoves and common mynas are also considered introduced species. Within the Leura Falls Catchment the primary concerns are foxes and feral cats.

Freshwater Crayfish

The creeks of the upper Blue Mountains, including Leura Falls Creek, have provided habitat for *Euastacus australiensis* (Sydney Spiny Crayfish). However, this species is highly susceptible to urban pollution. Readily available pesticides like Bifenthrin pesticide that can be readily purchased over the counter to control ants are a major concern. These insecticides are having a devastating impact on this species.

A Bifenthrin contamination incident in Jamison Creek, Wentworth Falls, in July 2012 led to surveys being undertaken in three Blue Mountains creeks, including Leura Falls Creek, in 2013, 2016, 2017 and 2018. Four survey sites on Leura Falls Creek were used at various times – below the Cascades, upstream from the Cliff Drive, adjacent to Vale Street (immediately below the stormwater treatment system), and in the tributary at the Cumberland Walkway.

All four surveys found very low numbers of crayfish, indicating high levels of contamination in the creek. The most recent survey in 2018 had very disappointing results. Only the site at Vale Street showed any improvement.

The report states “the creek is in a critical condition being unsuitable for the proliferation of endemic crayfish”.... “Leura Falls Creek requires ongoing monitoring, with continued investigation and creek protection from the wide range of contaminants and pollution from a variety of sources impacting the creek”.

For more information see:

http://bmcc.apache3.prod.beyondd.com.au/sites/default/files/docs/Crayfish-Surveys-2018_Final-Report.pdf

Threatened species

There are three threatened species found within the catchment:

- *Dasyurus maculatus* (Spotted-tailed Quoll)
- *Petalura gigantea* (Giant Dragonfly)
- *Eulamprus leuraensis* (Blue Mountains Water Skink)



***Eulamprus leuraensis* (Blue Mountains Water Skink)**

Source: IUCN SSC Skink Specialist Group (@skinks_IUCN)/Twitter

IMPACTS ON THE CATCHMENT

A range of degrading impacts have driven the ecological deterioration of the indigenous vegetation communities and streams of the catchment over the past 140 years or so.

Historical degrading impacts on the streams and natural vegetation

As increasing numbers of settlers moved into south Katoomba and Leura from the 1880s, eucalypt forests were felled to make way for housing. Fortunately, scenic escarpment and riparian areas were progressively set aside as public reserves, enabling a certain degree of indigenous plant and animal protection. Indeed, Leura Falls Creek and the Cascades, still bordered by dense stands of ferns and shrubbery, had become popular recreation venues by 1900.

However, the impacts arising from urbanisation continued to exert degrading influences on the reserves, adjoining areas of bushland, and the streams and tributaries. For example, a network of bare, hard surfaces had been created to service the new residential areas. Virtually all roads and footpaths of Leura were still in an unsealed condition by the 1940s, so for many decades expanses of earth and gravel were fully exposed to the abundant average annual rainfall of approximately 1300 millimetres per year.

The Deluge

As invariably transpires with a heavy Mountains storm, considerable damage was done to the roads and water-tables...loose earth disappeared before the onslaught of the rushing waters, exposing the metal in many places. The gutters as yet unflagged or concreted, were also heavy sufferers, the surface waters tearing great channels in their soft faces, and in places eating far into the neighbouring footway.

Blue Mountain Echo Friday 9 May 1919

Extensive quantities of mud, gravel and sand were inevitably swept into the stream network. The habitat of indigenous aquatic animals such as crayfish, platypus, macroinvertebrate bugs and small fish must have deteriorated rapidly.

The foundations for another serious environmental problem were also being laid, as residential areas within the catchment expanded in the late nineteenth century. Blackberry, a popular fruit, was thriving in the upper Blue Mountains by the 1900s, and not only in newly laid out gardens.

The Blackberry Pest

The blackberry is spreading over the fern gullies of the Blue Mountains, destroying the ferns and making desolate places which a short time ago were beauty spots. The growth of this pest is most insidious, and each year it claims for its own more of the beautiful natural growths of the Blue Mountains. This pest has already made its appearance on the Federal Pass at Katoomba, while other parts of the mountains are not free from it.

Goulburn Evening Penny Post Tuesday 3 November 1908

The Blackberry Pest On The Mountains

(From our Katoomba Correspondent.)

The serious question of the prevailing blackberry pest, and its destroying effect on many of the Blue Mountains beauty spots, caused a lengthy discussion at the last meeting of the Katoomba Council.

Lithgow Mercury Friday 31 March 1911

Contemporary management of degrading impacts

Weeds, erosive stormwater flows and pollution continue to exert degrading impacts on the urban reaches of the catchment's streams, and their indigenous plant and animal life.

Further additions to the Leura Falls Creek catchment weed list have included Buddleia, Privet, Broom, Montbretia, Tutsan and Holly. These plants have degraded extensive areas of the catchment, overrunning fern glades, swamps, and the indigenous stream edge vegetation.

Active environmental repair is now acknowledged as an essential component of local natural area management if the catchment's renowned natural environmental qualities are to be conserved. BMCC and NPWS environmental managers and rangers, bushcare officers and bushcarers have worked to manage weeds directly on, or in proximity to the historical sites including the former sewage treatment plant in the Jamison Valley; Linda Creek and Prince Henry Cliff Walk; Leura Falls Creek, Meeting of the Waters, Leura Cascades, Bridal Veil Falls (historically referred to as Leura Falls) and Weeping Rock; Lyre Bird Dell and Gordon Creek; Amphitheatre Track and Cliff Drive.

Weed management, erosion control, pollution monitoring, rubbish removal and indigenous plant restoration have been important tasks.

Both the BMCC and NPWS have active programs upgrading walking tracks. A key feature of these programs is repairing and/or upgrading the stormwater management systems.

WEEDS

Weed infestation of the natural environment is a primary concern of the Catchment Group and the bushcare groups working within the catchment. Most volunteer resources each year are directed to weed eradication and bush regeneration.

Since the 1880s the upper Blue Mountains, but particularly Leura, has developed a strong culture of home gardening, and there are now many large beautiful and famous home gardens, including the National Trust property 'Everglades', with European-style ornamental plantings of non-indigenous species. The BMCC is responsible for reserves and large public parks in this catchment, including Kingsford Smith Park. Many of the BMCC-managed reserves are adjacent to protected bushland, such as Leura Park, Gordon Falls Reserve and Leura Cascades and have European-style gardens established decades ago.

Many ornamental plants have escaped these public and private gardens to become bush invaders. Sadly, many in our community consider them to be attractive, and do not understand the damage they inflict on our indigenous habitats.

Weeds spread their seed by wind, water, birds, other animals, machinery, soil, the soles of shoes, or explosive release. Weeds can also do a slow creep into the bush by growing vegetatively. All the weeds listed below are aggressive competitors with our native plant species.

Woody Weeds

- Bamboo - *Phyllostachys* species
- Blackberry - *Phyllostachys* species
- Brooms, Scotch - *Cytisus scoparius*
- Broom, Cape - *Genista monspessulana*
- Buddleia - *Buddleja davidii*
- Camphor Laurel - *Cinnamomum camphora*
- Cherry Laurel - *Prunus laurocerasus*
- Cootamundra Wattle - *Acacia baileyana*
- Cotoneaster - *Cotoneaster* species
- English Holly - *Ilex aquifolium*
- Gorse - *Ulex europaeus*
- Himalayan Honeysuckle - *Leycesteria formosa*
- Lantana - *Lantana camara*
- Privet, Large-leaf - *Ligustrum lucidum*
- Privet, Small-leaf - *Ligustrum sinense*
- Pussy Willow - *Salix cinerea*
- Radiata Pine - *Pinus radiata*
- Spanish Heath - *Erica lusitanica*

Herbaceous Weeds

- Agapanthus - *Agapanthus praecox ssp orientalis*
- Coreopsis - *Coreopsis lanceolata*
- Creeping Buttercup - *Coreopsis lanceolata*
- Crofton Weed - *Ageratina adenophora*

- Miscanthus - *Miscanthus sinensis*
- Montbretia - *Crocasmia x crocosmiiflora*
- Red Hot Poker - *Kniphofia uvaria*
- Seaside Daisy - *Erigeron karvinskianus*
- Tutsan - *Hypericum androsaemum* and *Hypericum kouytchense* (syn. *H. x moserianum*)

Groundcovers, Vines and Scramblers

- Balloon Vine - *Cardiospermum grandiflorum*
- Blue Periwinkle - *Vinca major*
- Cape Ivy - *Delairea odorata*
- English Ivy - *Hedera helix*
- Japanese Honeysuckle - *Hedera helix*
- Madeira Vine - *Anredera cordifolia*
- Morning Glory - *Ipomoea indica*
- Trad- *Tradescantia fluminensis*
- White Jasmine - *Jasminum polyanthum*

For more information see:

<https://weedsbluemountains.org.au>

https://weedsbluemountains.org.au/wp-content/uploads/2012/12/BMCC_Weeds_Booklet.pdf

WATER

Water flow and water quality are also a primary concern of the Catchment Group and the bushcare groups working within the catchment.

Blue Mountains townships and villages perch on the ridges above some of the most biologically diverse, fragile and beautiful natural vegetation in the world. People have dramatically altered our natural environment, and all human activities carried out in our townships affect our downslope bushland, the World Heritage National Park, and the streams and rivers.

Stormwater rushes off all the hard surfaces - roads, roofs, car parks, garages, factories and driveways - carrying with it the pollutants and detritus of everyday life. These include oils and chemicals, rubbish and organic litter, soil from cleared land, fertilisers, pesticides, herbicides, sewage from overflows, weed seeds and animal faeces.

This stormwater cocktail enters the bush, erodes watercourses, silts creeks, and changes the nutrient levels of the soil. Most native plants are adapted to low nutrient conditions. High nutrient levels may impede their growth or cause them to die. Moist, fertile soil favours the growth of weeds and invasive species that replace native plants.

BMCC environmental managers have developed an innovative and award-winning design for storm-water control and treatment devices. These are being progressively installed at key urban discharge points in the catchment, filtering and cleaning the urban water that flows into the streams. Members of the catchment's bushcare groups have worked on these projects, assisting with identifying sites, planting, and weeding.

Catchment Group members have also conducted *Streamwatch* water and macroinvertebrate (bugs/insects) quality testing.

For more information see:

<https://www.bmcc.nsw.gov.au/environment/conservation-volunteers/streamwatch>



Storm-water management system showing biofilter pond Banksia Streamlet
Source: Michael Alexander 2021

CLIMATE AND CLIMATE CHANGE

The climate of the Blue Mountains is temperate and varies with elevation. At Katoomba, (1,010m) the summer average maximum temperature is around 22°C with a few days extending into the 30s although it is quite common to see maximum temperatures stay in the teens when east coast troughs persist. Night-time temperatures are usually in the teens but can drop to single figures at times.

During winter, the temperature is typically around 10 to 11°C in the daytime with –1°C or so on clear nights and 3 to 4°C on cloudy nights. Very occasionally it will get down to –3°C or slightly lower but usually the coldest air drains into the valleys during calm, clear nights. However, the passing of cold fronts can significantly lower the average temperature during the night and the day. There are two to three snowfalls per year.

Annual rainfall is about 1,050 millimetres in the Upper Blue Mountains with many misty days.

Future climate change appears likely to lead to higher temperatures and less rainfall.

Recent regional projections of average temperature and rainfall for suggest average temperatures for the could increase by 1.5°C to 3°C (both average minimum and maximum temperatures in all seasons) by 2050. Projections of rainfall are much more uncertain, however for Katoomba the current projections indicate that average summer rainfall could increase, while average winter rainfall could decrease. Concern has been expressed by many organisations over many years about the potential impacts of climate change on the Blue Mountains.

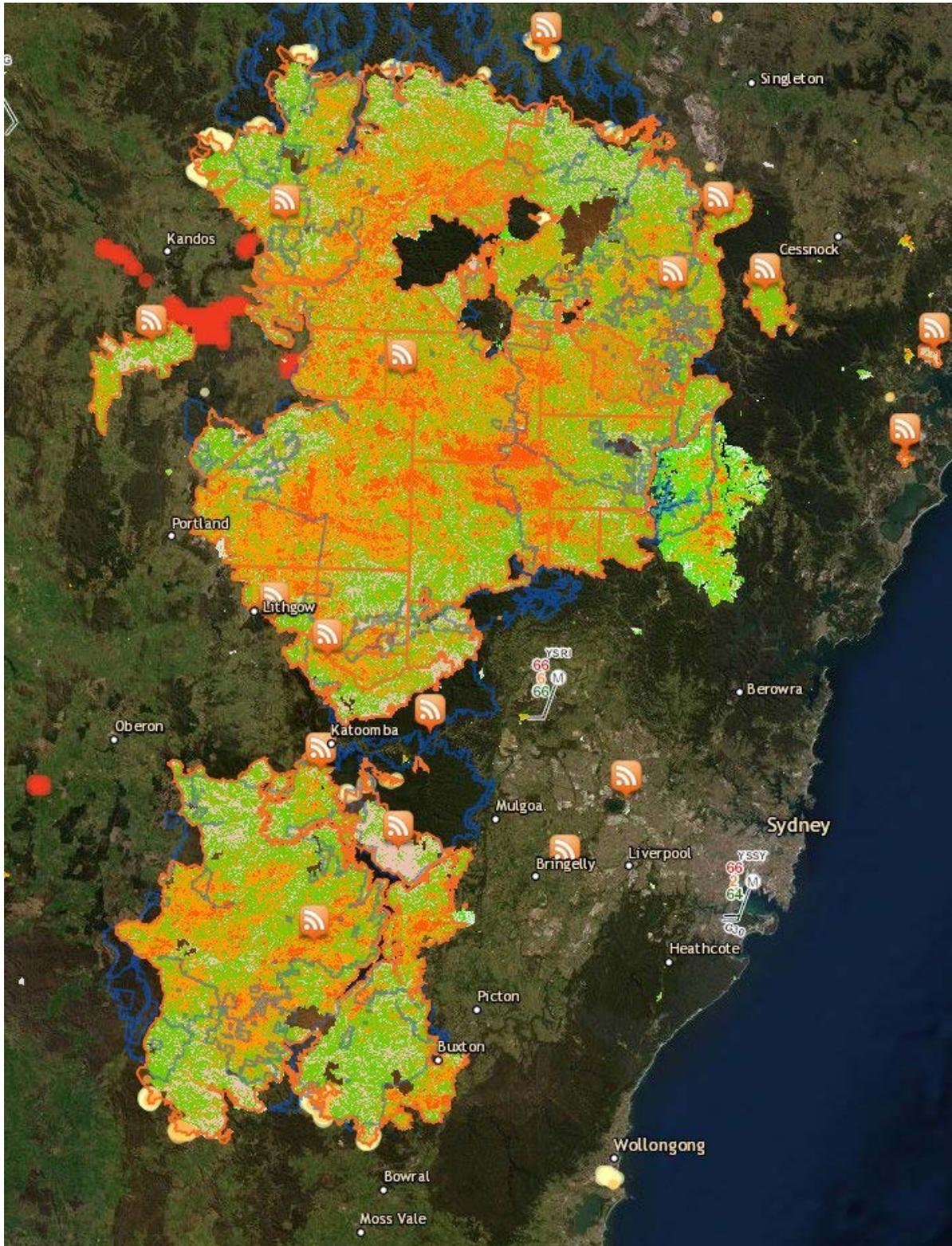
“Climate change will increase temperatures and lead to more wildfires. If this happens, the natural beauty and scientific value of the Blue Mountains will deteriorate, and this threatens its status as a World Heritage Area.” (Friends of the Earth, 25th June 2007).

On 26 October 2019 lightning struck the drought-stricken region of Gospers Mountain in the Greater Blue Mountains World Heritage Area of New South Wales, Australia. This ignited a bushfire which ran for three months to burn-out 838,000 hectares (around 80% of the World Heritage Area) and impact an estimated 140 million reptiles, birds and mammals. In October 2020 an Australian Government inquiry into these horrific wildfires concluded, for the first time, that their scale and intensity was a direct consequence of climate change. In December 2020 the *IUCN World Heritage Outlook 3* found that climate change is now the biggest threat to natural World Heritage globally.

Fortunately, the Leura Falls Creek Catchment was one of the few areas in the Blue Mountains that was not devastated by the 2019/20 bushfire, however many believe that this is an indicator of the risks ahead.

For more information see:

<https://www.iucn.org/crossroads-blog/202012/climate-change-and-wildfires-lessons-australias-blue-mountains>



Tree canopy impacts from the 2019/20 Bushfire in the Blue Mountains World Heritage Area

Source:

<https://datasets.seed.nsw.gov.au/dataset/google-earth-engine-burnt-area-map-geebam...> #AustralianFires #bluemountainsfires

BUSHFIRE

With its fire-prone dry sclerophyll forest, the World Heritage-listed Greater Blue Mountains Area is one of the most flammable environments on earth. Because of this, for management purposes, the area now has one of the most comprehensive fire regime analyses in the world.

Fire and climate change have been major drivers in the evolution of the diverse plants and animals in the Greater Blue Mountains area, producing a complex layering of different vegetation types. Fires play an important role in the health of this area. Indeed, intense fires offer a host of biodiversity benefits, including the breaking of hard seed pods and the clearing of dominant species. Similarly, smoke and charcoal can influence the dormancy of flowering plants.

Nevertheless, the severity and prevalence of major bushfires in Greater Blue Mountains Area means NPWS relies on research to manage the area effectively.

Bush fires and vegetation are closely linked, and both respond strongly to climate. When and where bush fires occur depends on four factors being present and 'switched on' in a landscape:

- a sufficient quantity of fuel,
- fuel that is dry enough to burn – i.e., 'available' to the fire,
- weather conditions suitable for fires to spread – determined by the weather on any given day, and
- a source of ignition.

If any one of these factors is missing, then major bush fires won't occur.

Studies in the Greater Blue Mountains/Sydney region have clearly demonstrated the very strong link between weather and major fires. While fuel and terrain do influence the behaviour and spread of fires in local areas, weather exhibits the strongest influence at the landscape level.

In the Blue Mountains National Park, lightning is responsible for approximately a third of ignitions, and arson a further third.

Global temperature and rainfall projections have been used to model how the frequency of dangerous fire weather might be altered by climate change. This modelling suggests that by 2050 there could be 3-6 extra days of such weather annually in the Sydney region.

"Periodic fires are a normal part of the lifecycle of many ecosystems, but climate change is creating mega-fires that instead of supporting biodiversity threaten to destroy it. In the aftermath of the worst fire season in Australia's recorded history, conservationists should turn to a mix of modern science and techniques practised by indigenous peoples for 60,000 years." (Dr John Merson, Blue Mountains World Heritage Institute, 8th December 2020).

Areas that have been burnt in a bushfire are often become subject to severe weed infestations, which can place additional challenges onto relevant agencies, and potentially voluntary organisations such as the Catchment Group and the bushcare groups.

URBAN INFRASTRUCTURE

Man-made infrastructure including buildings, roads, gardens, utilities, industrial facilities and transport systems can have negative impacts on the natural environment. This is a particular issue in the upper Blue Mountains where, unlike most mountain communities, where the urban infrastructure is on the ridges, impacting the natural environment, particularly the World Heritage national park at lower altitudes.

The earliest infrastructure constructed in the region was the highway and railway, both of which have been the subject of continual upgrading. The land corridors for this infrastructure, particularly the rail corridor, have an ongoing negative effect on the natural environment through rampant weed growth and erosion from inadequate drainage.

Undeveloped road corridors within the catchment are a matter of concern. They are often on very steep terrain and have minimal maintenance. Many have become weed infested and/or have erosion issues through poor drainage. The Catchment Group is particularly concerned about the unmade eastern end of Waratah Street, Katoomba.

There was a considerable amount of infrastructure constructed to support mining activities in Katoomba and Leura in the late 19th century and the early 20th century. Much of it has been demolished, and it was primarily to the east and west of the South Leura catchment.

In 1905 the *Katoomba Leura Gasworks* was constructed on a site bounded by Megalong, Lovel, York and Wilson Streets. This operated until 1986 and was subsequently demolished. As with most such developments there are ongoing concerns about contaminants in the soil.

Nearby, in Vale Street, a commercial laundry operated for many years to support the hotels and guest houses within the region. While this was demolished many decades ago, detritus in the vicinity was of concern to bushcare volunteers. Scientific tests undertaken for the BMCC have recently confirmed that there is no toxic contamination.

The South *Katoomba Sewage Treatment Plant* was constructed in the Jamison Valley below Leura Falls. It operated from 1935 until 1999 when it closed after construction of a new Blue Mountains Sewer Tunnel to a sophisticated new treatment plant at Winmalee. The 230 hectares of land associated with the plant was finally transferred from Sydney Water to the administration of the NPWS in 2018, however is not yet incorporated into the national park. Despite remediation works, there is still considerable weed infestation at this site.

Much of the sewage infrastructure in the upper Blue Mountains is old and in poor condition. Pollution of the creeks by leakages from the sewer lines is a matter of ongoing concern for the Catchment Group.

The *Cliff Drive* connecting Leura and Katoomba was constructed in three stages from 1937, with the final section between the Chelmsford Bridge and Gordon Falls Reserve being completed between 1945 and 1949. Numerous lookouts and very short walks were constructed along the route.

The construction of bushwalking tracks is considered elsewhere in this report. One curiosity associated with these was the installation of floodlighting on the track along Leura Cascades in 1932, four years earlier than the floodlighting at Katoomba Falls. This was a phenomenal success at the time, drawing thousands of people to participate in night-time bushwalking.

Now long abandoned, there are crumbling ruins left that do nothing to enhance the area or commemorate this curious piece of social history.

Construction in the industrial estate, most recently the new *Bunnings* development, has impacted Leura Falls Creek. The Catchment Group were active during the development application process for the Bunnings site, which ultimately had some of the most stringent and ongoing environmental requirements imposed as part of the final approval. The Catchment Group has been actively monitoring compliance with these requirements.

The group has also been active in reviewing draft legislation and strategic plans that impact the catchment. It also reviews relevant development applications.

Two current infrastructure projects are of interest to the Catchment Group.

The Great Blue Mountains Trail

The Great Blue Mountains Trail is a concept for a shared cycling/walking track crossing the Blue Mountains that is being progressively delivered by the BMCC. Many believe this is a flawed concept, as neither cyclists nor walkers consider mixed-use tracks in such difficult terrain to be safe. Sections already constructed include gradients that are inappropriate for recreational cyclists. Two sections of this trail have been completed within the South Leura catchment, with the section from Kiah Lookout to the Three Sisters currently unfunded. The design of this section is of great concern to the Catchment Group.

The Grand Clifftop Walk

The Grand Clifftop Walk is a new two-day 'Great Walk' from Wentworth Falls to Katoomba being delivered jointly by the NPWS and the BMCC. It is based around upgrading existing tracks, notably the Prince Henry Clifftop Walk and the Charles Darwin track at Wentworth Falls, with some new connecting tracks. The NPWS sections have been under construction for two years and are anticipated to be completed in the next few years. There has been ongoing contact with Catchment Group and Bushcare members. Funding has recently been provided for the BMCC sections of the track, and the Catchment Group look forward to consultations about the sections in the South Leura catchment.

ACHIEVEMENTS

The Catchment Group works to conserve the indigenous biodiversity of the natural areas of Leura Falls Creek catchment. To achieve this outcome, the group has developed a number of specific objectives, and an appropriate action plan and strategies. Since the group commenced its work in 2012, many positive environmental outcomes have been recorded.

The Catchment Group acknowledges the presence, importance and sensitivity of Australian First Nations cultural heritage within the catchment site and is always receptive to assisting with the management of that heritage, in the ways and at the times considered appropriate by the Traditional Owners.

Conserving and Communicating

The Catchment Group has formulated an environmental management vision for the catchment. This vision guides the action plan.

Cleaning up and Restoring

The Catchment Group, in conjunction with BMCC Bushcare Officers and other environmental managers, has regularly organised annual catchment working days and special catchment events. On these days bushcare volunteers and local residents have come together to conduct environmental repair work on a specific site within the catchment. Sites have included Kingsford Smith Park, Carrington Park, Leura Cascades, Vale Street tributary and Megalong Street tributary. Promotional material associated with these days and the catchment's environmental values has been distributed to the local community.

Connecting

Since its formation, the Catchment Group has supported BMCC environmental managers with the preparation of environmental repair and management grant applications for degraded sites within the catchment. Examples include stormwater management grants from Sydney Catchment Authority (see Archives/Leura Falls Creek 2014), community environmental education grants from Greater Sydney Local Land Services, and National Landcare Program grants from Greater Sydney Local Land Services that addressed environmental degradation concerns at Rest Park swamp, Leura and the Everglades Avenue tributary of Gordon Creek.

Communicating

The Catchment Group has prepared correspondence and submissions relating to catchment environmental issues, problems, and planning matters. Connections have been established with BMCC managers, local NPWS managers, NSW state government ministers and administrators, and other organisations. For example, the group has contributed to the Draft Local Environment Plan 2015 (BMCC), Kingsford Smith Park Plan of Management (BMCC) and the Southern Scenic Escarpment Master Plan (BMCC). Other catchment issues addressed include the instalment of bio-filtration plants and gross pollutant traps; erosion problems; management of stormwater and sediment flows; bushfire and landslip impacts; drain and kerb works; sewage and pollution incidents. The Catchment Group has provided input to specific development projects such as the Great Blue Mountains Trail (BMCC), Grand Cliff Top Walk and Gordon Falls Accessibility Project (NPWS).

Cleaning up and restoring

Successful management of severe weed infestations within the catchment has been undertaken and continues. Regular inspections and informal monitoring of public access riparian and bushland areas are conducted. These inspections have informed detailed polygon weed mapping undertaken in conjunction with BMCC environmental managers. The mapping has enabled treatment prioritisation of weed infestations, and effective intervention by BMCC environmental managers, field workers and bushcare groups. Severe weed infestation sites within the catchment have been integrated into the BMCC Urban Weeds Program.

Monitoring and Reporting

The Catchment Group primarily provides input on progress and catchment issues to the relevant environmental managers in the BMCC and NPWS for annual budgeting and reports, grant program updates et, and on it's own initiative surveys such as the current weed and stormwater run-off "hotspots" sites listed in the appendices.

APPENDICES

VOLUNTEERS IN THE CATCHMENT

The Catchment Group provides an informal point of liaison between the community Bushcare and Landcare groups working in the catchment. These are coordinated variously by the BMCC, NPWS and National Trust.

Eight of these groups are assisted and supported by the BMCC and generally meet once a month. The Prince Henry Cliff Walk group is assisted and supported by the NPWS, and generally meets twice a month.

BMCC Groups:

- Leura Park Bushcare
- Govett Street Bushcare
- Vale Street Bushcare
- Banksia Park Bushcare
- Birriban Bushcare (Katoomba High School)
- Everglades Landcare
- Gordon Falls Reserve Bushcare
- Sublime Point Bushcare
- Cumberland Walkway Bushcare (recently this has become defunct)

NPWS Groups:

- Prince Henry Cliff Walk Bushcare (in effect, two groups)
- Banksia Streamlet Bushcare (recently formed)

National Trust Group:

- Everglades Bushcare

The core activity of these groups is maintaining the health of bushland in the catchment. Under the guidance of a Bushcare Officer, groups remove weeds in a way that helps give native plants the space and opportunity to thrive. This is called Bush Regeneration.

Other activities Bushcare groups may do include stormwater control works, erosion control works, track maintenance and improvement, seed collection, plant propagation, replanting with indigenous species, public education, and other bushland management issues.

Bushcare officers provide training to volunteers in bush regeneration techniques and safety. The BMCC and NPWS also provide the necessary tools and other equipment for the groups.

Leura Park Bushcare Group

Members of this BMCC group have been working for many years on a range of challenging issues. Storm-water erosion damage at Peter Carroll oval has been remediated. Ecologically valuable areas of eucalypt forest and swamps in Leura Park and along Leura Falls Creek have been regularly monitored and successfully treated for weed infestation.

Govett Street Bushcare Group

Bushcarers of this BMCC group work to protect areas of remnant rainforest, eucalypt forest and swamps adjacent to a major Leura Falls Creek tributary.

Vale Street Bushcare

This site includes a major gross pollutant trap and wetland system, which filters stormwater from Katoomba township. Members of this BMCC group have targeted the establishment of an indigenous plant buffer zone around the wetland and are restoring the riparian vegetation along the tributary.

Banksia Park Bushcare Group

BMCC environmental managers and group members have been rehabilitating the highly degraded upper tributaries of Banksia Streamlet since 2009. Storm-water flows have seriously eroded sections of the stream. Another problem was the dense infestations of Blackberry that were overwhelming the indigenous sedge *Baumea rubiginosa*, a key swamp plant species. Successful treatment of the Blackberry has been undertaken, stimulating a strong recovery by the sedge.

Birriban Bushcare Group (Birriban Katoomba High Landcare for Sport)

This group at Katoomba High School is comprised of both Aboriginal and non-Aboriginal students. It offers students an alternative to organised sport on Wednesday afternoons and was established as a means of both increasing Aboriginal cultural awareness and incorporating it into their Agricultural Science teaching. It is comprised of Aboriginal students that were not doing sport.

Based on traditional Aboriginal methodology for managing Country the group came up with a motto "Read it don't just weed it". Weed management was not a concept the Aboriginal community had to deal with but knowing how to look at an area and understand its role enabled management for thousands of years. The group is assisted by community Elders.

Banksia Park Bushcare Group

This BMCC group aims primarily to rehabilitate a degraded Blue Mountains Swamp on the headwaters of Banksia Streamlet.

Everglades Landcare Group

This BMCC group works along the western edge of Everglades from the bridge to the staff/volunteer carpark (accessed by Blaxland Avenue), all areas around the stockpile site/Glades, along the driveway edge and within the unformed Denison Street road reserve between Blaxland Avenue and Everglades Avenue/Wentworth Avenue - some of the unformed road reserve closer to Blaxland Avenue is an asset protection zone, but it is still maintained by the Group.

Gordon Falls Reserve Bushcare Group

This group works primarily on the bushland fringing Leura Oval and aims to provide a healthy bushland barrier by preventing weeds from spreading into adjacent bushland and the hanging swamp above Gordon Creek.

Sublime Point Bushcare Group

Members of this BMCC group have undertaken a major natural area restoration project on the plateau in recent decades. Over twenty-five years, they have transformed a barren, disused quarry into a well vegetated riparian and woodland zone featuring pleasant walking tracks.

Cumberland Walkway Bushcare Group

This BMCC group were undertaking bush regeneration and revegetation along the unformed section of road in Cumberland Street. The walkway through this ss an important link between South Leura and South Katoomba. This group ceased operations in 2021.

Prince Henry Cliff Walk Bushcare Group.

This NPWS group regularly targets Buddleia, Montbretia, Privet and Blackberry along stretches of the walk and in the swamps and riparian zone of the Linda Creek catchment. Additionally, members of this wide-ranging group have undertaken valuable weed management work at Bridal Veil Falls, the Amphitheatre Track, the Federal Pass, extensive tracts of Leura Falls Creek below Leura Falls and at the former sewage treatment plant in the Jamison Valley.

Unlike other groups within the catchment, this group meets twice a month, and is in effect two groups – one focusing on Gordon Creek, the other on the Grand Clifftop Walk (Prince Henry Cliff Walk) from the Tarpeian Rock Lookout to Silver Mist Reserve.

Banksia Streamlet Bushcare Group

This NPWS group was formed in 2021 to focus on Banksia Streamlet between the Cliff Drive and the Prince Henry Clifftop Walk. Prior to 2021 the group was known as Vihara Landcare and work included weed control and planting both on the national park and on the Vihara Buddhist Temple land on Banksia Streamlet which borders it, primarily tackling the weeds Tutsan, Privet, Broom Blackberry and Japanese Honeysuckle. A stormwater management device has recently been installed by BMCC so that a biofilter pond removes sediments from stormwater before it enters the natural stream system. Since 2021 the group focusses on the national park only and plans to address other weedy areas between Banksia Streamlet and Echo Point.

Everglades Bushcare Group

This group is funded by the National Trust. It works along the northern boundary and the western boundary (parallel with a tributary of Gordon Creek, sometimes called “Everglades Creek”) to a point where it becomes unsafe with cliffs and steep slopes. Work on the edge of some steep slopes is undertaken by the paid staff for safety reasons. The group also worked in a native area around the lookouts, but because of the presence of *Armillaria* and *Phytophthora* that area is now only worked by paid staff to minimise further spread.

Despite the impacts of COVID-19 restrictions in 2020 and 2021, the value of this voluntary effort is considerable:

	2018-2019		2019-2020	
	Volunteers	Hours	Volunteers	Hours
Leura Park	85	240	36	106
Govett Street	40	119	20	64
Vale Street	31	89.5	23	64
Banksia Park	49	149.5	21	59
Birriban	226	343	99	149
Everglades Landcare	50	284	40	192
Gordon Falls Reserve	53	145	54	155.5
Sublime Point	174	211	100	124
Cumberland Walkway*	10	34	8	11
Prince Henry Cliff Walk	112	293	90	281
Banksia Streamlet **	x	x	x	x
Everglade Bushcare	32	87.5	21	60.5
	862	1995.5	512	1266

* Ceased operating in 2021

** Formed in 2021

2021 WEED HOTSPOTS SURVEY

This list is based on field inspections on 4 and 14 May 2021, and ongoing observations by members of the various bushcare and landcare groups in the catchments. It does not include many sites that are being managed on an ongoing basis by these volunteer groups.

Most of the sites are on land managed by the BMCC, however a few are either managed by the NPWS or are privately owned.

BMCC-MANAGED SITES

HIGH PRIORITY - REQUIRING GRANT FUNDING

1. Unmade Waratah Street, Katoomba

The scale of the complex weed infestation on this site is daunting. Currently this is the worst site within the two catchments. This site would require a staged weed eradication programme extending over several years and is an obvious candidate for grant funding (like Rest Park, Leura). There is also a major stormwater run-off issue at this site.

HIGH PRIORITY - BY BMCC URBAN WEEDS OR NATURAL AREAS OPERATIONS?

1. Unmade Denison Street / The Links Road, Leura (western end)

There has been significant deterioration at this site over the past year. This location also has a stormwater run-off issue. This site could feasibly be addressed using existing sub-catchment funding.

2. Unmade Jamieson Street, Leura

This site is accessed by an informal track from the western end of The Links Road to Blaxland Avenue. An urgent response would hopefully prevent the weed infestation spreading into the national park. This site could also feasibly be addressed using existing sub-catchment funding.

3. Gordon Road, Leura (the reserve at the north-east end of the road, south of Leura Oval).

There is significant weed infestation in this section of the reserve which is currently not being managed by a bushcare group.

HIGH PRIORITY - CURRENTLY BEING MANAGED

1. Rest Park, Leura

Work being undertaken by contactors funded through a multi-year grant.

2. Everglades Creek

Work being undertaken by contactors funded through a multi-year grant.

3. Leura Falls Creek (between Wilson and Govett Streets, Katoomba - behind Bunnings)

Work is being undertaken by contractors working for Bunnings as part of a DA requirement. It requires ongoing monitoring.

HIGH PRIORITY - RECENT TREATMENT BY CONTRACTORS, BUT REQUIRING FOLLOW-UP WORK

1. Cliff Drive, Katoomba (NW side, near historic culvert)

Blackberries sprayed recently.

2. Cliff Drive, Katoomba (west of Merriwa Street, either side of old toilet block)

Extensive complex weed infestation despite recent work.

3. Cliff Drive, Katoomba (rock face below Solitary Restaurant)

Extensive complex weed infestation despite recent work. There is a large tree stump that is in danger of falling onto the road. This is work that would best be undertaken before the Cliff Drive reopens. Clarification is required as to whether this is the responsibility of the Solitary Restaurant tenants, or the BMCC.

4. Leura Falls Creek (the branch from Magdala Street through Mitre Ten)

Contactors have been observed working in this area in recent weeks.

PRIORITY – BY BMCC URBAN WEEDS OR NATURAL AREAS OPERATIONS?

1. Unmade Tennyson Street, Leura

Significant remedial work has been completed in this area, but more work required.

2. Wentworth Avenue, Leura

Weed infestation on the kerbs.

3. Leura Falls Creek (between Wilson Street and unmade York Street)

There is extensive complex weed infestation on this site, which is understood to be in private ownership.

4. Unmade Commonwealth Street, and Murray Street, Leura

The swamp in this locality is of particular concern. Some of this area is in private ownership. Some remedial work has been privately funded, and some through the Bush Backyards program. More work is required.

5. Council land on Cliff Drive, Katoomba, running down to the national park boundary, north of the Vihara

6. Banksia Streamlet area, on both sides of the Cliff Drive, Katoomba

PRIORITY – BY BMCC WEED COMPLIANCE

1. Unmade Everglades Avenue Leura (southern end, between Wentworth and Blaxland Avenues)

The privately owned properties to the east of this site are particularly badly weed infested.

PRIORITY – BY SUBLIME POINT BUSHCARE GROUP?

1. West Street, Leura (western end)

Need to query whether the weed infestation at this site can be managed by the Sublime Point Bushcare Group. This site also has a stormwater management issue.

2. Willoughby Road, Leura (western end)

Understood to be managed by the Sublime Point Bushcare Group.

PRIORITY – LEURA PARK BUSHCARE GROUP

1. Cliff Drive, Leura (from Gordon Road to Chelmsford Bridge)

This site includes the Great Blue Mountains Trail in the same general locality. Work was undertaken by Leura Park Bushcare Group on 14 May 2021. The site needs follow-up in spring.

NPWS-MANAGED SITES

HIGH PRIORITY

1. Cliff Drive, Katoomba (the embankment on the corner opposite The Rooster Restaurant)

This site has had some management in recent years by the Prince Henry Bushcare Group, however the scale of work and difficulty of access suggests that work needs to be undertaken by contractors. Uncertainty about the impacts of the proposed extension of the Great Blue Mountains Trail (shared-use bike track) is a constraint.

HIGH PRIORITY - RECENT TREATMENT BY CONTRACTORS, BUT REQUIRING FOLLOW-UP

Contractor operations funded through the Save Our Species program.

1. Gordon Falls Creek (south of Lyre Bird Dell – between the two bridges)

Montbretia has been sprayed by contractors. Ongoing weed reduction work is undertaken by the Prince Henry Bushcare group and contractors, but the scale of weed infestation suggests that major support by contractors will be necessary if there is to be effective remediation. Gordon Falls Creek downstream from this site is now in good condition after work by bushcare volunteers.

2. Lone Pine Avenue, Leura (midway between Gordon Road and Olympian Parade.

Blackberries sprayed recently.

PRIORITY – CURRENT TREATMENT BY CONTRACTORS

Contractor operations funded through the Save Our Species program.

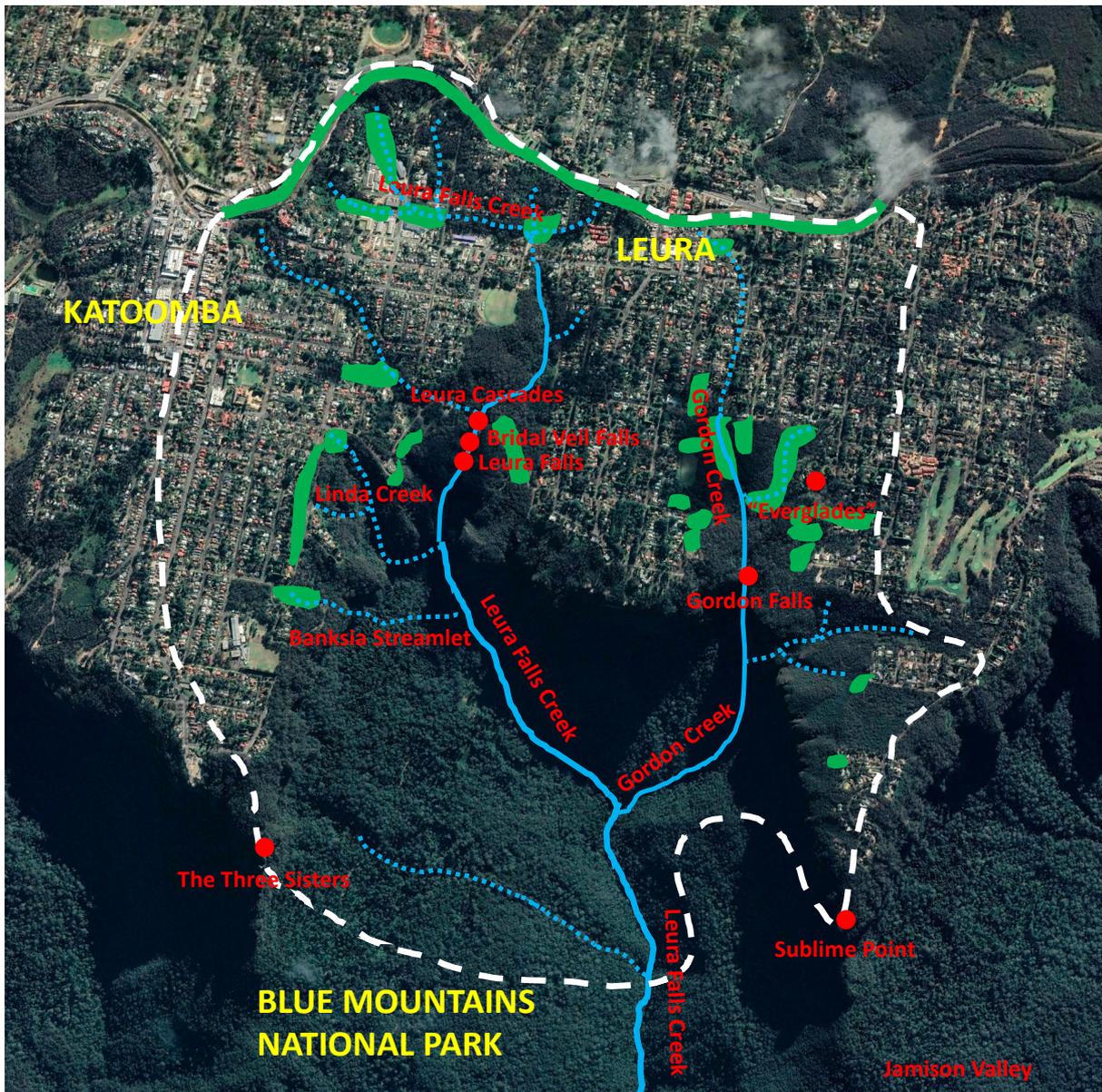
- 1. Blaxland Road Swamp & Road Environs**
- 2. Below corner of Gordon Road and Lone Pine Avenue**
- 3. Track from Lone Pine Avenue to Lyre Bird Dell (including landslip area)**
- 4. South of Spencer Street**

OTHER SITES

HIGH PRIORITY

1. RAIL CORRIDOR – BLUE MOUNTAINS LINE

Rampant weed infestation – particularly broom.



2021 Weed Hotspots

2021 STORMWATER RUN-OFF HOTSPOTS SURVEY

This list is based on field inspections on 4 and 14 May 2021, and ongoing observations by members of the various bushcare and landcare groups in the catchments. These volunteer groups have supported the construction by the BMCC of several bio-filters within the catchments through weeding and planting programs.

Most of the sites are on land managed by the BMCC, however one is managed by the NPWS.

BMCC-MANAGED SITES

HIGHEST PRIORITY SITES

1. Gordon Road, Leura (eastern end)

This site is considered to be a high priority for the installation of a bio-filter. Extensive damage has occurred within the national park downstream of this site after recent storm events. The Prince Henry Bushcare Group and contractors are undertaking ongoing weed eradication activities in this location.

2. Unmade Waratah Street, Katoomba

Major stormwater flows into Leura Cascades Reserve after storm events. There is also a major complex weed infestation at this site. This site would require a staged programme extending over several years and is an obvious candidate for grant funding (like Rest Park, Leura).

PRIORITY SITES

Stormwater flowing from each of the sites on the following list is creating damage of varying magnitudes in the adjacent national park. The most appropriate engineering response at each site needs to be determined. It may or may not be a bio-filter. Sites 4 and 6 discharge initially into BMCC-managed reserves before entering the national park.

1. West Street Leura, Leura (western end)

There is also a modest weed infestation at this site.

2. The Links Road, Leura & unmade Denison Street

There is also a weed infestation at this site.

3. Unmade Everglades Avenue Leura (southern end, between Wentworth and Blaxland Avenues)

In this location there is an intermittent flow after storm events from heavily weed infested private properties, through the road reserve into Everglades and then the national park. Given the conservation status of the Everglades garden it is not possible to construct a bio-filter or other stormwater flow management structure within that garden. Weeds in this location are managed by the Everglades Landcare/Bushcare group.

4. Malvern Road, Leura (western end)

This is the only remaining untreated stormwater flow into the eastern side of the Leura Park Reserve.

5. Gordon Road, Leura (western end)

Major stormwater flows into the national park after storm events. There is also a weed infestation at this site.

6. Vale Street

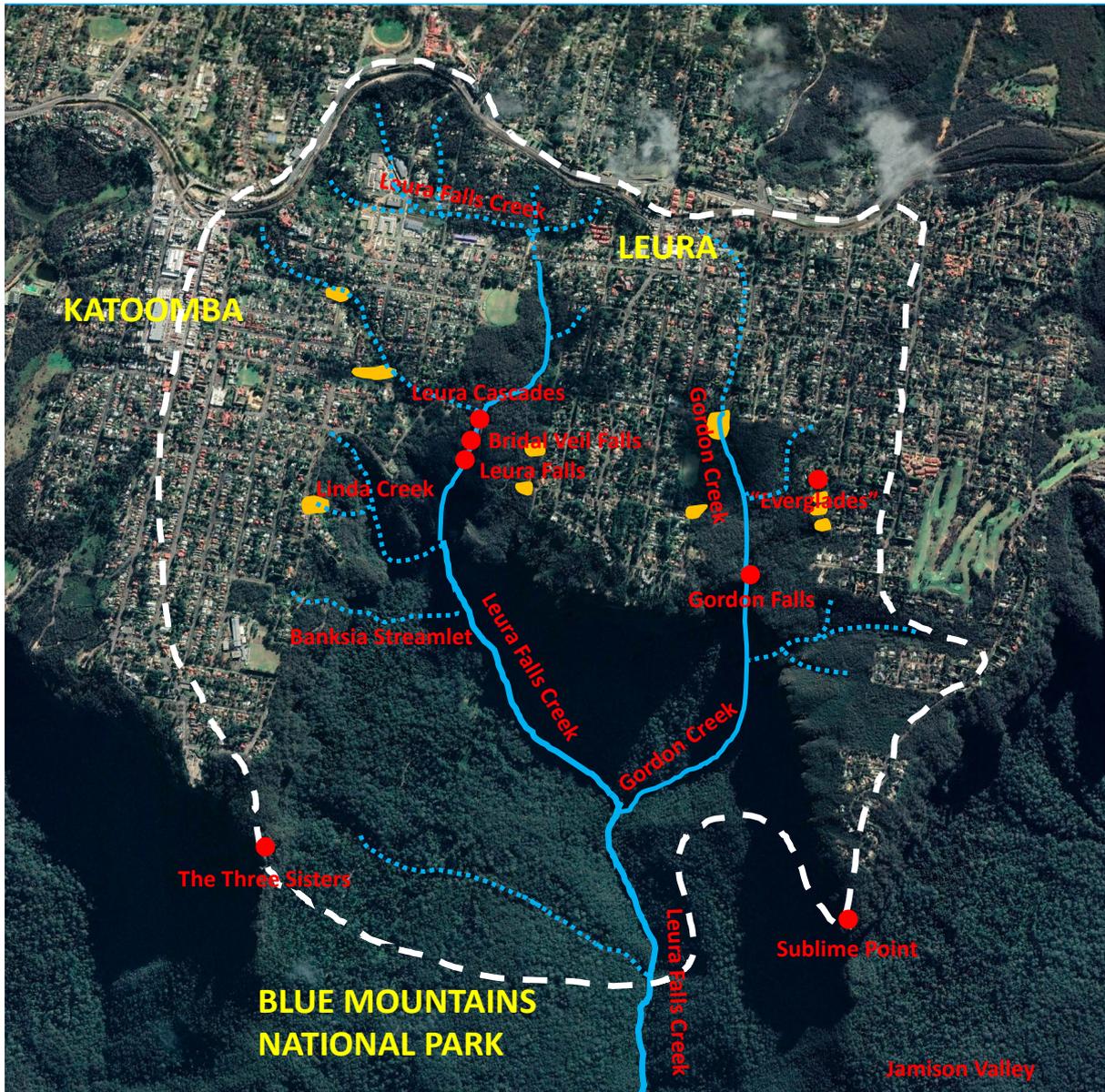
Erosion on the creek edges downstream from the rain garden is constraining bushcare activities.

NPWS-MANAGED SITES

PRIORITY SITE

1. Gordon Falls Creek (south of “The Braes”)

Gordon Falls Creek at this location is permanently flowing, however after storm events it receives major stormwater flows from a variety of upstream locations. These are creating major damage downstream. There may be some benefit from this site being jointly managed by the NPWS and BMCC.



2021 Stormwater Run-off Hotspots

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Historical media and photographs have been sourced from Trove, National Library of Australia, the Dictionary of Sydney (State Library of NSW), and the Local Studies Collection, Blue Mountains City Library.

ONLINE RESOURCES

- Bushcare - <https://www.bushcarebluemountains.org.au>
- Bushcare Manual - https://www.bushcarebluemountains.org.au/wp-content/uploads/2018/07/Bushcare-manual_web.pdf
- Bushwalking and Conservation - <https://bmlocalstudies.blogspot.com/search/label/bushwalking>
- Climate Change and Bushfires in the Blue Mountains - https://www.google.com.au/search?q=blue+mountains+climate+change&bih=1249&biw=2231&hl=en-GB&ei=zDYsYZCpJ7md4-EPxaqDUA&oq=blue+mountains+climate&gs_lcp=Cgdnd3Mtd2l6EAEYAjIFCAAQgAQyBQgAEIAEMgUIABCABDIGCAAQFhAeMgYIABAWEB4yBggAEBYQHjIGCAAQFhAeMgYIABAWEB4yBggAEBYQHjIGCAAQFhAeOggIABCABBDJAzoLCC4QgAQQxwEQrwe6BQguEIAESgQIQRgAULcVWJgkYP9JaABwAHgAgAG1A4gBtxCSAQcyLTMuMy4xmAEAoAEBwAEB&sclient=gws-wiz
- Climate Change and Bushfires in the Blue Mountains - <https://www.iucn.org/crossroads-blog/202012/climate-change-and-wildfires-lessons-australias-blue-mountains>
- Fauna - <https://www.bmcc.nsw.gov.au/documents/blue-mountains-fauna-inventory>
- Fauna - <https://bmnature.info/fauna-gbmwha.shtml>
- Geology - <http://www.geomaps.com.au/scripts/bluemountainsoverview.php>
- Gundungurra - <https://gundungurra.org.au/gundungurra-tribe-history/>
- Katoomba - <https://dictionaryofsydney.org/entry/katoomba>
- Leura - <https://dictionaryofsydney.org/entry/leura>
- Prince Henry Cliff Walk - <https://www.nationalparks.nsw.gov.au/things-to-do/volunteer-activities/prince-henry-cliff-walk-bushcare>
- South Leura Catchment Group website - <https://sthleuracatchment.bushcarebluemountains.org.au/the-catchment/>
- Streamwatch - <https://greatersydneylandcare.org/streamwatch/>
- Streamwatch - <https://greatersydneylandcare.org/streamwatch/>
- Weeds – <https://weedsbluemountains.org.au>
- Vegetation Mapping - <http://emapping.bmcc.nsw.gov.au/connect/analyst/mobile/?mapcfg=Locality#/main?mapcfg=Locality>

REFERENCES

- Armitage A M, *The Katoomba-Leura Story*, Katoomba Rotary Club, Katoomba, 1998
- Baker M, *Native Plants of the Upper Blue Mountains*, Three Sisters Productions, Winmalee, 1984
- Baker M, *Birds of the Blue Mountains*, Three Sisters Productions, Winmalee, 1988
- Croft & Associates in association with Meredith Walker, *Blue Mountains Heritage Study, Final Report*, Department of Environment and Planning and the Blue Mountains City Council, Katoomba NSW, 1982
- Cronin L, *Exploring the Blue Mountains*, Envirobook, Annandale, 2004
- Emilsen W & Stockton E, *Sacred Ways and Places in the Blue Mountains*, Blue Mountain Education and Research Trust, Lawson, 2021
- Fox B, *Upper Blue Mountains Geographical Encyclopaedia*, the author, Bathurst, 1999
- Fox B, *The Origin of Leura, Blue Mountains*, the author, Bathurst NSW, 2001
- Hanisch S & Jasiak B, *Native Orchids of the Blue Mountains*, the authors, 2017
- Johnson D, *Sacred Waters: The Story of the Blue Mountains Gully Traditional Owners*, Halstead Press, Sydney, 2007
- Knox K & Stockton E, *Aboriginal Heritage of the Blue Mountains: Recent Research and Reflections*, Blue Mountain Education and Research Trust, Lawson, 2019
- Low J, *Blue Mountains Byways*, Second Back Row Press, Katoomba, 2021
- Martyn J, *Rocks and Trees*, Step Inc, Turramurra, 2018
- MUSEcape Pty Ltd & Beaver D, *Walking Track Heritage Study*, NPWS Blue Mountains National Park, 1998
- Pells P & Hammon P, *The Burning Mists of Time, A Technological and Social History of Mining at Katoomba*, Philsquare Publishing, 2009
- Pickett J & Alder J, *Layers of Time, The Blue Mountains and their Geology*, Department of Mineral Resources, 1997
- Ridge, R, *Once Upon a Time in History, the Upper Blue Mountains*, Blue Mountains Historical Society, Wentworth Falls, 2017
- Smith J, *How to see the Blue Mountains*, Megalong Books, Katoomba, 1994
- Smith J, *Walking Track Heritage Study, Historical Report*, NPWS Blue Mountains National Park, 1998
- Smith J, *Walking the Federal Pass, The First 100 Years 1900-2000*, Den Fenella Press, Wentworth Falls, 2001
- Smith J, *The Blue Mountains Mystery Track, Lindeman Pass*, Three Sisters Productions, Winmalee, 1990
- Smith J & P, *Fauna of the Blue Mountains*, Kangaroo Press, Kenthurst, 1990

Smith, J, P & K, *Native Fauna of the Greater Blue Mountains World Heritage Area*, the authors, Blaxland, 2019

Stanbury P & Bushell, L, *The Blue Mountains, Grand Adventure for All*, The Macleay Museum, 1985

Stockton E, *Blue Mountains Dreaming, The Aboriginal Heritage*, Three Sisters Productions, Winmalee, 1993

Stuart V, *Blue Mountains Best Bushwalks*, Woodslane Press, Warriewood, 2006