



NEWSLETTER NATIONAL PARKS ASSOCIATION OF NSW INC

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SOUTHERN SYDNEY BRANCH

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Connectivity and corridors

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BUSINESS MEETINGS All are welcome to attend, have your say and hear what's happening in the NPA. Contact Brian on 0419260236 or Gary on 95701813 for details. These meetings are now held on either the 1st or 2nd Monday of the month.

BRANCH MEETINGS: Come and meet other members from your local area, new members and friends are most welcome. These meetings are organised for you, are informal, informative and relaxing. An interesting evening is guaranteed and supper is provided. The venue for Branch meetings is the Multi-Purpose Centre, 123 Flora St Sutherland (near Belmont St) 3 minutes' walk from the railway station and with plenty of parking. All meetings commence at 8.00pm. Now held on the 4th Wednesday night every second month.

The September meeting will be held on 23rd September and it will also be our AGM. Please consider standing for office. We are a friendly lot.

Now this will be carried out under Covid-19 rules. That means you must register. See page 2!!!

Free event. See details on the following page

Walks/Activities

The Branch AGM and general meeting will be held on September 23rd at our usual location, the Multi-Purpose Centre, 123 Flora St Sutherland starting at 8.00pm. This will be held under Covid-19 safe rules which mean you must register to attend. In order to do so email Brian Everingham at brian.everingham@gmail.com and provide your name and phone number as well as your email address. That's a requirement so if there is any issue the Department of Health can track all contacts quickly and effectively. We also ask you to wear a face mask for this event.

Guest speaker: Catherine Cunningham

Catherine Cunningham will give a well-illustrated address on The Effect of subsidence from long wall coal mining on the ecology and water quality of streams. Catherine will clearly illustrate how the careful use of scientific methodology can tease out answers to important questions regarding possible risks from this modern form of coal mining that has replaced the former border and pillar style mining which left much coal intact for safety purposes. The research was conducted under the auspices of Sydney Water and University of Canberra.

You are welcome!!!! Don't be shy in putting yourself forward also to help the Committee do our work.

Walks

25 th August	Garawarra Farm loop walk via Burning Palms	Brian Everingham
1 st September	Curra Moors Loop	Brian Everingham
4 th September	Wattamolla to Curracurrong	Brian Everingham
6 th September	Patonga to Umina.	Esther Chow
7 th September	Costens Point	Brian Everingham
12 th September	Waterfall to Heathcote via Lake Eckersley	Brian Everingham
13 th September	Crossing the Blue Mountains: Section 6	Esther Chow
15 th September	Robertsons Knoll and Wattle Forest Loop	Brian Everingham
18 th September	Mulgoa NR	Brian Everingham
19 th September	Barren Grounds NR	Brian Everingham
20 th September	Mt Banks one trail loop	Esther Chow
21 st September	Gulguer NR	Brian Everingham
4 th October	Looking for waratahs	Esther Chow
5 th October	Forest Path and Bola Creek	Brian Everingham
6 th October	Jibbon Circuit	Brian Everingham
10 th October	Six Foot Track: Megalong Cemetery to Cox's River	Brian Everingham
11-21 October	The Great Ocean Walk ¹	Esther Chow
21-27 October	The Grampians ²	James Moule
1-12 November	Six Foot Track	Angelo Emmanuel
20-21 November	Newnes weekend away	Bob Crispin

¹ Depending on Covid-19 restrictions

² As above

While the Billy Boils

Map Reading 1

So now you have started to read the landscape; now you are looking around you and not just enjoying what you are walking in but even recognizing the creeks, the ridges, the cliff lines. Yes, you can get the map out now. It's time.

Let's take for our starting point the most regular maps you'll see out on a bushwalk on the eastern seaboard of NSW: a topographic map prepared and produced by the Central Mapping Authority of NSW. Most you will use ones that come in a 1:25000 scale. That translates that for each cm of paper there is 25000 cm of land below your feet: or, to make it easy, when you open the map and see a crisscross of lines, each square has a border of 1km!

Those lines are useful. We call them grid lines. We can use them to locate features and, if we are lucky, even ourselves, anywhere on the map. Sometimes we use area references and they place us within the square. When we call these figures we work in the opposite way to latitude and longitude. We quote the figures at the bottom (or top) of the page first (eastings) and then use the figures on the sides (northings). Now if we imagine each square to be divided into imaginary lines of ten (we do love the decimal system) we can locate ourselves much more accurately. We express this in six figures, three for the eastings and three for the northings. We call this the grid reference. It's easy, right!



Practice. Get out your favourite map and find some features. Give those features grid references.

One more thing is important to remember about grid lines. The lines that run up and down do not go North and South. There is a True North, a magnetic North and a Grid North. But let's not worry about that until we begin to talk about compasses. Just store that away for future use.

OK, so we can locate places on the map using grid references but how does that help read the landscape of the ground? How, in other words, do we know if we are about to start climbing up a very steep hill!!!! It does not. Those lines do not exist on the landscape. They are just helpers in dividing a large space of paper. The lines that do exist are those strange wiggly ones; sometimes in red and sometimes in brown; sometimes wide apart and sometimes so very close together; sometimes elongated, sometimes in glorious circles. They are contour lines and if you take one line and follow it, off onto other adjoining maps if necessary, you will find that they always join in full loops.

Contours are a mapping convention to measure height above sea level. They occur at certain intervals, called the contour interval, and that can vary from one map to another. Often in our part of the world the contour interval is 10 metres. That means that between each contour line you will lose - or gain – ten metres in altitude. How steep that loss or gain is determined by how close the lines are to each other. The closer the lines, the steeper the land!

Now it's time to start to get familiar with those contour lines. It's tough navigating if you can't look at a map and imagine the land rising in front of you, in full three-dimensional form, just from the shape of the contour lines. Find the creeks and look at the way the contours form around them. You will notice that they form a series of U bends up the creeks. The opposite is the case with ridges.

And for this piece, that is surely enough. Just grab that map and play with it. Draw the shapes. Do vertical cross sections. Take one grid reference, for example, and then map the gradient between it and another grid reference. Let's pretend it is your next bushwalk. You can do gradient maps, work out not just the altitude gained or lost but in what patterns. Is it happening in one steep pull at the end? Or is it an even slope? Soon you'll have enough knowledge to challenge leaders' descriptions, leaders' language.

Enjoy the walking!

Brian Everingham

Wildlife Crossings-Making Life Better for our Animals

'Wildlife crossing' is a general term which encompasses underpasses, overpasses, ecoducts, green bridges, amphibian/small mammal tunnels, and wildlife viaducts. All of these structures are designed to provide semi-natural corridors above and below roads so that animals can safely cross without endangering themselves and motorists.



Koala found in Woronora Heights, June 2020

According to the International Union for the Conservation of Nature (IUCN) by 2050, 60 million km of roads could cover the globe, connecting communities but also driving habitat fragmentation and biodiversity loss. However, avoiding and minimizing these impacts is possible—there are solutions to protect ecosystem services, natural capital, and wildlife populations, while delivering the benefits of infrastructure.

This issue will be a major theme at the IUCN World Conservation Congress, Marseille 2020 (delayed until 2021) under the title; 'Corridors and Crossings: Mainstreaming ecological connectivity into existing and planned infrastructure'.

In the IUCN's opinion, over the last 30 years, many actors around the world have learned how to avoid or minimize the impacts to ecological connectivity caused by infrastructure – including roads, railways, canals, fences, and energy networks. It is clearly of growing importance to mainstream biodiversity conservation requirements into infrastructure development that maintain, enhance, and restore ecological connectivity. There is an increasing body of global best-practices to inspire action at the local level through collaborative networks, projects, research initiatives, and legal, policy, and regulatory frameworks (1).

But at the local, practical level what exactly are the impacts of roads on wildlife and the benefits of wildlife crossing? Roads and traffic can have a detrimental effect on wildlife populations by decreasing habitat amount and quality, increasing mortality due to wildlife-vehicle collisions (road kill), preventing access to resources on the other side of the road, and subdividing wildlife populations into smaller and more vulnerable sub-populations (fragmentation). Habitat fragmentation can ultimately lead to extinction or extirpation if a population's gene pool is restricted enough. In addition to conservation concerns, wildlife-vehicle collisions have a very appreciable cost to society because such collisions can damage property and also injure and kill passengers and drivers.

The benefits derived from constructing wildlife crossings to extend wildlife movement corridors over and under major roads appear to outweigh the costs of construction and maintenance. One US study (2) has estimated that adding wildlife crossings to a road project is a 7-8% increase in the total cost of the project. However, the strict monetary costs associated with constructing and maintaining wildlife crossings in ecologically important areas are easily surpassed by the benefits associated with protecting wildlife populations, reducing property damage to vehicles, and saving the lives of drivers and passengers by reducing the number of collisions caused by wildlife.

Australian Wildlife Crossing Success Stories

Compton Road is a major east-west arterial road cutting through one of the largest areas of remnant bushland in South East Queensland. Prior to its widening Professor Darryl Jones of Griffith University—an expert in urban ecology and wildlife management—advised on a fully vegetated wildlife overpass with rope ladders for possums, poles for gliders and customised culverts to act as tunnels for small animals to pass beneath the road. More than a decade later the Compton Road fauna overpass is perhaps the world's most studied overpass, providing a wealth of information on best practice road permeability methods to manage wildlife, as well as a greater understanding of fauna behaviour, home ranges and seasonal movements (3). The lessons learned include the following;

- i) Just six months after completion, there was intensive use of the overpass by a variety of the native fauna on both sides of the road, based on camera-trap and track evidence, with the species diversity increasing over time.
- ii) The wildlife structures at Compton Road cost \$700,000, which was just 1.5% of the overall cost of upgrading the road.
- iii) The Compton Road design has been duplicated across Europe, including seven in Sweden. This research has been embedded in major road construction approvals across Australia, with road permeability options for wildlife now standard in many places.

Moreover, the NSW Roads and Maritime Services has spent the past 20 years developing, refining and improving connectivity measures for all native fauna, not just koalas, and the upgrade of the Pacific Highway has been recognised across Australia and internationally as a leader in reducing animal strikes and maintaining habitat connectivity (4).

Identified critical need for koala crossings in Southern-Western Sydney

The findings of the recent NSW upper house parliamentary inquiry into koalas has led to renewed calls for a special national park in south-western Sydney and protective measures along Heathcote Road. This inquiry also found koalas may well become extinct in NSW by 2050 without

urgent government intervention to protect their habitat. There is an urgent need to both survey of koala numbers following last summer's bushfires and for the government to "urgently prioritise the protection of koala habitat and corridors in the planning and implementation stages of urban growth areas". There are identified "kill zones" along Heathcote Road- in 2018 six koalas had been killed on Heathcote Road in the last year, including two within a week- and a safe wildlife crossing needs to be established at the disused Cawley's Bridge over the M6 motorway.

The evidence-based and very cost-effective success of the Compton Road wildlife crossing provides one excellent template to move speedily to now remove this bloody stain on the environmental credentials of our local region, for the restoration of the populations of koalas and other fauna that continue to suffer on our roads.

It is now the hope of many Environmentalists that we will be able to save the healthy koala population in South and Western Sydney by a combination of both wildlife crossings and also two proposed National Parks- the Lower Georges River and the Nepean/ Bargo River. One vehicle proposed to support the establishment of these new national parks is the Queen's Commonwealth Canopy (QCC). Originally started in 2015, the QCC includes forty six countries and already encompasses 3,495,000 hectares, protecting forests and their biodiversity. The QCC will give these national parks and wildlife crossings an international profile, tourism opportunities and youth training.

The UN General Assembly has recently declared 2021-2030 to be the Decade of Ecosystem Restoration, it being fundamental to achieving its Sustainable Development Goals including biodiversity conservation (5). Wildlife crossings have a significant part to play in this restoration of our ecosystems and biodiversity which continues to be degraded by our current road systems; they also need to be a standard component of 'best-practice' in the planning of any new road systems.

Dr Ross Jeffree, National & International Projects Officer, Southern Sydney Branch and NPA State Counsellor

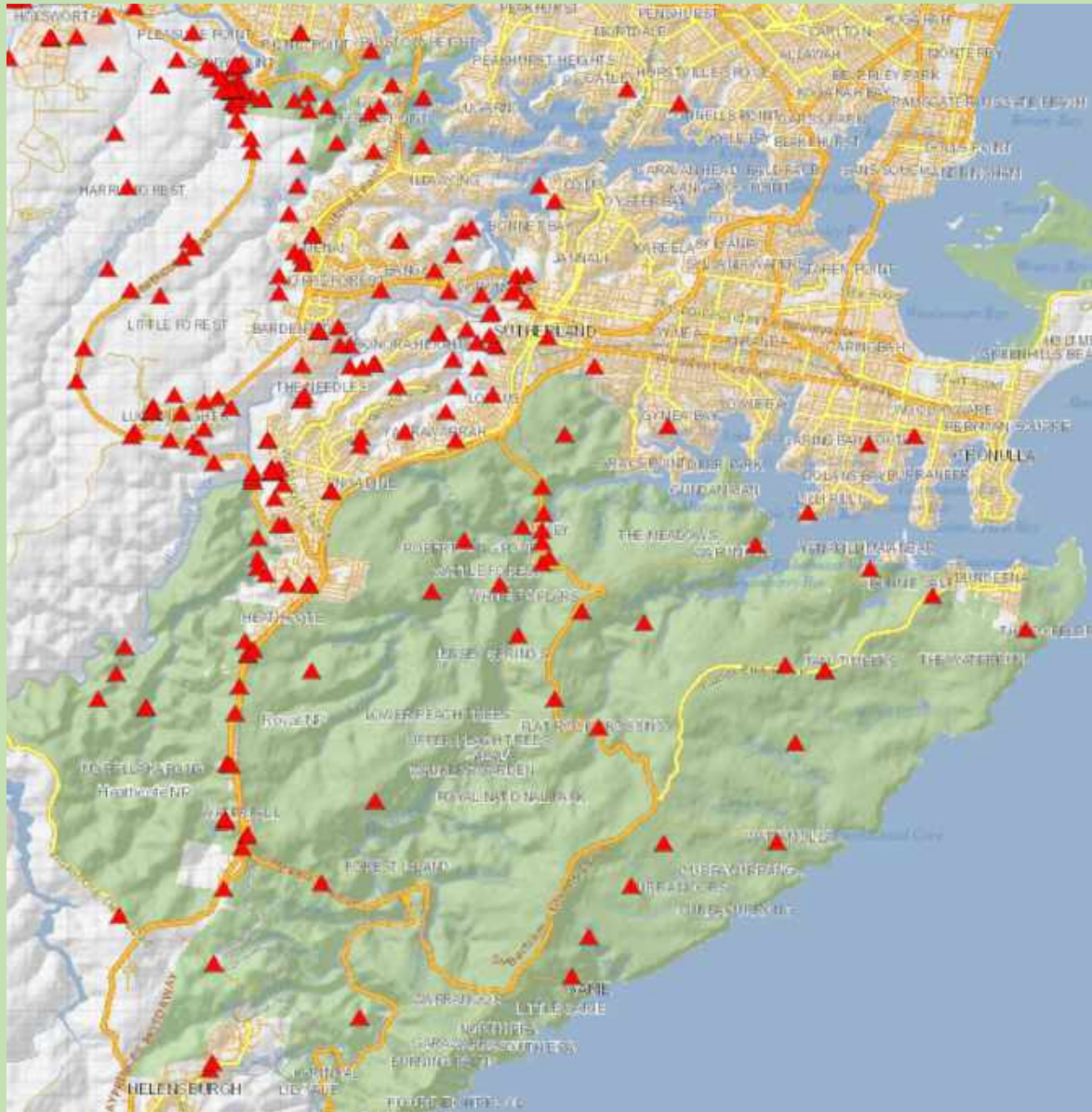
References

1. IUCN (2019). Corridors and Crossings: Mainstreaming ecological connectivity in existing and planned infrastructure.
2. Bank, F. G.; C. L. Irwin; G. L. Evink; M. E. Gray; S. Hagood; J. R. Kinar; A. Levy; D. Paulson; B. Ruediger; R. M. Sauvajot; D. J. Scott; P. White (2002). Wildlife habitat connectivity across European highways (Report). U. S. Department of Transportation: Federal Highway Administration. pp. 1–45.
3. <https://www.griffith.edu.au/research/impact/compton-road-wildlife-corridor>
4. <https://www.rms.nsw.gov.au/about/news-events/news/roads-and-maritime/2015/151023-fauna-crossings-on-pacific-highway-a-success.html>
5. <https://www.unenvironment.org/news-and-stories/press-release/new-un-decade-ecosystem-restoration-offers-unparalleled-opportunity>

Recommendations for increased protection for koalas and resilient habitat within the Sutherland Shire

Sutherland

By Catherine Reynolds



The report from the NSW Senate inquiry Koala populations and habitat in New South Wales has found koalas could become extinct in NSW by 2050 without urgent government intervention. The Report's recommendations state government should 'urgently prioritise the protection of koala habitat and corridors in the planning and implementation stages of urban growth areas'. The importance of koala corridors is noted, with 'safe connectivity between habitat areas' being 'essential for the survival of koalas, as they were not social animals and needed habitat to migrate and exchange genetic material. By moving on the ground through fragmented patches of habitat, koalas were also put at higher risk of being hit by vehicles or attacked by dogs.'

According to this report Councils can play a critical role in conserving koala habitat.

The NSW Senate Report - Koala populations and habitat in NSW

Sutherland Shire Environment Centre, National Parks Association Southern Sydney, Friends of the Royal National Park, Georges River Environmental Alliance, Oatley Flora and Fauna Society have been calling for increased protection for native animal habitat, and in particular koala habitat, for some time now. Wildlife corridors are increasingly being recognised as critical to the survival of native species, allowing them to move freely over the landscape, find mates, build genetic diversity, escape difficult conditions, and maintain populations at viable levels.

- Recommendation 3 of the Report specifically states 'That the NSW Government fund and support local councils to conserve koala habitat, including by identifying pockets of urban bushland to include in the State's protected area network.'
- Recommendation 12 of the Report states 'That the NSW Government ensure that the combination of underpasses, overpasses and exclusion fencing along roads is incorporated into both the retrofitting of existing infrastructure and new development in areas of known koala habitat.'
- Recommendation 14 of the Report states 'That the Roads and Maritimes Services allocate appropriate and sufficient funds for the ongoing maintenance and management of exclusion fencing along roads.'
- Recommendation 24 of the Report states 'That the NSW Government increase funding to local councils to support the implementation of local koala conservation initiatives.'
- Recommendation 27 of the Report states 'That all councils with koala populations be required to develop comprehensive koala plans of management in a timely manner.'
- Recommendation 29 of the Report states 'That the NSW Government increase resources to local councils to support them in conducting mapping required for comprehensive koala plans of management.'

The suggestions on the following pages are areas we believe the recommendations of the NSW Senate Inquiry can be implemented across Sutherland Shire.

Four main locations are identified - including "kill zones" along Heathcote Road. Protective measures could be put in place at Deadman's Creek at Sandy Point, at the Lucas Heights precinct, and around Heathcote Road Bridge over the Woronora River. What is needed in these areas is not overly complicated, and could be done under existing Roads and Maritime funding and work arrangements.

Cawley's Bridge near Helensburgh crosses the F6 Freeway at Garawarra and is no longer used as a public road, but remains a service road for various agencies. This bridge could be easily be transformed to offer a critical wildlife corridor giving native animals safe passage from Heathcote

National Park and the Woronora Special Area catchment through to the Garawarra State Conservation Area and on to the Royal National Park.

Proposed Reconstruction of Cawley's Bridge at Garrawarra as a Wildlife corridor over the F6 Freeway



Cawley's Bridge has been recognized by the National Parks and Wildlife Service (NPWS) since the mid-1970s as a potential wildlife corridor. At that time NPWS identified a number of wildlife corridors around Royal National Park, Heathcote National Park and SCA as necessary for the wellbeing of animals. The F6 Freeway acts as a major barrier to wildlife movement, severely limiting the ability of animals to move around these areas.

Cawley's bridge can potentially allow native animals safe passage over the F6 from Heathcote National Park and the Woronora Special Area catchment through to the Garawarra SCA and on to the Royal National Park. The Royal National Park has become increasingly isolated from surrounding natural lands, with a number of species originally found in the Park now locally extinct. This loss was exacerbated by the catastrophic 1994 fires. Reshaping Cawley's bridge into a wildlife overpass can be done for relatively minimal cost. One lane of the service road could be retained: it is only necessary to turn one side of the bridge into a habitat area. Sheltered walkways could be built on the bridge rails for the use of arboreal species and connected to nearby trees to allow wildlife to safely access the crossing.

The Compton Road overpass in South-East Queensland is one model which suggests that Cawley's bridge could be successfully transformed in this manner. Compton Road is a major east-

west arterial road similar to the F6. In the 10 years since the completion of the land bridge there, only 3 mammals have been killed from motor vehicle accidents. Before this, 5 were killed on this road every month.



The Compton Road incorporates rope ladders for possums, poles for gliders and customised culverts to act as tunnels for small animals to pass beneath the road. It is planted with locally sourced vegetation so it became a continuous with the surrounding forest. A fence has also been installed which acts as a funnel directing wildlife towards the crossing.



The Compton Road overpass is a model for what can be achieved with wildlife overpass crossings. The design has been duplicated across Europe, with seven overpasses in Sweden alone. The project has been embedded in a number of major road construction approvals across Australia.

Similar measures to what is proposed here would be easy to implement along Heathcote Road at Sandy Point, the Lucas Heights Precinct, and Woronora Bridge with the forthcoming upgrades there.



Sandy Point – the Deadman’s Creek kill zone

Reports suggest a significant number of koalas and other native species have been killed at Deadman’s Creek at Sandy Point, with confirmed reports of at least 6 koalas killed in 2018 alone.

The Holsworthy military training base provided a relatively safe habitat for koalas but this area was devastated by fire in 2018. Clear-felling of koala habitat at the Moorebank Intermodal Site and the relocation of the new Army Logistics site on Moorebank Rd has further jeopardised koala habitat around the area, forcing them to seek alternative food sources. The Appin, Mt Gilead and Wilton areas appear to be increasingly subject to urban expansion. Providing safe corridors away from these zones should be made a priority.

The recent parliamentary inquiry report recommended the government "urgently prioritise the protection of koala habitat and corridors in the planning and implementation stages of urban growth areas".

With the koala kill zones at Heathcote Road, flashing lights and signs warning motorists are inadequate to address the road kill, as is the currently existing fencing. An underpass already exists at the new bridge at Sandy Point which could be modified to allow safe passage for these koalas. As with Compton Road, directional fencing could be installed to act as a funnel directing wildlife towards this underpass. Rope ladders for possums, poles for gliders could be installed overhead. Local Aboriginal land holders to the east of the road and the Ministry of Defence on

the western side may need to be consulted in order to obtain permission for this fencing to be installed. The Department of Roads and Sutherland Shire Council would also need to approve this work.



Koala sightings and roadkill at Sandy Point
Bionet 13 July, 2020: <http://www.bionet.nsw.gov.au/>

The Lucas Heights precinct and Heathcote Road bridge at Woronora River

The New Illawarra Rd at Lucas Heights has unfortunately become another kill zone at the same time as new housing estates have been developed around the area, putting pressure on the existing koala population.

The Heathcote Road Bridge over Woronora River upgrade is expected to result in road closures for at least 6 months. Regardless of what final decision is reached regarding the character of the upgrades, the closure and associated roadwork offers an ideal time to install koala friendly wildlife crossing and fencing, as per the Compton Road project mentioned above. These

measures could be implemented at both the new Lucas Heights Innovation Precinct, and around the Heathcote Bridge across Woronora River.



Further references – successful wildlife crossings

Saving Wildlife – the Compton Road effect, Griffith University

<https://www.griffith.edu.au/research/impact/compton-road-wildlife-corridor>

Wildlife Crossings supported by the NSW Roads and Maritime Services - 'Gliders take the high road: Study proves highway fauna crossings are being used by threatened species', ABS News, 19 July, 2018

<https://www.abc.net.au/news/2018-07-19/gliding-mammals-use-fauna-power-poles-to-cross-road-study-finds/9991528>

Wildlife Movement Solutions Brisbane City Council

<https://www.brisbane.qld.gov.au/clean-and-green/natural-environment-andwater/biodiversity-in-brisbane/wildlife-in-brisbane/wildlife-movement-solutions>

CSIRO Wildlife Research 30(5), 04 December 2003, 'Cutting the carnage: wildlife usage of road culverts in north-eastern New South Wales'

<https://www.publish.csiro.au/am/pdf/AM09007>

VicRoads Fauna Sensitive Road Design Guidelines 2012

https://www.vicroads.vic.gov.au/-/media/files/documents/planning-andprojects/environment/vicroads_n1571864_vicroads_fauna_sensitive_road_deisgn_guidelines_final.ashx

Catherine Reynolds, on behalf of Sutherland Shire Environment Centre, National Parks Association Southern Sydney, Friends of the Royal National Park, Georges River Environmental Alliance and Oatley Flora and Fauna Society

Recording Nature

By John Prats

Since prehistoric times humans have illustrated flora and fauna as well as their natural environment. These can be seen in the cave drawings in Europe and other engravings and paintings around the world including those in Australia. These works evolved into more sophisticated illustrations with the improvements in the mediums used. In more recent times explorers collected specimens throughout the world and illustrated and classified them adding to our knowledge of living things - think of Sydney Parkinson who was Joseph Bank's illustrator on the Endeavour and his drawings of Australian plants and animals.



The invention of photography has made the recording and illustration of nature much easier. Photographs of natural scenes by Ansel Adams in the USA for instance, showed Americans the beautiful and majestic scenery in their country. His photographs of these locations inspired people and helped convince citizens and politicians alike that these areas had to be protected

resulting in the creation many national parks. The same happened in Australia with the work of such people as Myles Dunphy.

Through photography, some of us in NPA have continued this tradition. Members interested in photography have come together to go on bush walks where the aim is not only to exercise and see the beautiful places and wildlife of our national parks but also, through video and photography, record what we've seen and show people what there is out there in the hope of not only encouraging them to visit these places but also to show that these places are worth preserving.

These walks are not exclusively for photographers but also for those who don't mind a slow walk that may include plenty of stops. Nature photographers will generally take longer in walking as they make a lot of stops to inspect interesting things along the walk. In fact you will know when one of these people has joined your normal walk as they tend to lag behind and, because of this, they can be a bother for some walks leaders. For nature photography, it's much better to walk with like-minded people.

In our walks, we may carry point and shoot cameras or single lens reflex cameras or both. Lenses of the latter can vary depending what you expect to be shooting. Ideally one carries a camera and two lenses, one for long distance shots of birds etc., the other for close-up shots. You may also carry a wide angle lens for scenery shots. These days, the cameras in newer mobile phones are quite good especially if the photos are only going to be uploaded on the internet. It combines communications, GPS navigation and camera into a very small portable device. The only thing it may not be able to do in photography is capture detailed images of subjects at a distance. Here you really need long lenses which can be heavy and bulky. How much you are interested in capturing distance shots will determine how amenable you are in carrying such loads.

In searching for things to photograph you will be surprised at what you would notice that you wouldn't otherwise on a normal bushwalk. I liken photography walks to mini expeditions as you never know what you'll come across. In fact on some occasions when we have been accompanied by non-photographers, they have remarked on how much more they have seen, be it flowers, insects, birds and other wildlife, as well as seldom seen animal behaviour. You can include scenery and geological features in that as well. Not much is missed especially when you are with a group as there are many eyes on the lookout for subjects to photograph.

Noticing plants, flowers, insects and other living things on a walk makes the walk more interesting. Photographing them, seeing how well they have been captured, trying to identify species and sharing this information with others adds to the pleasure. For unknown species there are several sites on the internet, including social media that can help identify flora and fauna. Nature photographers are like the old specimen collectors of the 18th and 19th centuries, but unlike them no specimens come to harm. They are merely photographed, not dried or killed and preserved for the long voyage home.

As we know, a great advantage of digital photography over film is that you can take hundreds of shots without any costs and this allows us to take many shots of the same subject in the hope of getting a perfect one. However this has added to our workload as one of the task you would usually have to do after a trip is to view the photos and cull the not so good ones. Then you

would normally upload them to your computer or device and, after that, what you would do will depend on how much time you would want or can spend in front of a computer. In the old days of film most of us would just leave the negatives at a camera shop for them to do the developing and printing. But now, with all new editing software that is around with capabilities for all sorts of adjustments that work has landed on our laps. This, together with the initial culling we have to do, invariably adds to our workload. Doing this on many shots can be an onerous task. However, for some, this would be a pleasure as it gives them options on how they would like their image to look by cropping the frame to show what is relevant and adjusting brightness, colour saturation, and sharpness as well as other fine adjustments.

Even after culling and editing, with the ease of taking so many shots, you can easily accumulate quite a large number of photos. What can an avid photographer do with all these? Here are some possibilities:

- Upload them on social media to promote our natural environment. This also allows you to get feedback on how good your photos are and where there's room for improvement.

- Frame and hang exceptional ones on your wall or make calendars out of them to give as presents.

- To help in the survey of species, details of the findings could be uploaded to NSW Bionet.

- Use them for presentations to entertain, inform or educate. – Photographs woven into a story adds interest and appreciation.

- Photography is an art form and photographs can be artistic. But as they are good at capturing detail and colour, you can also use them as an aid to drawings and paintings.

- Donate them to non-profit organisations such as Wikipedia and others.

- And of course there is the option of selling them on Alamy, Shutterstock, Getty or other such companies. Considering the amount these organisations pay for each photo, you may have to sell quite a large number to make some money to pay for your daily cappuccino and, even then, you may have to have a smooth processing system to lessen the amount of time you have to sit in front of a computer screen refining shots and uploading them. But despite this small financial reward, for some of us, the thought that someone has actually shown appreciation for our photos by paying for them is reward enough!

If you are interested in doing one of these walks, check out the NPA activities program for one. If you don't see any, why not request for one – you may just see nature like you've never seen it before!

Recreational use of Royal National Park and adjacent Reserves

Within the course of the next few months the new Draft Plan of Management for Royal and Heathcote National Parks and Garawarra SCA will be released for public comment and there will be a number of contentious matters arising that members will need to consider when and if they make submissions.

In this context it is worth reminding us all why we have national parks and within NSW the various categories of protected land managed by the NPWS are governed by the *National Parks and Wildlife Act 1974 No 80*.³ Mostly we understand that this Act applies to Nature Reserves, National Parks, State Conservation Areas and Historic Sites but whatever the terminology and whatever the classification of any particular reserve the core objective of the Act is:

(a) the conservation of nature, including, but not limited to, the conservation of habitat, ecosystems and ecosystem processes, and biological diversity at the community, species and genetic levels, and landforms of significance, including geological features and processes, and landscapes and natural features of significance including wilderness and wild rivers,

(b) the conservation of objects, places or features (including biological diversity) of cultural value within the landscape, including, but not limited to places, objects and features of significance to Aboriginal people, and places of social value to the people of New South Wales, and places of historic, architectural or scientific significance,

(c) fostering public appreciation, understanding and enjoyment of nature and cultural heritage and their conservation.

In other words each and every reserve has as its core purpose the protection of the diverse values of that reserve and all other matters must remain secondary.

It is this imperative that is central to any good plan of management and that should inform whatever recreational provisions are made within the reserve system of NSW.

As we consider the recreational opportunities being planned for Royal, Heathcote and Garawarra, NPA supports the International Union for Conservation of Nature (IUCN) reserve categories and what is acceptable within those categories and expects those categories to determine what the condition of such parks should be. This assumes that any recreational development must be consistent with the purposes for which a specific park was gazetted and its core environmental attributes. We therefore believe that all parks must be assessed for their landscape capability of supporting such an activity, including but not limited to the potential for erosion, habitat fragmentation, loss of biodiversity and impact on threatened species.

It is therefore crucial that there must be base data about the condition of a national park and any recreational activity must be monitored to measure the impact it is having on the park. It must also assess potential downstream environmental impacts such as species range/habitat fragmentation, dispersal of pests and weeds and disruption of nocturnal fauna behaviours- especially for linear infrastructure such as walking and mountain biking trails.

³ <https://www.legislation.nsw.gov.au/#/view/act/1974/80/part1/sec5>

If any recreational activities cause a deterioration NPA expects that there will be a graduated response to rectify the damage, to restrict the activity or to completely close it (either temporarily or permanently, depending on the situation).

In practice NPA believes that a good plan of management for Royal National Park would demonstrate that prior to any new recreational infrastructure being planned and built, baseline data would be obtained on but not necessarily limited to:

- Flora and fauna surveys that are site specific, with an understanding of the varying responses to human activity (day and night, given the expanded hours humans enter the bush) and habitat fragmentation
- Ideally that would include invertebrates though current legislation excludes them from the remit of NPWS Act
- The current track network, their condition and the degree of habitat fragmentation

NPA notes that the huge number of bushwalkers using Royal National Park, in particular, has caused serious erosion, especially along the Coast Track, and over many years it has advocated for appropriate resources to better protect the values of the park. In that spirit it has been pleased to see resources allocated for track repair and re-constructed routes with more impact-resistant materials and has supported the reduction of formal camping sites, no camping fires, limits on numbers on walks and limits regarding off-track walking.

Accordingly NPA has consistently advocated for regular monitoring and reporting of track/trail conditions, including but not limited to width, erosion, short cuts, modifications, etc, regular monitoring of impact on flora and fauna that is based on consistent, objective, scientifically based criteria and a graduated set of responses to the various thresholds to ensure remediation and/or recovery of sites up to and including permanent closure.

Finally, NPA notes that recreational users can also conflict with other users and this conflict must be managed equitably with a view to the safety of users and their ultimate enjoyment of the national park so that their visit does, indeed, foster “public appreciation, understanding and enjoyment of nature and cultural heritage and their conservation.”

Over many years our Branch of NPA has been closely involved in addressing the increasingly popular pastime of recreational mountain biking. For a number of years Gary Schoer was the NPA representative on a working group whose major aim was to provide some direction on the extent to which such non-motorised bikes might use the tracks and/or management trails of Royal National Park while at the same time supporting the objectives of the *National Parks and Wildlife Act 1974*.

There was substantial consensus from our Branch, NPA NSW, leadership of Mountain Bike key bodies and the NPWS that mountain biking on the wide, generally flat management trails that could support firefighting and other management vehicle uses was a sustainable use, given the NPWS’s right to shut trails on a needs basis should tracks become too muddy or otherwise less supportive of wheeled impacts. We all supported this principle of “adaptive management” that might alter any specific directions within the current legislated 2000 ***Plan of Management***. The issue that created the most discussion and management dilemmas was that the Mountain

Biking representatives often called for downhill single tracks that provided an adventure dimension beyond more passive pursuits on flatter, wider trails that NPA felt were more conducive to park users enjoying the “naturalness” other than through bushwalking. How this issue will be carried forward as a long-overdue revision takes place of the current Plan of Management is now front and centre of NPA’s thinking as the new revised Draft POM is due to be released in August 2020.

We in NPA have struggled to gain much timely traction with NPWS management to address the proliferation of illegal single tracks on steep downhill sections leading down to Temptation Creek near Loftus. However, simultaneously NPWS worked with the formal mountain biking leadership to cooperate in developing a limited length of very moderate downhill single tracks in the Temptation Creek catchment not far from the NPWS office at Audley Heights. These supposedly “trial” tracks have retained this status from 2009 up until the third printing of the official Royal National Park Map in 2016. These tracks are described as “single walking track temporarily accessible to bikes for a trial period”.

NPA would contend that decisions about just which of these trial (single) tracks gain a more permanent status should be resolved during the current Plan of Management revision process. The retention of the highlighted “trial” tracks is close to what NPA supported in its response to the Mountain Bike Discussion Paper, with the assumption that there would continue to be labour cooperation in maintaining the sustainable use of these tracks.

NPA emphasises though, that research into what the final layout for any single bike track network might look like needs to be informed by on-the-ground evaluation of how “trial” tracks have performed and other research such as that conducted by students from the University of Wollongong. NPWS has been reminded of these trials in our Branch’s submission to the 2019 Mountain Bikes “Discussion Paper”, and has been urged to closely study all findings that give direction to how future management needs to be cognizant of sustainability goals of the NPW Act.

It is also worthwhile to consider just how many management trails are available for mountain bike users compared to single tracks that would normally be set aside as walker-only tracks noting that walkers are still the dominant user group in the three reserves (Table 1).

Table 1. Management Trails and National Parks Roads compared to single width walking Tracks in Southern Sydney National Parks estate *

Reserve	Trail/ Park Roads available for shared cycling & walking if Plan of Management Permits	Single track; Cycles excluded by NPWS Policy	Ratio Cycling trail/Park Road availability vs single walking track
Royal National Park	89	62 <i>(an additional 3km shared single track, trial basis)</i>	1.4
Garawarra State Conservation Area	11	2	5.5
Heathcote National Park	25	6	4.1

- Source: 2010 Royal National Park Map; NPWS

Cumulatively then, these three reserves offer approx. 125km of management trails and roads for cycling enjoyment of the natural features, while only c. 70 km service the needs of walking recreators on single tracks. So a desire for far more than the 3km trial single tracks for downhill sport that could well compete with the needs of walkers for both safety and distancing from less passive activities is challenged by NPA. This concern needs to be viewed through the lens of just how much access mountain bikers already have to these reserves (Table 1).

Illegal track use has become solidly entrenched over more than a decade.

A group of Branch executive recently examined on-the-ground issues related to the current decade-long trials at Temptation Creek and current illegal use of single tracks there and elsewhere in the local Reserve system. While we have communicated many of our concerns already to local NPWS management, our monitoring raises many questions that should affect the nature of future management intent after feedback to the Draft Revised Plan of Management is examined.

- *What is the current situation regarding the extent of illegal use of single tracks?* The 80% reduction in illegal use reported by Wollongong University researchers needs examining based on more recent surveys for signs of illegal use in Temptation Creek and Heathcote East within Royal National Park and Kelly's Falls and Helensburgh west sectors of Garawarra State Conservation Area
- *What is the scale of environmental destruction?* There is soil disturbance, hole digging to create soil for curved track sections, introduction of concrete and other materials for

jumps and disturbance of undergrowth and fragmentation of habitat. The discovery of a tennis court roller deep in the bush at Garawarra SCA west highlighted the extent of the ineffectiveness of a resource-stretched NPWS to put a lid on this scale of community abuse of significant bushland areas that are supposedly *protected under the NPW Act*.

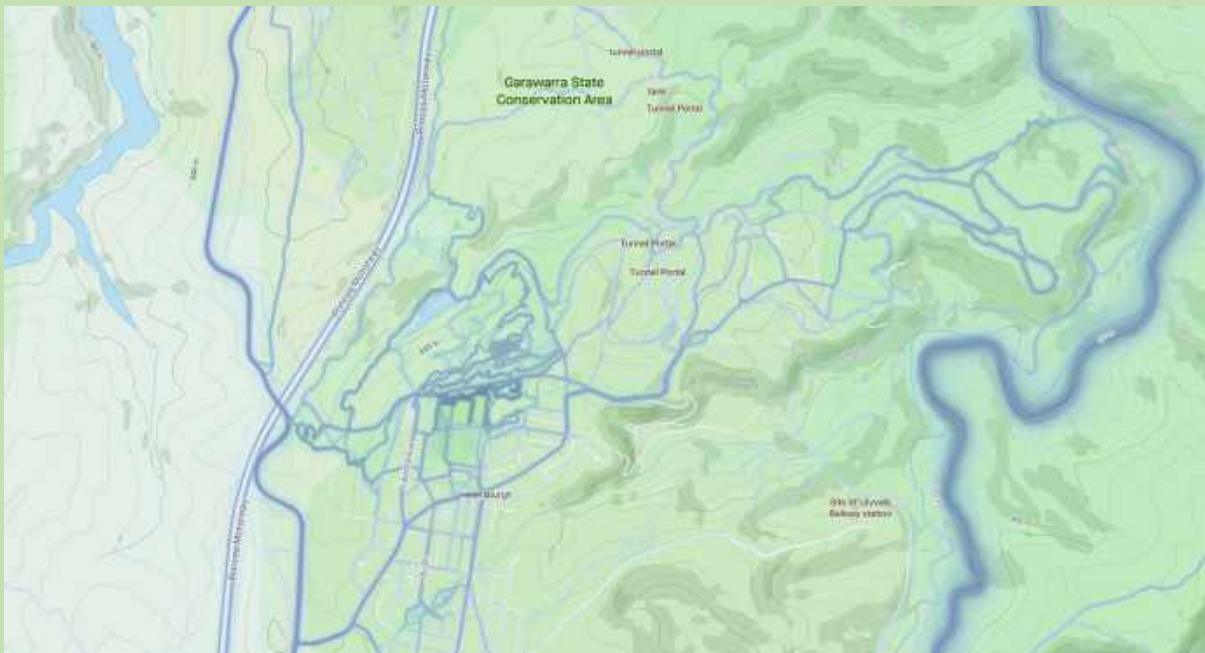
- What management decisions will be embedded in the revised POM that will provide a strong direction to how to restore these damaged ecosystems? There may even be gross landscape disturbance to a possible endangered ecological community at Heathcote East. There seem to be no current signage urging local and visiting bike users to keep off other than hardened, flat management trails in the area. The trial single walking track running parallel to the Engadine Lakes Trail is reported to be in a devastated condition.

Bodies of evidence on the illegal usage and environmental degradation caused by Mountain Bikes

- a) *illegal creation and usage of tracks by Mountain Bikes (& perhaps some trail bikes) as documented by the web app, Strava*

Below are two images from the website/app Strava. Strava is used by cyclists, runners and other outdoor users to record their activities either directly via the Strava phone app or by uploading from other sources. One feature of Strava is that it provides the routes used by other Strava members which is useful for example if you are after a new route experience. The images below show the routes used by bikes on both paved and dirt surfaces. The darker the lines the more often a route is used by all riders. The two images are of areas adjacent to Loftus and Helensburgh. Research is admittedly needed to determine what % of records may be from non-bike users, but our monitoring of bike tracks on these single tracks indicate that there is substantial bike usage on all single tracks we examined radiating from legal management trails in several areas.

From these two sample areas, using both Strava data and personal observations, it is estimated that there are 12 km of illegal riding recorded on either formal single walking tracks or “untracked” areas as per the 2016 edition of the NPWS Royal National Park map around the Temptation Creek Catchment. There are also an estimated 6 km of illegally used “bike tracks” in the western part of the Garawarra State Conservation Area.



Moreover, these visual representations give one indication of the high spatial intensity of the dissection of bushland which has been caused by illegal Mountain Bike intrusions in these two sample areas. Such an overview is difficult to adequately capture in individual photos of damage to bushland.

b) Evaluation of the trial mountain biking program

Several university Honours studies have been made of the trial mountain bike program since its inception but they do not appear to have been made public and in any case the introduction of the trial proceeded without the baseline data that is necessary to make many valid conclusions. NPA received no information as to methodology, tracks studied and actual raw results. As such there is no way of understanding of explicit results that related to trial single tracks, tracks in NPA supported network or others mooted by *Dirt Art*. They thus cannot be used to justify specific management decisions related to the development of MTB use of any tracks within a revised Plan of Management for the Temptation Creek Precinct.

NPWS is thus urged to request a more thorough analysis of these studies and a comparison of what these results can inform compared to what *Dirt Art* recommends. Without such an analysis, revision of the POM for this precinct will lack scientific rigour, especially when coupled with lack of impact analysis on plants and animals.

c) Ground Survey by NPA Members, July 2020

During July several NPA members visited selected sites to view the impacts of Mount Bikes at several locations.....

Photographic evidence was obtained to demonstrate the following;

- i) 'Industrial scale' production of tracks with heavy equipment including this track roller which was found deep within the Garrawarra State Conservation Area



- ii) Construction of bridges across small streams and soil disturbances, which also confirmed through track marks that trail bikes were also using these mountain bike networks of trails, often widened by the cutting of adjacent trees.



- iii) use of dislodged bush rock and fallen trees to construct mid-path jumps



- iv) the use of track networks by walkers of dogs and even a pack of unleashed domestic dogs was observed on numerous occasions at both Heathcote East and the western part of Garawarra State Conservation Area. This speaks to the probable inadequacy of NPWS patrolling activity.

By Gary Schoer, B Sc (Hons) Dip Ed, Dip Env Studies and Ross Jeffree, PhD

Native Orchids of Southern Sydney Book Review

This small sized lightweight publications punches above its weight and presents the reader with an excellent guide to the orchids found in the southern Sydney region. The book is authored by Shire resident and Australian Plants Society member from the Sutherland group, Margaret Bradhurst. It culminates 25 years of work.

The book begins with a succinct three page introduction of which a single page describes the orchid flower and helpfully illustrates some key floral arrangements common to orchids. This is followed by two pages of information on terrestrial orchids and how to find them.

From there the book details alphabetically the genera found in the region. Each orchid species features key descriptors and a photograph of each species.

Flowering Times, an index of common names, synonyms and alternative names plus a page for notes rounds off the book.

At \$20 it is well worth it and soon becomes indispensable.

Ian Hill

