

PARK WATCH



OUR GREAT GRASSLANDS
NATURE PROTECTION STALLS
SAVE OUR SPIDER CRABS
JOINT MANAGEMENT
OPENING UP OYSTERWATCH
QUIZ: SHARKS AND RAYS
WILD FAMILIES LOVELY LEAVES

SEPTEMBER 2020 NO 282



**VICTORIAN
NATIONAL PARKS
ASSOCIATION**
Be part of nature



Be part of nature

PRESIDENT Bruce McGregor

DIRECTOR Matt Ruchel

Level 3, 60 Leicester St, Carlton, VIC 3053

ABN 34 217 717 593

Telephone: (03) 9341 6500

Email: vnpa@vnpa.org.au

Web: www.vnpa.org.au

OUR VISION

The Victorian National Parks Association vision is to ensure Victoria is a place with a diverse and healthy natural environment that is protected, respected and enjoyed by all.

Everyone can help in the conservation of Victoria's wild and beautiful places. To find out how you can help, visit www.vnpa.org.au/support or call us on (03) 9341 6500.

EDITOR Meg Sobey

PUBLISHING POLICY

All advertisements should be compatible with VNPA policies. Publication of an advertisement does not imply endorsement by the VNPA Inc. of the advertised product or service. The VNPA reserves the right to refuse any advertisement at any time.

Park Watch may be quoted without permission provided that acknowledgement is made. The opinions of contributors are not necessarily those of the VNPA Inc.

GUIDELINES FOR CONTRIBUTORS

You're always welcome to contact the editor to discuss ideas for articles. Phone the VNPA or email meg@vnpa.org.au

COPY DEADLINE for December 2020 *Park Watch* is Friday 23 October.

DESIGN South Star Design **PRINTING** Adams Print

COVERS

Front cover: Blue Pincushion (*Brunonia australis*), Common Everlasting (*Chrysocephalum apiculatum*) and a single Chocolate Lily (*Arthropodium strictum*) bursting with colour in Evans Street Grassland. Photo: Chris Clarke.

Back cover: Hoary Sunray (*Leucopogon albicans subspecies tricolour*) in remnant grassland. Photo: Debbie Reynolds.

Victoria's western grasslands are full of diversity and beauty – but our government is failing these critically endangered ecosystems. Read our feature article on pages 6–10 and find out how you can help call for their protection.

Learn all about grassland flora in the book *Plants of Melbourne's Western Plains: A Gardener's Guide to the Original Flora, 2nd Edition*, available at: www.apskeilorplains.org.au/book.html

Park Watch ISSN 1324-4361

Authorised by Matt Ruchel, Executive Director,
Victorian National Parks Association.
Level 3, 60 Leicester St, Carlton, VIC 3053.

Park Watch
is printed on
FSC certified
paper.

CONTENTS

- 3 From the President
- 4 VNPA COVID-19 Update
- 5 Permanent protection for nature stalls

Our Great Grasslands

- 6-8 Going, going, gone?
- 9-10 Renewed rush to 'clear' the way

- 11 Getting crabbier
- 12-13 Westernport – a wildlife wonderland at risk
- 14-16 Traditional Owner Joint Management
- 17 Book review: Kosciuszko: A Great National Park
- 18-19 River Red Gum Parks – designated but dewatered
- 20 Quiz: Sharks and Rays
- 21-23 What lies beneath?
- 24-26 The world is our oyster
- 27 'Cane toads of the sea' no more
- 28-29 Special Species: Sphagnum Moss
- 30 Tributes
- 31 Quiz Answers
- 32-33 In Parks: Afton Street Conservation Park
- 34-35 Wild Families: Lovely Leaves

From the President



Victoria has been experiencing an unprecedented lockdown and stay-at-home restrictions in response to the COVID-19 pandemic. Many are experiencing anxiety and stress with limited contact with family, friends, workmates, and little time in nature. Never before have the benefits of being outdoors, experiencing nature, been so demonstrated to so many. Melbourne has seen unprecedented crowds flocking to use the bushland paths along waterways, created by community efforts over the past 40 years. 'Friends of' groups in these areas of Melbourne are to be congratulated for their community-minded efforts – though they are frustrated at being prevented by present restrictions from doing their ongoing work. VNPA has responded to the community's need for nature connection by producing a Nature-At-Home webinar series that has been very well received by our existing supporters and new audiences.

Given this community enthusiasm for nature, it is therefore astonishing that the Victorian Government continues to sit on their hands when it comes to the creation of more national parks. While various governments have been planning for big population growth in Victoria with new subdivisions and roads, the provision of suitable natural protected areas is left languishing to wishy-washy 'market forces' – contrasting sharply with the rhetoric and promises made at the last state election.

As covered previously in *Park Watch* and again in this edition on page 5, the Victorian Environmental Assessment Council (VEAC) report into the forests of the Central West recommended the creation of many new parks. After four years of expert consideration by VEAC, the report was delivered more than a year ago, and the state government was meant to respond by February. There has been more than adequate time to agree to create these parks. Victorians in these areas are being denied access to new parks and protected areas. Are the voices

of very few antagonists going to block the overwhelming desires and needs of the rest of the community?

At the last state election, the government promised the creation of five smaller regional parks around the edges of the growth boundary of Melbourne. Nearly two years on, there is minuscule action on these proposals. There are constant changes in departmental staff responsible for planning these parks, and no one appears able to take the lead. Furthermore, after ten years, the Western Grassland Reserve, was supposed to be completed this year, yet barely 10 per cent of the land has been acquired. Read our feature on pages 6–10.

The protection of the Ramsar-listed Westernport Bay is also of critical importance. This magnificent area provides critical habitat and breeding grounds for a host of rare marine life and is a wonderful recreation area for millions of Victorians – even overseas tourists come from afar just to see the Fairy Penguins. Our government should not be considering endangering such an important environment by allowing AGL to build a gas import terminal. See more on pages 12–13.

I have recently re-read the National Geographic book celebrating the 2016 Centennial of the USA National Parks Service. The book cites Thomas Jefferson: "Do you want to know who you are? Don't ask. Act! Action will delineate and define you." Our state government's inaction on park creation is telling us much about who they are. What actions are the government and its ministers taking on parks and recreation?

The book also poses the question, when does access become excess? And further, who are the national parks for, and in what numbers? These questions are highly relevant to Victoria. Just what natural experience is gained by overcrowding and over-using parks? Do we allow the MCG to be over-filled by

letting people sit around the boundary line and along the isles? Does the MCG have insufficient public amenities and poorly maintained footpaths? No. Because allowing overcrowding and poor infrastructure is illegal. Participation limits are placed on popular commercial events. So why does the Victorian Government neglect proper natural resource management by underfunding Parks Victoria, allowing overuse by tourists, and infrastructure to fall into disrepair? The Andrews Government's continual and almost pathological inaction on adequate park management tells us much about who they are.

As mentioned in the June *Park Watch*, various economic stimulus packages are being developed by governments right now. VNPA staff are advocating for more 'green infrastructure', improved planning, and more funding for Parks Victoria. Staff have also provided a detailed submission to the Parliamentary Inquiry into Ecosystem Decline in Victoria. Your support in communicating these needs to decision-makers is vital. Proposals for more roads, gas pipelines and other 'make work' proposals of dubious economic merit must be challenged – and I encourage you to contact your MP.

Pandemic restrictions and working at home rules have been stressful for VNPA staff. The VNPA Council really appreciate the ongoing commitment of staff to our campaigns, programs, the VNPA community and nature in Victoria over this enormously challenging period.

I hope all our staff and supporters are safe and well. I thank everyone who was able to support our fundraising efforts at the end of the financial year. At this critical time, the funding provided by our Members, supporters and philanthropic partners is enabling us to continue to advocate strongly for nature. • PW

Bruce McGregor, VNPA President

UPDATES

VNPA COVID-19 Update

Brushtail Possum curled up in its home in Carlton Gardens.

PHOTO: ANDY EASTERLIN, FLICKR CC

Along with the rest of the community, we have been negotiating our way through the COVID-19 pandemic on a week by week basis. This has been a truly challenging time for all of us, and we are thinking of you and your families and communities.

To remain up to date with the VNPA's COVID-19 response, visit www.vnpa.org.au/COVID-19

Bushwalking and activities and citizen science

At this stage, we are still unfortunately unable to run bushwalking and other community activities. Our usual Bushwalking and Activities Program is, therefore, again not included with this edition of *Park Watch*. Please make sure you are on our bushwalking email list to hear when activities are up and running again. You can subscribe at www.vnpa.org.au/bwag-sign-up

Our citizen science programs ReefWatch and NatureWatch have spent the last few months focussed on some small-scale staff-led field work to maintain our projects, as well as preparing reports and developing new projects which we look forward to sharing with you soon!

Nature At Home webinars and workshops

To help us stay connected with nature from our homes, VNPA has a new Nature At Home section of our website with podcasts, videos and self-guided nature activities. Visit www.vnpa.org.au/nature-at-home

In addition, we have created a series of Nature At Home webinars and workshops. So far we have hosted webinars on the nature of national parks, the wonders of the central west, Spider Crabs and other crustaceans, and workshops on fungi identification and birdwatching for beginners. We've enjoyed the enthusiasm of hundreds of people joining us at these events.

If you missed the webinars visit our website to watch the recordings and keep an eye on your email and VNPA social media for future webinars and workshops (including an upcoming focus on marine and grassland environments) at www.vnpa.org.au/nature-webinars/

Continuing to care for nature

Thanks to the wonderful support of our members, supporters and volunteers, our work protecting nature continues apace. Thank you to those of you who have contacted decision-makers or made submission over the last few months requesting action to protect nature and national parks. While we all recognise that it is a challenging time to advocate for nature, with many critical government processes and decisions regarding nature on hold, it is important to maintain the pressure to stand up for nature in Victoria. Read more about VNPA's nature protection advocacy work that your support makes possible in this latest edition of *Park Watch*.

For regular news and updates you can follow us on Facebook, Twitter and LinkedIn (search 'Victorian National Parks Association') or sign up for our emails at www.vnpa.org.au/sign-up

Your support

The reality is that our natural environment needs us now, more than ever. As people who love nature, we must stand up for Victoria's special places and give voice to the species that call them home. Sadly, many

within our community are experiencing financial hardship right now. But if you are in the fortunate position of having the capacity to give, we ask that you continue to support VNPA's work through your Membership or by making a donation – nature still needs you.

Call the team on (03) 9341 6500 or visit www.vnpa.org.au/donate • PW

Ecotours and walking in the High Country, East Gippsland and beyond

Are you curious about the natural world?
Imagine immersing yourself in nature
while we share our love and knowledge
of the environment with you.



Let us arrange the accommodation,
the driving, the walks and talks. Even
your meals appear like magic. Enjoy the
companionship of a small group of
like-minded nature lovers and return
home refreshed, informed and invigorated.

Gippsland High Country Tours

Phone (03) 5157 5556

www.gippslandhighcountrytours.com.au

Advanced Ecotourism Certification. Est. 1987



PHOTO: SANDY SCHELTEMA

Seasons pass while these forests wait for protection they deserve.

Permanent protection for nature stalls

WE ARE INCREASINGLY ALARMED BY THE ANDREWS GOVERNMENT'S DELAY IN APPROVING NEW NATIONAL PARKS – ESPECIALLY AS IT CONTINUES TO MAKE DECISIONS TO THE DETRIMENT OF NATURE CONSERVATION, WRITES EXECUTIVE DIRECTOR **MATT RUCHEL**.

The impact of bushfires and COVID-19 are rightly high priorities for the state government. But long-outstanding nature conservation decisions are in the meantime stalling for no decent reason.

One year on from being tabled in the Victorian Parliament, the Victorian Environment Assessments Council's report recommending the creation of new national parks in the Central West gathers dust on a Minister's desk. The Andrews Government is now six months past its legislated deadline to release the decision on the expert formal proposal for 60,000 hectares of permanent protection for the Wombat, Wellsford, Mount Cole and Pyrenees Ranges forests.

The delay in a decision to approve the new national parks is putting the future of these unique forests and the threatened species that live in them at real risk. Alarming, mining exploration and logging are escalating in the very same areas proposed for protection, prompting outcries from conservation groups and the community. Locals in the Central West region have led direct action protests and gathered over 5,000 signatures on an online petition.

Yet in this same period of time that the Andrews Government seems to be finding it impossible to decide on these new national parks, it hasn't stopped making other decisions to the detriment of nature conservation. This notably includes re-signing the Regional Forest Agreements to continue logging Victoria's native forests for another ten years

(see coverage in the June edition of *Park Watch*), and initiating a review of the key regulatory document for managing native forest logging the Code of Practice for Timber Production, which seems rather concerned with the meeting of supply commitments of the state-funded logging agency VicForests. (See the Premier's media release: www.premier.vic.gov.au/review-protect-victorias-forests-jobs-and-timber-industry)

It is also not just the Central West national parks proposal that has languished; protection for other native forests across the state have not progressed as previously promised.

As part of the Victorian Forestry Plan to phase out native forests logging by 2030 announced in November 2019, the Andrews Government stated they would introduce immediate exemptions from logging for 96,000 hectares of forest across Victoria, including areas in the Strathbogrie Ranges, Central Highlands, Mirboo North and East Gippsland, as well as areas in the Rubicon Valley. The government clearly committed to this "biggest addition to our reserve system in over 20 years". The briefing note on the Department website still states that "In early 2020, we will announce the process for consultation ... This consultation process will help guide decisions on the best way to permanently protect the Immediate Protection Areas" (See: www.forestsandreserves.vic.gov.au/forest-management/environmental-regulation-of-timber-harvesting).

While much of the East Gippsland 'Immediate Protection Areas' were impacted by the bushfires last summer, communities around the Strathbogrie Ranges, Central Highlands and Mirboo North, like those in the Central West, are still waiting for these "immediate" protection areas, or at least some sort of process to protect their local forests.

We, like everybody else in the Victoria community, understand that the COVID-19 emergency has been the focus for government. But when the community came out of the first lockdown, people flocked to our parks for respite and recreation, with many of our existing parks overflowing with visitors. So many Victorians are again patiently waiting for their next bushwalk or camping trip. The community's desire and value for nature is high. Now is time for the state government to get back on track and commit to nature and create these new national parks.

In a time when we need a bit of hope, the government priorities allowing native forest logging rather than protecting nature for everyone to enjoy is a great shame for our state.

We need these decisions made and clear timelines put in place for permanent protection. A parks creation package would give us all something to doubly celebrate. • PW

Please join us in continuing to call for new national parks in the Central West: www.vnpa.org.au/central-west

OUR GREAT GRASSLANDS



Going, going, gone?

THE FAILURES IN PROTECTING ONE OF OUR MOST CRITICALLY ENDANGERED ECOSYSTEMS – GRASSLANDS – FROM MELBOURNE'S EVER-INCREASING URBAN SPRAWL IS FINALLY BEING PUBLICLY EXPOSED. BY EXECUTIVE DIRECTOR **MATT RUCHEL**.

The June release of a scathing Victorian Auditor-General report into the delivery of the Victorian Government's program to protect critically endangered grasslands on the urban fringe was followed by an extensive exposé in *The Age*.

The grasslands, grassy woodlands and grassy wetlands of Victoria's Volcanic Plains are one of the most critically endangered habitat types in our state. Once covering almost a third of Victoria, now only 1–5 per cent remains.

It is a landscape carved by volcanic activity that once stretched from the area that is now the western suburbs of Melbourne to the South Australian border. Much like the prairies of North America or the savanna of Africa, these grasslands are diverse, alive and play an important role as home to many incredible, unique, and

threatened plants and animals found nowhere else on earth.

A decade ago, in a rush to clear the way to 'streamline' approvals for property development and Melbourne's growth, the state and federal governments stitched up a deal called the Melbourne Strategic Assessment to clear about 6,000 hectares of grasslands within the 'urban growth boundary'.

In exchange for this clearing, developers were to pay a levy, which was then to be used to purchase large grassland reserves outside the urban growth boundary – an 'offset'.

In the state and federal government's words in 2010, it would: "increase the extent of protection of Natural Temperate Grassland of the Victorian Volcanic Plain from two per cent to 20 per cent," and "The Department of

Sustainability and Environment will be the acquiring authority and will acquire all freehold land (excluding quarries) and reserve it by 2020."

So these reserves were supposed to be largely delivered by this year – but these promises have been broken. The Victorian Auditor-General report found that:

- Protection is vital to ensure the future existence of grassland and grassy woodlands.
- The Victorian Department of Land, Water and Planning (DELWP) has not met its commitments to deliver the two grassland reserves by 2020:
 - *Only 10 per cent* of designated land has been acquired for the Western Grassland Reserve (between Melton and Werribee)
 - No land has been acquired for the Grassy Eucalypt Woodland Reserve (north of Melbourne around Donnybrook)

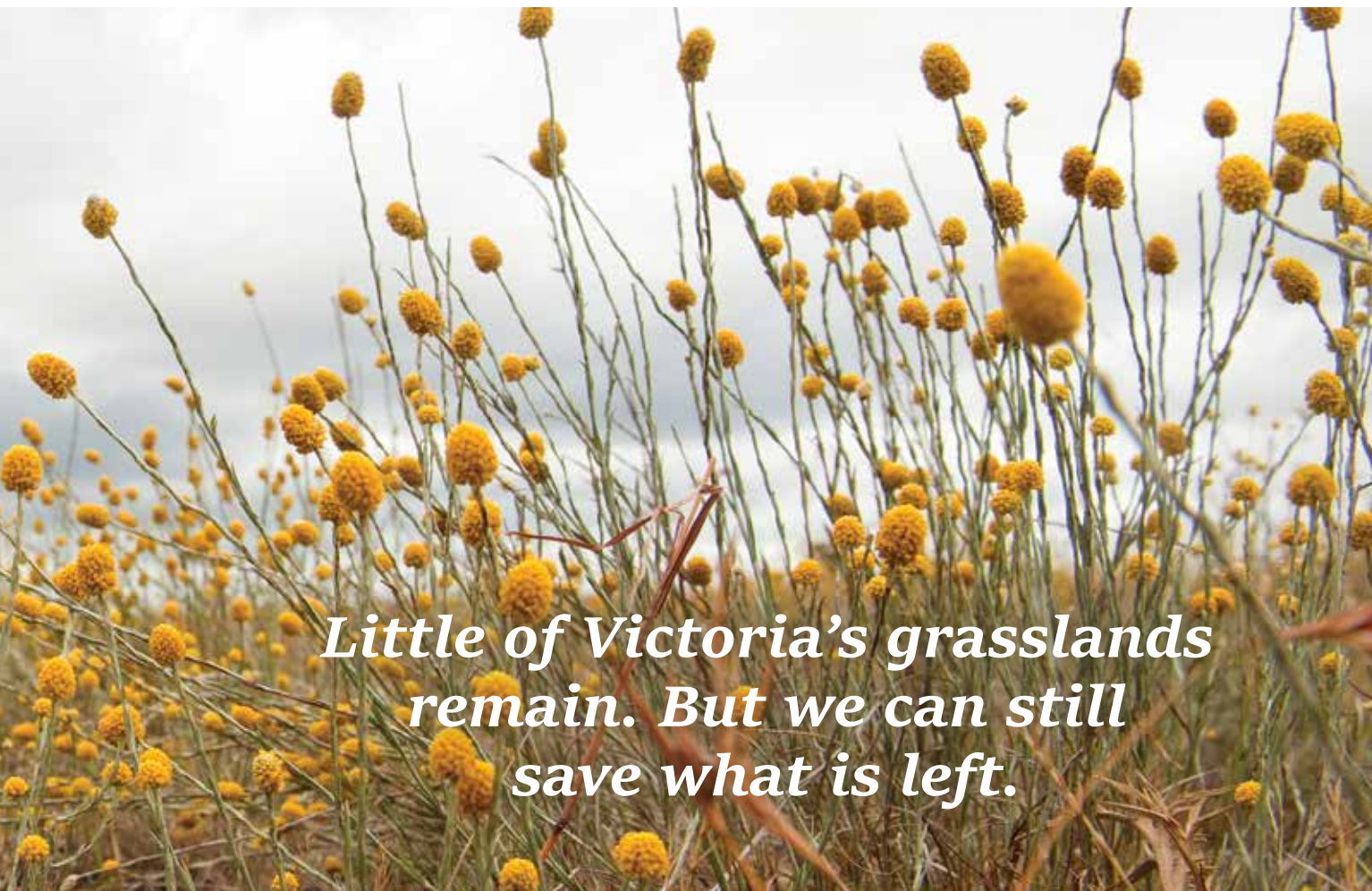


PHOTO: CHRIS CLARKE

Little of Victoria's grasslands remain. But we can still save what is left.

Lemon Beauty Heads (*Calocephalus citreus*) in abundance at Bababi Marning (Cooper Street) Grassland Nature Conservation Reserve.

- Delays in acquiring land, and continuing threats of degradation, pose risks to the ecological values of native vegetation within the reserves.
- Estimated program costs have increased around 80 per cent between 2013 to 2019, mostly due to rising land values.
- DELWP was slow to put the Melbourne Strategic Assessment governance arrangements in place and changed them several times. This has limited their effectiveness, meaning DELWP has missed key oversight activities or not always performed them consistently or to expected standards.
- DEWLP can't demonstrate that the quality of land purchased is of the quality of the grasslands being cleared.

Poor oversight and monitoring are among a raft of other issues.

The scheme was deeply flawed from the beginning, with priority always for 'streamlining' development approvals. Now, a decade on, it is truly flailing, and the property industry is circling to pounce on the remaining land pieces.

As I said in *The Age*: "The property industry got security and certainty, but the environment got half-baked promises that have not been delivered."

New legislation has been passed to collect more money to fund the purchase of the reserves. The *Melbourne Strategic Assessment (Environment Mitigation Levy) Act* was passed in February this year; its main function to enable the state government to increase fees for clearing of habitat. While the state government delayed acquiring land these past ten years, that same land has increased in price – the Auditor-General estimated that cost of purchase of grassland for the program has now almost doubled, to just under \$2 billion.

All the while the same delay mean habitats have continued their trajectory toward extinction. Revenue alone will not resolve the significant flaws and failings of this program. As yet there is no real change in the pace of delivery of the protection, or extent and effectiveness of the

management, of grasslands or grassy woodlands. Melbourne's population and housing demand are also likely to slow, due to economic downturn associated with COVID-19, further reducing revenue as these as the fees collected are dependent on land being developed.

Now the Victorian Government faces paying potentially millions in extra compensation to landowners instead of spending money on fixing the grasslands. The government was also outbid on a key piece of land in the reserve area, even though it has a public acquisition overlay, so it has now fallen back into the hands of property speculators.

There is also significant concern that the quality of the grasslands being protected is not of the same quality as the grasslands being cleared. There have been long-running concerns by community members and ecologists around the 'like for like' quality of vegetation identified for offsetting from within the Urban Growth Boundary with that in the reserves. As reported by the Auditor General, DELWP has only been able to undertake 'over the fence'

Continued overleaf



OUR GREAT GRASSLANDS

Continued from previous page

survey work of parts of the proposed Western Grassland Reserve.

To add insult to injury, the Andrews Government, under the cover of COVID-19, released a Strategic Extractive Resource Areas (SERA) Pilot Project in the South Gippsland and Wyndham areas. The investigation area overlaid the majority of the Western Grassland Reserves area. While there has been one active quarry for some time, there is now approval for a second quarry within the reserve, which further undermines the integrity of the entire scheme.

Many of the issues highlighted by the Victorian Auditor-General report have been raised for years and ignored or dismissed in the race to 'cut green tape' and push ahead to make Melbourne boom. The foundation of the entire Melbourne Strategic Assessment was a rushed process. Even ten years on, there has never been any serious consideration of alternative or mixes of models for protecting grasslands, such as in smaller high-value conservation areas within the urban growth zone rather than just the larger reserves on the outskirts.

The federal government, one half of the deal, has been missing in action on the issue.

'Natural Temperate Grasslands of the Victorian Volcanic Plain' and 'Grassy Woodlands of the Victorian Volcanic Plain' are both listed under the national *Environment Protection and Biodiversity Conservation Act 1999* as 'critically endangered' – the step before extinction in the wild.

They are home to 32 threatened flora and 25 threatened fauna listed under this national environmental law including Growling Grass Frog, Golden Sun Moth, Striped Legless Lizard, several migratory bird species plus numerous important native plants such as the critically endangered Plains Rice-flower and Matted Flax-lily.

Despite their listing under national environment laws, all have been neglected by the Australia Government.

Still, only ten per cent of the grasslands within the urban growth boundary has been cleared so far – there is still time to save some of the high-quality areas, before they are either also cleared, or left to become overrun with weeds.

A succession of Victorian and federal governments have failed to deliver what was promised. But there is still an opportunity to deliver outcomes before the options – and grasslands – disappear due to development or neglect. It requires leadership and a renewed plan to prioritise acquisition, protection and management of high conservation areas considered in the Melbourne Strategic Assessment – to save our grassy ecosystems. • PW

Take Action

Please send a message to the Victorian Environment Minister calling for an urgent examination of how to prioritise acquisition, protection and management of highest quality remaining grassland areas. You can also call on the federal government to enforce the commitment to protect Victoria's grasslands under our national environment law. Send your messages here: www.vnpa.org.au/protect-grasslands

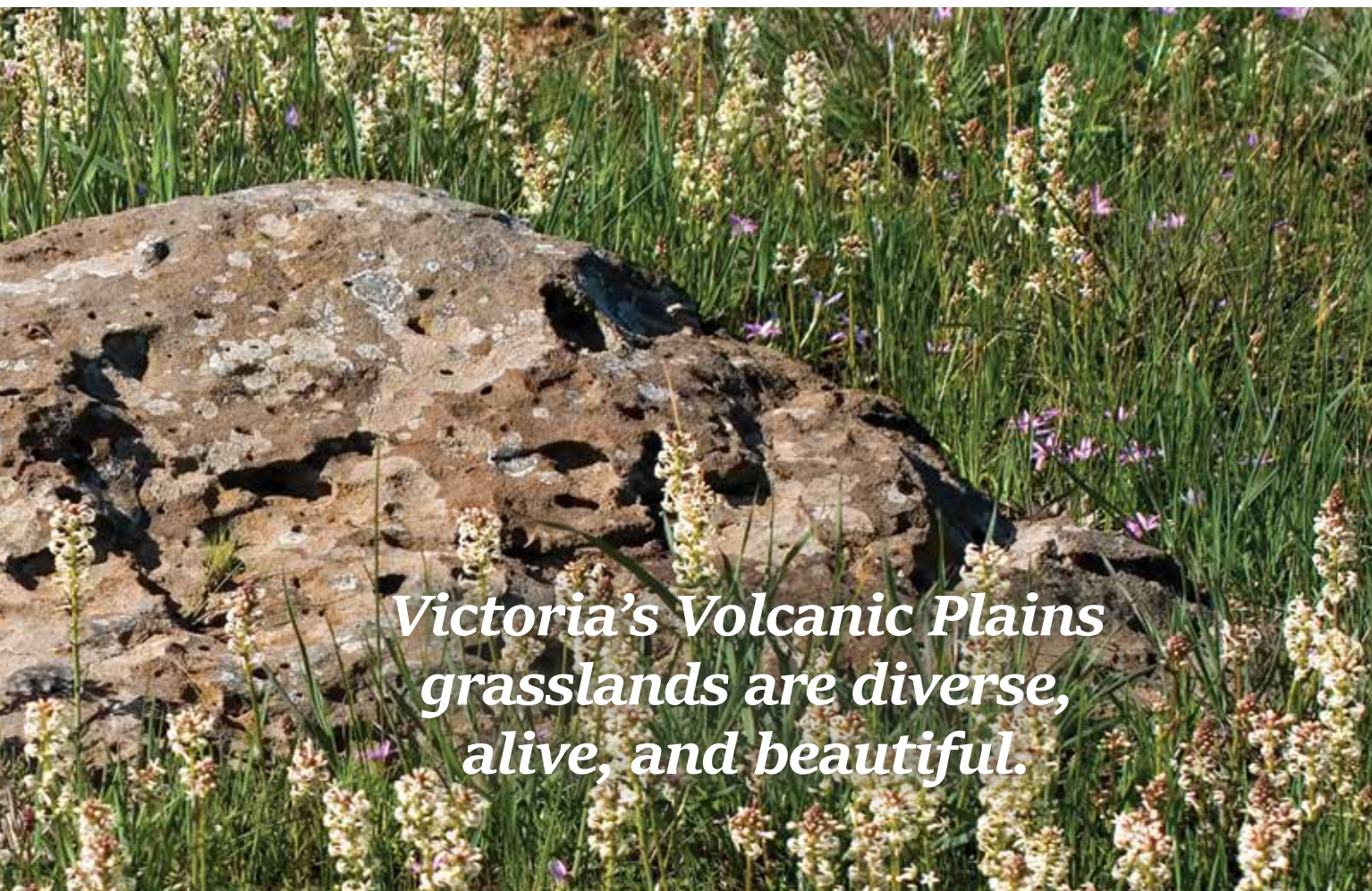


PHOTO: CHRIS CLARKE

Victoria's Volcanic Plains grasslands are diverse, alive, and beautiful.

Western Plains Creamy Candles (*Stackhousia subterranea*) grows around a basalt 'floaters' in Derrimut Grassland Nature Conservation Reserve.

Renewed rush to 'clear' the way

THE REVEAL OF THE FAILURES OF THE MELBOURNE STRATEGIC ASSESSMENT (SEE PREVIOUS ARTICLE) COMES RIGHT AT A TIME WHEN THE MORRISON GOVERNMENT IS REVIEWING OUR NATIONAL ENVIRONMENT LAWS.

The review of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is being carried out by Professor Graeme Samuel, who has now released an Interim Report.

However, the Morrison Government has flagged that it may move ahead to legislate changes before the review is even finished.

The federal government should not repeat the mistakes made with the Melbourne Strategic Assessment by entrenching similar 'strategic assessments' as a 'streamlining tool' in a reformed EPBC Act.

The interim report notes that:

"The legal arrangements for strategic assessments are

complex ... but the strategic assessments that have been conducted have led to more streamlined regulatory arrangements. However, some have been criticised for not achieving their intended environmental outcomes."

So in the same breath, the failings of Melbourne Strategic Assessment are acknowledged as "not achieving their intended environmental outcomes", but is dismissed in praise for the success of 'streamlining'.

Further:

"Strategic assessments and other approaches have resulted in some streamlining, but there are opportunities for further efficiency gains."

"Opportunities for further efficiency gains" – yet no mention of achieving better outcomes for the environment.

Some of the regulatory or legal failings identified for 'strategic assessments' in the interim report include the state of being 'frozen in time' – an inability to vary a program once endorsed or respond to changes in information and circumstance, such as the listing of new species. This also means assessments that operate for long periods of time, such as the Melbourne Strategic Assessment which could be in place for 60 years, are unable to be adjusted to better achieve the environmental outcomes envisaged.

Interestingly, the report also notes that "it is unclear whether a person

Continued overleaf

There is an app for that!

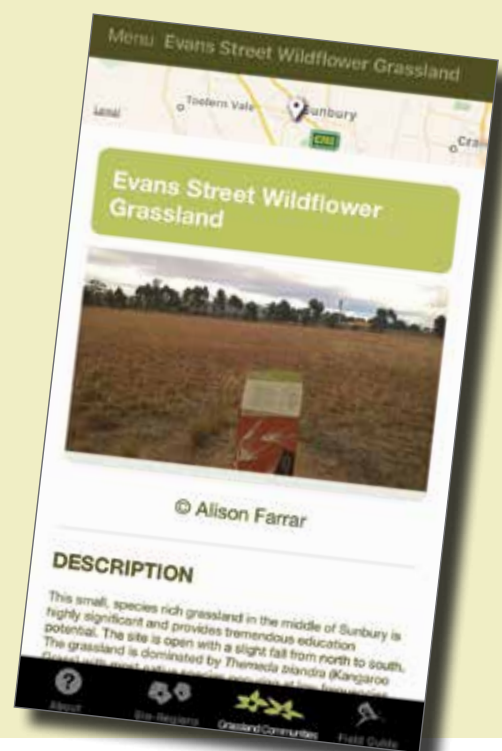
A new, free comprehensive field guide app for iPhone and iPad, *Grasslands: Biodiversity of South-Eastern Australia*, introduces users to and aims to build an appreciation of the unique biodiversity of south-eastern Australia's temperate native grasslands.

The app includes:

- Information on eight endangered grassland communities of south-eastern Australia, including two grassy wetland communities
- Over 500 flora descriptions with images
- Over 200 fauna descriptions with images and selected bird and frog calls
- Distribution maps from the Atlas of Living Australia
- Details of 25 easily accessible grassland sites to visit, representative of grassland communities in Victoria, NSW, ACT, South Australia and Tasmania – with more grasslands planned for inclusion in future app releases
- Grassland site descriptions include species lists linking back to the field guide, allowing users to explore their local grasslands and identify species present
- Interactive maps of grassland sites, communities and their bioregions.

The app is a collaboration between the University of Melbourne and Ecolinc, with funding from the Myer Foundation and the dedication of the many individuals who donated time, expertise and photos over the many years it has taken to develop.

Visit grasslands.ecolinc.vic.edu.au to download the app. You can also access the website version.



Continued from previous page

can rely on a strategic assessment approval if a commitment has not been fulfilled" – a key question for the very much unfulfilled Melbourne Strategic Assessment.

The interim report did call for "a strong, independent cop on the beat ... that is not subject to actual or implied political direction from the Commonwealth Minister" and that "it should be properly resourced and have available to it a full toolkit of powers". However, this was quickly dismissed by the Morrison Government.

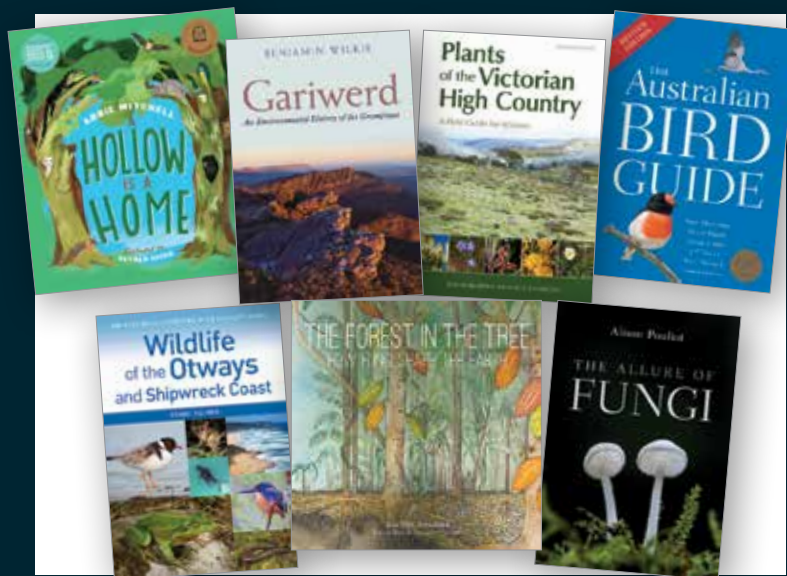
The interim report largely ties itself to developing a system of national environmental standards and giving states jurisdiction for assessment processes and potentially approvals under Federal law. Without a strong independent regulator, this will be catastrophic. There are significant probity issues of state governments potentially approving projects under national environmental laws, when many of those projects are state-run. It would also likely increase the cost and complexity for state government assessment processes.

It is shameful that the Commonwealth seems in such a hurry to wash its hands of the environment and devolve its powers to the states. A disastrous situation, as shown in both the Victorian and federal government's appalling handling of grassland protection.

This review is heading for national environmental laws with a focus on streamlining at the expense of actual protection for nature. If the experience of the Melbourne Strategic

Assessment is anything to go by, nature will continue to be put at the bottom of the list when up against property developers, as well as miners and loggers. • PW

It starts with science...



Visit the **CSIRO Publishing** website for more quality science books, journals and magazines

publish.csiro.au



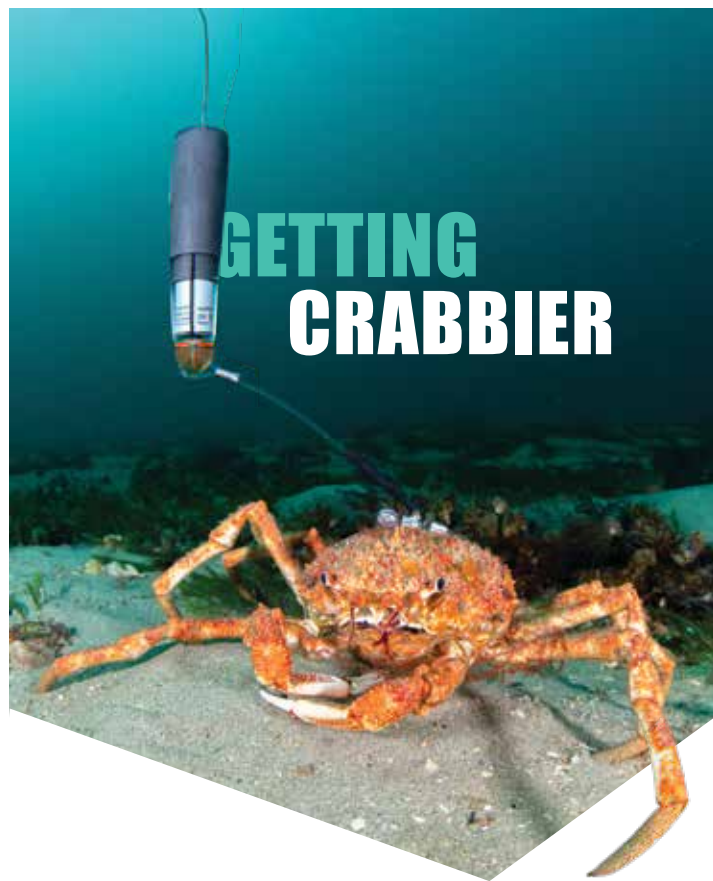


PHOTO: NAOIMI STRONG | STRONG OCEAN MEDIA

In the June edition of *Park Watch* we revealed the plight of the world-renowned but now at risk Spider Crabs in Port Phillip Bay.

The Victorian National Parks Association is working with the Spider Crab Alliance and Spider Crabs Melbourne – under the name #SaveOurSpidercrabs, or SOS – representing members from the scuba diving industry, fishers, conservation and education sectors and concerned community members.

Together we are asking the newly-appointed Minister for Fishing and Boating, Melissa Horne, and the Victorian Fisheries Management Authority (VFA), for a no-take period between April and July during the Spider Crab annual moulting season.

Each year during this period, local and international visitors flock to witness the famed 'march of the crabs' into the shallows along the Mornington Peninsula to undertake this critical but vulnerable stage of their growth.

But concerns for the future of this tourism drawcard began in 2019 and escalated in 2020 when fishing of the crabs exploded in intensity at Rye and Blairgowrie piers, resulting in marine environment destruction and pollution and increased safety risks to the general public.

Crowds of people gathered with crab nets during the main aggregation. Chicken carcasses used as bait littered the seafloor, crab pots were dropped on people in the water, and marine rich pylons were dragged against by nets.

THE SPECTACULAR ANNUAL SPIDER CRAB AGGREGATION EVENT MAY HAVE ALL BUT BEEN AND GONE FOR THIS YEAR, BUT THAT DOES NOT MEAN THE CAMPAIGN TO #SAVEOURSPIDERCRABS IS OVER, SAYS NATURE CONSERVATION CAMPAIGNER SHANNON HURLEY.

Since the previous article in *Park Watch* and state-wide coverage in the media, there has been some success. The Victorian Fisheries Management Authority (VFA) has undertaken satellite tagging of 15 Spider Crabs to find out where the Spider Crabs go once they have aggregated to moult – currently a mystery. These are welcome steps in the right direction, and we acknowledge the VFA for their efforts. However our concerns remain that these efforts do not address risks of the intense crabbing pressure that the past two years

have seen, and without intervention, the 2021 event will be an even greater hazard for all involved.

The Spider Crab moulting aggregations are worth potentially more in terms of tourism value to the region than being harvested on mass. An introduction of a seasonal no-take period April–July will address the emerging issues, while still allowing the opportunity for recreational crabbing outside of the species sensitive moulting season.

Almost 34,000 signatures are calling for increased protection measures of the crabs, including the local and global community who have been distressed by the problematic crabbing practices. These include families, locals businesses, divers, fishers, and even Sir David Attenborough!

The Victorian Fisheries Authority and the Minister for Fishing and Boating can make the decision to give the Spider Crabs the protection they deserve. However, it is also important to get the Minister for Environment and Tourism on board. • PW

TAKE ACTION

You can help escalate concern for the Spider Crabs to the three relevant Ministers:

- Minister for Fishing and Boating, Melissa Horne
- Minister for Environment, Lily D'Ambrosio
- Minister for Tourism, Martin Pakula

To send them your message visit: www.vnpa.org.au/spidercrabs

Westernport – a wildlife wonderland at risk

NO ONE WANTS WESTERNPORT BAY TO BE TURNED INTO AN ARTIFICIAL SWIMMING POOL, EXPLAINS **SHANNON HURLEY**.

Our beautiful and beloved Westernport Bay likely brings memorable nature experiences for many of us – visiting the penguin parade at Phillip Island, a ferry trip to French Island National or Marine National Park, or watching thousands of waterbirds bask in the rich wetlands.

Westernport Bay makes for a perfect wildlife wonderland for many birds, fish, mammals, and sponge gardens due to its diversity of habitats of mudflats, seagrass meadows, mangroves, saltmarshes and rocky reefs.

This is why we have been working to highlight the huge risks energy giant AGL's plans for a gas import terminal poses for the bay. Their plan involves a permanently moored industrial-sized 300-metre-long gas storage ship off Crib Point's shore (south of Hastings), and a pipeline (proposed by APA, an energy infrastructure business), all the way to Pakenham. Each year there would be up to 40 additional large carrier ships entering the bay.

A giant floating gas-filled ship is a terrible idea for an internationally protected Ramsar wetland and environmentally significant marine area. The potential irreversible damage to this highly-connected and sensitive ecosystem must not be risked.



PHOTO: PARKS VICTORIA

Serenity in French Island National Park.

VNPA has been collaborating with Environment Victoria, Environmental Justice Australia, Save Westernport and other local groups, and are extremely concerned about the impacts this project could have on marine and terrestrial wildlife and habitats. Not to mention the social impacts on the local community who live there, and to the tourism from people who travel from far and wide to bird watch, snorkel, fish, kayak or camp.

AGL's environmental impact reports were on exhibition from 2 July to 26 August through the state environmental assessment process, known as the Environmental Effects Statement (EES), in which public comments were invited.

Between our collective groups and experts, much of the 11,000 pages of reports were read and an analysis done of AGL's assessment of the project impacts. VNPA focussed on the impacts on marine biodiversity and engaged expert marine consultant and scientists to help digest AGL's analysis.

A project of this scale and risk should have the highest level of environmental assessment. Yet AGL's environmental impact reports are shockingly bad. Through our analysis, the EES documents show that AGL has failed to thoroughly assess many of the environmental impacts arising from the project.

AGL's documents did not adequately address the following potentially significant impacts on marine biodiversity:

- Impacts of catastrophic incidents – ship collisions, oil spills and potential gas explosions.
- Impacts from chlorine discharge and release of toxicants as part of AGL's processing of the Liquefied Natural Gas are unacceptable – we can't have Westernport Bay turned into an artificial swimming pool!
- Impacts on the internationally-protected Ramsar wetlands and migratory waterbirds.
- Impacts on listed threatened marine species and communities under Victoria's *Flora and Fauna Guarantee Act 1988* (FFG Act) and national *Environment Protection and Biodiversity Conservation Act 1999* (EPBC ACT), and other sensitive species and communities.



PHOTO COURTESY OF HOEGH LNG AND ENGIE

This is what AGL's Gas Import Facility at Crib Point jetty in Westernport Bay could look like.

- The entire project has the potential to cause severe biological and ecological harm over large areas, which may be irreversible.

Ultimately, AGL's documents as they relate to impacts on marine biodiversity are not to the standard that a comprehensive, science-based environmental assessment should be. The structure and implementation of the EES is not considered reliable for environmental decisions and management, being largely opinion-based and without supporting evidence.

In addition, the pipeline component of the project would result in the direct removal of 15 hectares of native vegetation – almost half of which is endangered vegetation types. The existence and ongoing maintenance of the pipeline is a serious threat to the survival of the nationally-endangered Southern Brown Bandicoot (listed under the FFG and EPBC Acts). The project will directly result in the removal of vegetation from sites of likely habitat of the Southern Brown Bandicoot. This could result in local extinctions of this species.

These are just some of the concerns VNPA highlighted in our submission to the Inquiry and Advisory Committee (IAC), appointed to consider the public consultation on the EES process, draft Planning Scheme Amendments and the Works Approval Application. IAC will advise the Victorian Minister for Planning, Richard Wynne, who has ultimate responsibility for the final decision – if the project will go ahead, or not, at the state level.

With the coronavirus pandemic making it exceptionally challenging for many in the community to actively participate in the EES process (which coincided with Stage 3, and then Stage 4 restrictions), our collective groups wrote in to the Minister Wynne in April, July and August with a request to suspend the EES until restrictions eased. Unfortunately, the Minister refused our request.

Our request to extend the time of the public consultation from 30 to 40 days was granted, and we were grateful for the Minister allowing some flexibility.

Opportunities to highlight the failure of AGL's environmental impact assessments to address the potential

long-term, irreversible and ecosystem-wide damage to marine wildlife and wetland habitats is not yet over.

IAC will now be processing submissions, and from 12 October onwards will coordinate public hearings (a similar process to a VCAT process). VNPA and other groups will be putting forward our expert marine consultants to speak to the potential impacts on Westernport Bay's important marine ecological values.

On conclusion of the public hearings, which can take up to ten weeks, IAC will deliver their report to Minister Wynne, and he will then make his assessment and final decision. There will be opportunities to share your voice with the Minister over the coming months, so stay tuned on how you can help preserve our precious Westernport Bay.

For now, it is worth celebrating the over 10,000 people – just between Environment Victoria, VNPA, Save Westernport and other local conservation groups alone – that responded to the EES and put in submissions. This reflects the strong opposition the Victorian community has to this project. Heartfelt thanks to everyone who voiced your concerns. • PW



PHOTO: PHIL INGAMELLS

Gunaikurnai scar tree near the Princes Highway, Bairnsdale.

Traditional Owner joint-management

VICTORIA'S GO-IT-ALONE APPROACH TO TRADITIONAL OWNER RECOGNITION AND SETTLEMENT AGREEMENTS HAS MADE JOINT MANAGEMENT OF OUR NATIONAL PARKS THE 'NEW NORMAL', SAYS **PHIL INGAMELLS**.

Victoria has been quietly undergoing a radical change in management arrangements for our finest remaining 'natural' areas. Most of our national parks now have formal, or sometimes informal, joint management agreements with Victoria's various Traditional Owner groups.

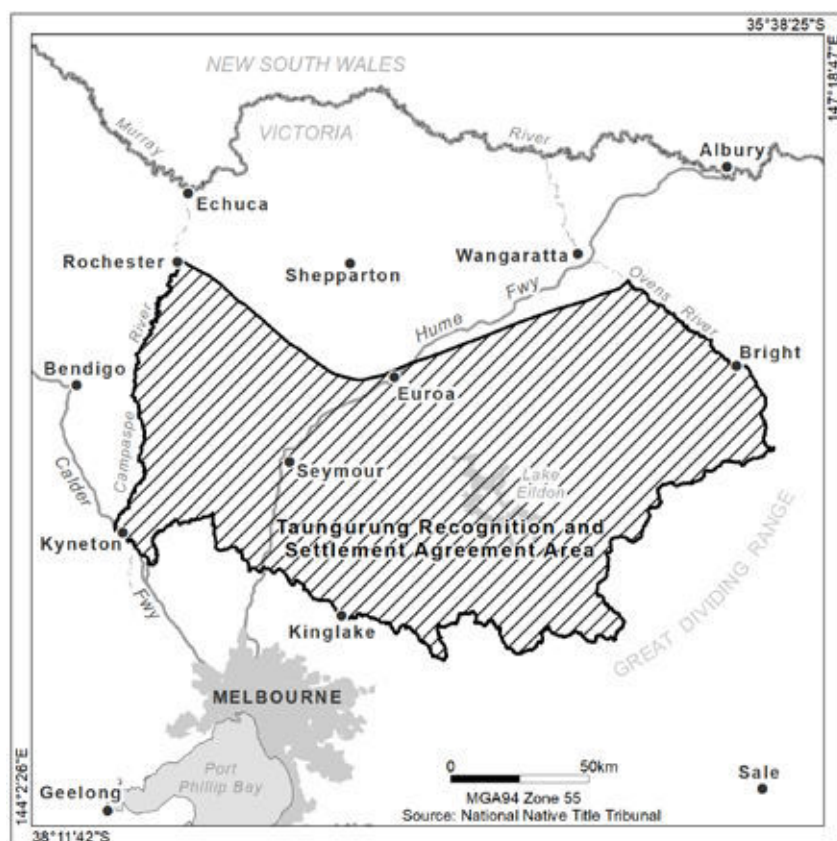
In August this year, the Victorian Government reached a settlement agreement with the Taungurung people of central Victoria.

It gives the Traditional Owners the right to jointly manage one of Victoria's oldest national parks, Mount Buffalo National Park, as well as part of the Alpine National Park and Kinglake National Park, all of Heathcote Graytown National Park, Lake Eildon National Park, Mount Samaria State Park, Cathedral Range State Park, and some smaller reserves.

with vigilantly. Parks Victoria has simultaneously produced, as required under the Ramsar Convention, a plan for Barmah's extensive Ramsar-listed wetlands. The two plans are in strong agreement, and might, in time, achieve a return to a more natural seasonal flooding regime for the park.

The Gunaikurnai people of Gippsland now jointly manage many parks: The Lakes National Park, Gippsland Lakes Coastal Park, Lake Tyers State Park, Mitchell River National Park, and Tarra Bulga National park among them. While their traditional land takes in a southern section of the Alpine National Park, the settlement agreement doesn't include joint management there. And while it also takes in part of Snowy River National Park, a joint management arrangement only exists over a small but highly vulnerable, culturally sensitive area.

The Taungurung Recognition and Settlement Agreement Area.



A similar planning process has taken place with the Dja Dja Wurrung, traditional owners of much of central Victoria. Their Dheulkunya Dja joint management plan takes in Greater Bendigo National Park, Kooyoora State Park, Paddy's Ranges State Park, Hepburn Regional Park and part of Kara Kara State Park, among others.

How are these agreements reached?

Following the High Court of Australia's 1992 Mabo decision allowing the granting of Native Title over Crown Land, it became clear to the Victorian government that it might take 50 years to resolve all claims through the difficult and costly process set up within the High Court.

With the agreement of the Commonwealth, the Victorian government set about creating its own process, resulting in the *Traditional Owner Settlement (TOS) Act 2010*. The TOS Act allows a Traditional Owner Settlement Agreement to be reached by negotiation, and can include:

Settlement agreements have now been reached with many Aboriginal communities across Victoria, and they have been engaged in the development of joint management plans for some time.

Among them:

The Yorta Yorta Community, from Victoria's north, recently produced a strong draft management plan for Barmah National Park that was heavily directed towards the resolution of pressing environmental issues. Environmental weeds and pest animals (including feral horses) at Barmah can now be dealt

- A *Recognition and Settlement Agreement*, giving certain rights over Crown land.
- A *Land Agreement*, which allows joint management of public land, including national parks.
- A *Land Use Agreement*: a simplified process to allow for the performance of certain cultural activities.
- A *Funding Agreement*, providing sustainable funding to allow Traditional Owner organisations to fulfil their responsibilities.
- A *Natural Resource Agreement* that allows for the use of natural resources for traditional (non-commercial) purposes.

Continued overleaf



Continued from previous page

Importantly, national parks jointly managed between Traditional Owners and the state must still be managed according to the clear conservation objectives of Victoria's *National Parks Act 1975* (and other parks are also to be managed in line with the legislation under which they were proclaimed). Public access to national parks remains unchanged, with the possible exception of vulnerable heritage sites, and occasional temporary limitation of access when Traditional Owners are involved in cultural activities.

So what is changing?

We'll be seeing more Aboriginal names for parks, and features within them. And we'll probably find that Victorians become far more familiar with the names of Traditional Owner groups; this is something that's been largely missing in Victoria's cultural consciousness.

We might also get a better understanding that Aboriginal cultural sites aren't just shell middens and scar trees, but include the landscape itself, and the plants and animals that live there.

Funding agreements for Traditional Owners should produce an increase in Aboriginal training and employment in all areas of park management. These funds have already seen the emergence of some strong management plans, and hopefully the capacity to implement them.

Most recently, the Gunaikurnai have followed up their joint management plan for Gippsland parks with a comprehensive draft Camping and Access Strategy for Lake Tyers (traditionally Bung Yarnda) State Park. The draft, which is open for comment until September 20, protects the park's natural and cultural areas and plans to upgrade camping and boating access while minimising foreshore damage.

Joint management allows an exchange of knowledge

Much has changed since colonial times. The bush has been cleared and remaining areas are often fragmented, weeds and feral animals are rampant, and the climate is rapidly changing.

Added to that are the high levels of physical and cultural dispossession of Aboriginal People in Victoria.

We all have a lot of learning to do. This might be most evident in the case of fire management. Taking a careful look at Indigenous burning practices might be the shake-up our current management of fire needs.

And surely, both Indigenous knowledge and western science have always been founded on learning through careful observation.

The dispossession of Aboriginal people is not just something that happened 200 or more years ago. I once knew an Aboriginal elder who told me he would sometimes take a break and camp along the beach at East Gippsland's Wingan Inlet, but was told to move on when Croajingolong National Park was proclaimed.

Yet earlier this year, the Gunditjmarra people of Victoria's south-west, after a long campaign, won the difficult-to-achieve recognition on the World Heritage List for the remarkable Tae Rak (Lake Condah) Wetlands, listed now as the Budj Bim Cultural Landscape.

It's a gift to all Victorians.

There's no going back on this journey. Hopefully, it's a new and much better time we're moving towards. • PW

Kosciuszko

A Great National Park

BY DEIRDRE SLATTERY AND GRAEME L. WORBOYS

ENVIROBOOK, CANBERRA, 2020.

28X21CM. RRP \$74.99.

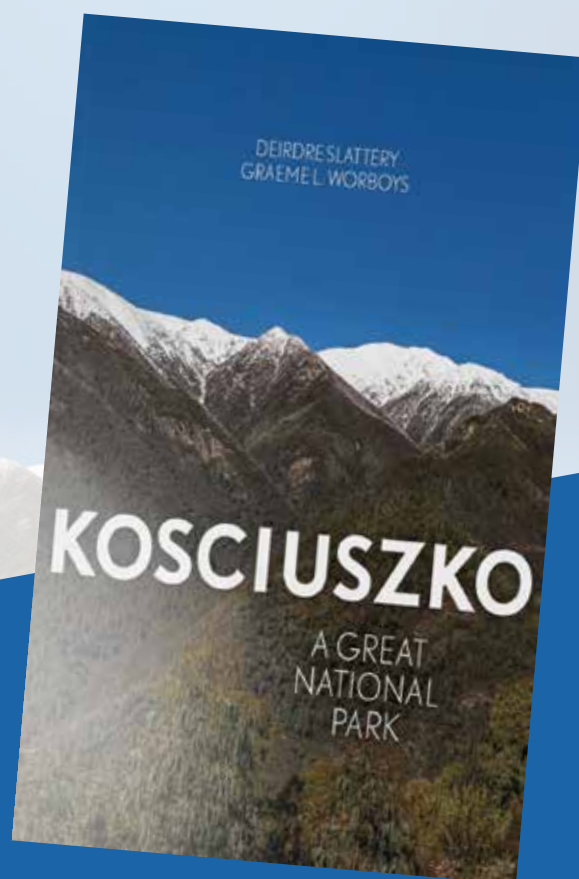


PHOTO: IAN PULSFORD

If you love Kosciuszko National Park or the Australian Alps generally, or are interested in national park management, conservation history and politics, or Australian history, this impressive book is definitely for you.

Although not a field guide as such (author Deirdre Slattery has already produced one of these, *Australian Alps: Kosciuszko, Alpine and Namadgi National Parks*, 2015), the new book will greatly add to people's appreciation of Kosciuszko National Park.

In their Preface, the authors state that "Kosciuszko National Park owes its protected area status to an ecological disaster in one of Australia's most productive water catchments". This disaster (i.e. vegetation loss and erosion) was caused by 120 years of grazing by cattle, horses and other introduced animals, and unregulated burning off.

"The story we present," they continue, "tells how Australian society transformed its view of its most important water catchment from one of use for exploitative industries to one of conservation."

Late last year Kosciuszko was once again struck by fires burning into the park, destroying structures and facilities and, together with grazing by feral horses, creating the conditions for further erosion and loss of indigenous species. The authors comment that many people see the 2019-20 summer as a turning point in land management and climate change action.

The book has twelve sections or chapters covering First Peoples occupation, European exploration and settlement, illegal stock grazing and fire, recreation, the Snowy Mountains Scheme, science and conservation, park planning and management, and the ongoing feral horse issue.

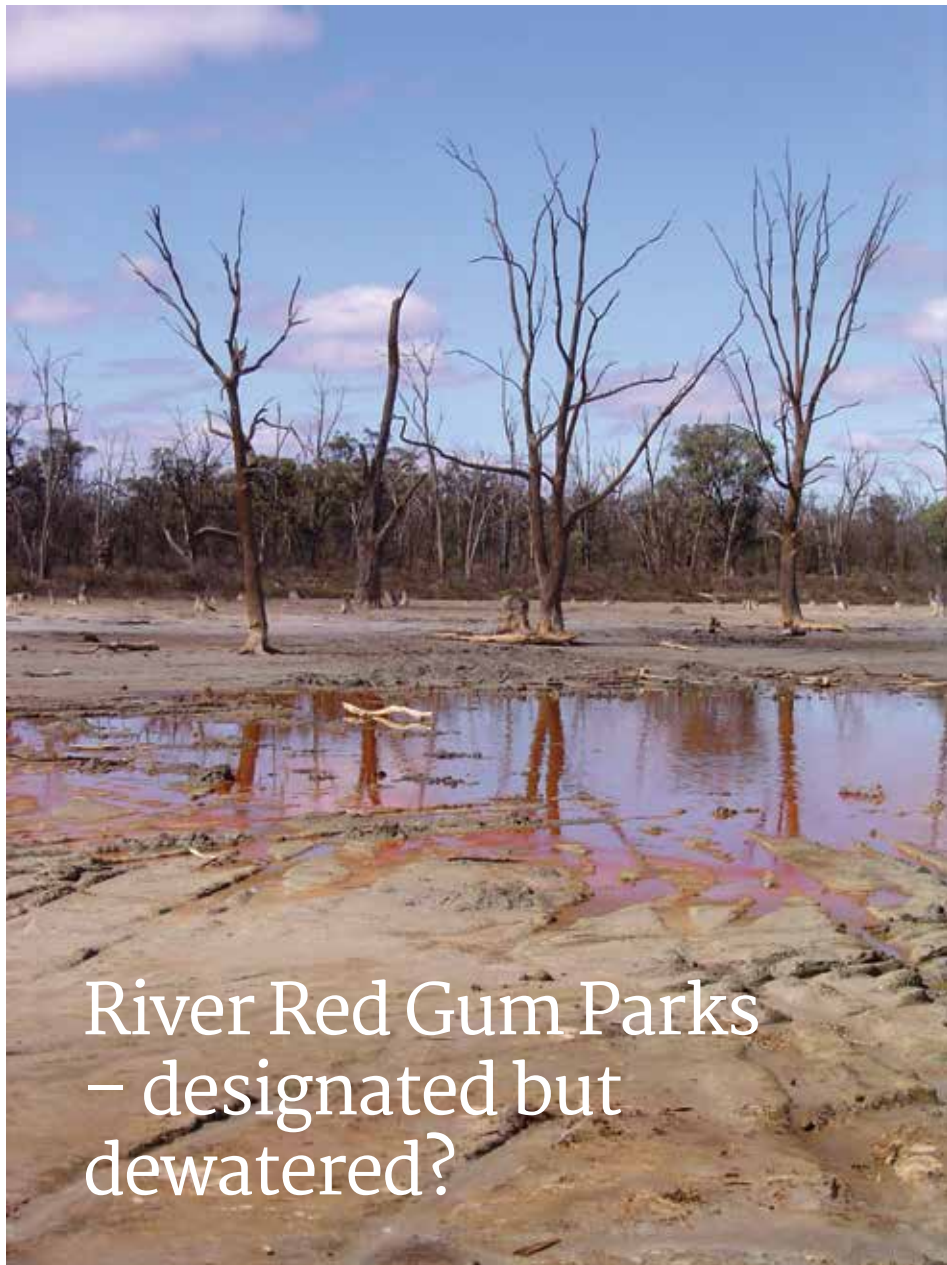
It's attractively designed, with a good-sized and readable typeface and plenty of subheadings to guide the reader. Some of the text about political and administrative struggles is a little heavy, but an excellent index helps you find your way. Geographers will love the 26 'figures' (mostly maps and plans).

For me, this book has three special features:

- The 200-plus photos, all with informative captions, covering issues such as damage by erosion, fire and visitors (and its repair), and subjects like park history, staff and scientists at work, magnificent landscapes, trees and wildflowers, and native animals. As well as being a vital reference, *Kosciuszko* is a coffee-table book par excellence.
- The 26 'pen portraits' of people connected with the Kosciuszko area are outstanding. Taking in a wide range – from explorer Count Strzelecki to politician Sir William McKell, revered ecologist Alec Costin, park planner and manager Penny Spoelder, expert zoologist Linda Broome, and many more – they absolutely bring the park's story to life.
- The 48-page Chronological History, which acts as a summary, key and guide to the whole Kosciuszko story.

The authors deserve our thanks and hearty congratulations for producing a book that will be a standard text for many years. • PW

Review by Michael Howes.



Psyche Bend wetlands, Kings Billabong Park on the River Murray near Mildura, showing the ravages of hypersalinity and acidification of sediments due to inadequate watering during the millennium drought, 2009.

River Red Gum Parks – designated but dewatered?

PHOTO: JAMES PITTOCK

FOLLOWING **MATT RUCHEL'S** REFLECTION ON THE TENTH ANNIVERSARY OF THE RED GUM PARKS IN THE PREVIOUS EDITION OF *PARK WATCH*, **PROFESSOR JAMIE PITTOCK** FROM THE AUSTRALIAN NATIONAL UNIVERSITY OUTLINES HIS FEARS FOR THEIR FUTURE.

As a scientist concerned for conservation of biodiversity, I rejoiced at the designation of 215,000 hectares in over 100 parks along the rivers of northern Victoria ten years ago.

Efforts to establish co-management of these parks with the Indigenous Traditional Owners is another notable step to address the wrongs of the past.

However, park declaration is only one step towards conserving these floodplain wetland ecosystems. Unless they are adequately watered, they will die. Their survival is being jeopardised by government mismanagement and climate change.

Different floodplain wetland ecosystems need to be inundated at different annual frequencies to remain healthy. Watering these ecosystems requires enough water to fill

the river channel and then spill out over the floodplain. If the watering is too infrequent, the wetland vegetation dies, transitions to a dryland ecosystem, or becomes hypersaline or acidic.

The impacts of climate change are already being witnessed in our rivers, with reduced inflows. In addition to direct loss of water, river inflows are threatened by other risks, including capture in farm dams, the greater evapotranspiration from the catchment from forests regrowing after fires, and from biodiversity restoration plantings and commercial plantations.

However, I am most worried about the conservation measures that our governments can control and promised to implement in the Murray-Darling Basin Plan by 2024 – but have not delivered.

The Murray-Darling Basin Plan was adopted in 2012 by the Australian Parliament with the concurrence of state governments to manage water resources that “balances social, economic and environmental demands” – ostensibly to return the Basin’s freshwater ecosystems to health.

A seemingly obvious major failure in the Basin Plan is it made no direct allowance for climate change. And while the Basin Plan reallocates some water to the environment, it is not possible

to conserve all floodplain wetlands with less than three fifths of river inflows left after diversions for irrigated agriculture. The wetlands to be conserved versus those to be sacrificed have not been clearly identified. Two government strategies – one good and one bad – are particularly important.

The good: reconnecting rivers to their floodplains

Known as ‘constraints relaxation’ in the obtuse jargon of the sector, in 2013/14 our governments agreed to restore seven major floodplains, including along the Goulburn and Murray rivers, in the ‘Constraints Management Strategy’. Roughly \$840 million is allocated to compensate around 3,300 farmers for periodically flooding their riverside paddocks, moving infrastructure and to improve roads, bridges and levee banks. Around 375,000 hectares of floodplains would be restored – along the Goulburn River in Victoria, 12,000 hectares (92 per cent) of floodplains would be restored.

But our governments have done little to fulfil these commitments. Instead, the Victorian Government is not allowing managed water out of river channels for fear of compensation claims from landholders.

The bad: re-engineering floodplains for artificial ponding

Another jargon warning: these projects are referred to as the 'environmental works and measures' component of the 'Sustainable Diversion Limit Adjustment Mechanism' strategy in the Basin Plan. In Victoria, this involves construction of \$281 million in pumping stations, levee banks and water regulators (small dams) in nine areas covering nearly 62,000 hectares in river-side parks – from Gunbower National Park to the border of South Australia – by 2024. Water from the River Murray channel would be diverted and artificially ponded on areas of floodplain to mimic natural floods.

There are a number of reasons for being gravely concerned about this strategy.

Only a little over 14,000 hectares would be able to be actively inundated with the infrastructure, at an exorbitant capital cost of nearly \$22,000 per hectare. Using such infrastructure means relying on Victorian Government agencies to undertake expensive operation and maintenance measures every year forever.

Meanwhile, artificial ponding this water on the floodplain will not actually replicate vital ecological processes.

The 'Sustainable Diversion Limit Adjustment Mechanism' was a trade-off promoted by the Victorian and NSW governments for projects that purported to conserve biodiversity with less water. Consequently, the Commonwealth agreed to reduce planned water recovery for the environment by 22 per cent (605 billion litres) in the final Basin Plan.

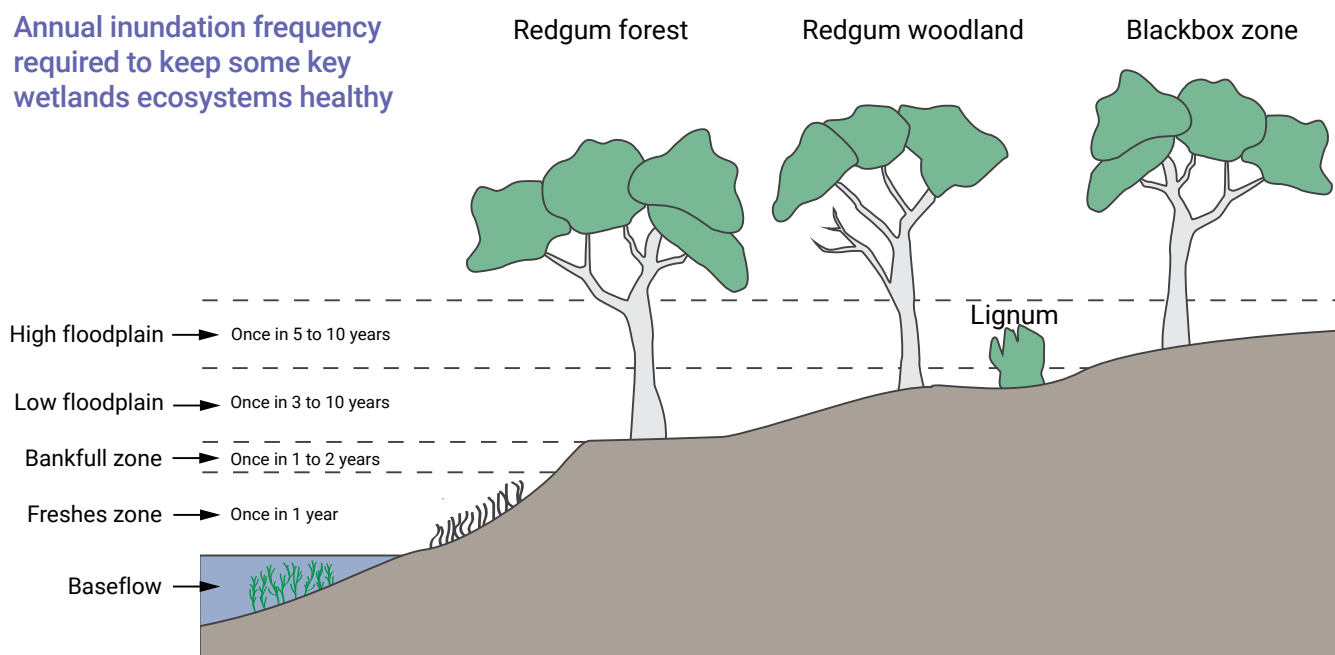
It is unclear what the environmental objectives are for these 'environmental works and measures' projects. The governments have not argued that representative conservation of wetland ecosystems would be improved – and it would certainly be difficult to artificially water the ecosystems that sit higher on the floodplains. Originally the governments claimed the projects could help maintain core wetlands in drought. Unofficially, some government officials argue that the projects are for triage – to conserve remnant wetlands in the face of severe climate change. Regardless, the area of wetlands conserved by this strategy would be small. Worse, the more frequent and small environmental watering targets for the floodplain ecosystems bear no relationship to the less often but much larger 'stream flow' targets at the 'hydrologic indicator sites' that the overarching Basin Plan is intended to achieve.

Current Victorian Government focus on the Sustainable Diversion Limit Adjustment Mechanism over the Constraints Management Strategy means that the major area of wetlands in the Red Gum Parks floodplains may only be conserved accidentally by unmanaged floods.

The Victorian Government must deliver on the 'constraints relaxation' and reconnect the Goulburn and Murray rivers to their floodplains. And 'environmental works and measures' project approvals currently underway need to be reconsidered. Lastly, the revision of the Basin Plan by 2026 must also address the issue of which wetlands will be conserved and with what volume of water in a changing climate.

The future of the Red Gum Parks depends on how well they are watered. • PW

Annual inundation frequency required to keep some key wetlands ecosystems healthy



Source: CSIRO 2011

HOW MUCH DO YOU KNOW ABOUT SHARKS AND RAYS?




- 1 How many species of sharks have we discovered so far a) on the planet, and b) in Australia?
- 2 What are baby sharks called?
 - a. cubs
 - b. pups
 - c. school
 - d. fry
- 3 True or false: sharks have better eyesight than humans.
- 4 What is the biggest threats to the survival of sharks?
- 5 Do sharks have ears?
- 6 True or false: human limbs can evolutionarily be traced back to the pectoral and pelvic fins of sharks.
- 7 The Smooth Stingray is the largest of all Australian stingrays. It grows to 4.3 metres in length, two metres wide and a weight of 350 kilograms. What does it eat?
 - a. fish and small invertebrates
 - b. algae
 - c. crabs and molluscs
 - d. all of the above
- 8 I can grow up to 1.5 metres long, have a distinct hoe-like snout, and females of my species enter large shallow bays and estuaries such as Port Phillip and Westernport in Victoria to lay eggs which can take up to 10 months to hatch. I am known as:
 - a. Hoe shark
 - b. Snout Shark
 - c. Schnoz Shark
 - d. Elephant Shark
- 9 Port Jackson Sharks have:
 - a. large teeth for catching prey
 - b. small teeth for crushing prey
 - c. no teeth
- 10 I am a shark-like ray with a somewhat flattened disc-like or diamond-shaped body and am known by the following name:
 - a. Banjo Shark
 - b. Guitar fish
 - c. Fiddler Ray
 - d. all of the above
- 11 When disturbed or threatened, how do Draughtboard Sharks respond in an attempt to avoid predation?
 - a. change colour to resemble their surroundings
 - b. increase size by inflating their stomachs with air or water
 - c. flatten their shape on the sea floor

Answers on page 31

PHOTO: JACK BREEDON

WHAT LIES BENEATH?

SHANNON HURLEY SHARES OUR
INVOLVEMENT IN PROTECTING THE
DEEP SEA OFF SOUTH-EAST AUSTRALIA.



Black coral is one of the many wonders
of the Australian Marine Parks network.

PHOTO: JAMES PARKINSON

We are incredibly lucky in south-eastern Australia to be bordered by oceans that support a rich diversity of marine life.

Countless mammals and birds; more than four thousand species of fish; tens of thousands of species of invertebrates, plants and microorganisms – many of which are globally significant and found nowhere else in the world.

Particular areas of our 'biodiversity hotspots' are protected by the 14 marine parks known as the South-east Marine Parks Network.

Not to be confused with state-level marine parks, the South-east Marine Parks Network was established in 2007 as part of the Australian Marine Parks network managed by the Federal Government.

The South-east Marine Parks Network extends from the warm temperate waters around South Australia, Victoria and New South Wales, through to the cool temperate waters around Tasmania and the sub-Antarctic Southern Ocean waters around Macquarie Island.

Continued overleaf



PHOTO: ED DUNENS, FLICKR CC

Shy Albatross glide above the waves.

Continued from previous page

Two of these marine parks in the Bass Strait are the Apollo Marine Park, south of Cape Otway; and the Beagle Marine Park, between Wilsons Promontory and Tasmania's Flinders Island.

Together, they form one of the largest networks of temperate marine parks, a total of 388,464 square kilometres (an area almost one and a half times the size of New Zealand).

How do these parks differ from our state marine national parks and sanctuaries?

The Victorian Government manages marine waters *within* three nautical miles of the coastline, including Victoria's marine national parks and sanctuaries which make up 5.3 per cent of our state's waters.

The Commonwealth Government manages marine waters *from* three nautical miles out to 200 nautical miles out (referred to as 'Commonwealth waters').

Parks Australia manages this South-east Marine Parks Network, and the other marine parks around Australia (58 in total), ranging from the tropical waters in the north to the sub-Antarctic waters, including the South-east network.

A journey from the shallows to the deep sea

South-eastern Australia is the meeting place of three great oceans. Currents, the circulatory systems of the planet, flow from the Pacific and Indian Oceans and blend with the cold Southern Ocean, drawing up water and nutrients from the deep to create ideal conditions for abundant, diverse and unique marine life.

If you were a fish, you might bask in the sunlit reefs on the relatively shallow continental shelf, around 40 metres average depth. Or you might descend to the unimaginably deep and dark abyssal plain almost five kilometres down.

You would be awed by majestic submarine canyons and massive underwater volcanoes (known as seamounts) flourished with a community of plants and animals.

The conditions here – both shallow and deep, the variety of seafloor features, and a relatively stable marine climate – have created favourable conditions for marine life to evolve over millions of years. The warm and cool currents of the region have inhibited migration, causing species to evolve independently in each habitat.

Each marine park in the South-eastern network hosts different biological communities, and within parks, unique ecosystems exist in different canyons and seamounts. Up to 85 per cent of fish, 90 per cent of echinoderms, 95 per cent of molluscs and 65 per cent of seaweeds live only in these waters and nowhere else on the planet.

Replenishing the ecosystem

Pollution, pests and diseases, and historic overfishing have all taken their toll on many fish populations in the south-east marine region. Long-lived, deep water species are particularly vulnerable. By creating spaces where marine life can thrive, marine parks not only conserve biodiversity but can help to ensure our uses are sustainable.

Scientific exploration

Research voyages to these marine parks are discovering an extraordinary diversity of species, including hundreds that are new to science. Australia's marine researchers use a

variety of sea and shore-based facilities and instruments, including moored sensors, deep sea floats, autonomous underwater vehicles, acoustic tracking devices, baited remote underwater video systems, and remote sensing satellites.

In January 2020, Deakin University's marine mapping team completed eight days of bathymetry mapping (the study and mapping of the sea floor, equivalent to mapping topography on land) within the Apollo Marine Park (refer to map). Onboard the MV *Yolla*, the team travelled more than 884 kilometres within the marine park and mapped more than 119 square kilometres of seabed, or 10 per cent of the marine park. The data revealed deep reefs, ancient shorelines and river systems that would have flowed when the sea level was lower, many thousands of years ago.

This voyage has provided baseline information that will allow Parks Australia to develop a habitat inventory of the park and will help target future research efforts, including where to deploy underwater cameras.

(If you're interested in reading recent research highlights from Australian Marine Parks, such as this Apollo Marine Park work, then be sure dive deeper into the Science Atlas: atlas.parksaustralia.gov.au/first-glimpse-of-deep-reefs-beneath-bass-strait)

South-east Marine Parks Advisory Committee

On behalf of the Victorian National Parks Association, I am a member of the South-east Marine Parks Advisory Committee. We work with Parks Australia staff to shape the management of Australian Marine Parks, providing advice on marine issues at a regional level and strengthening our understanding of park user interests and issues.

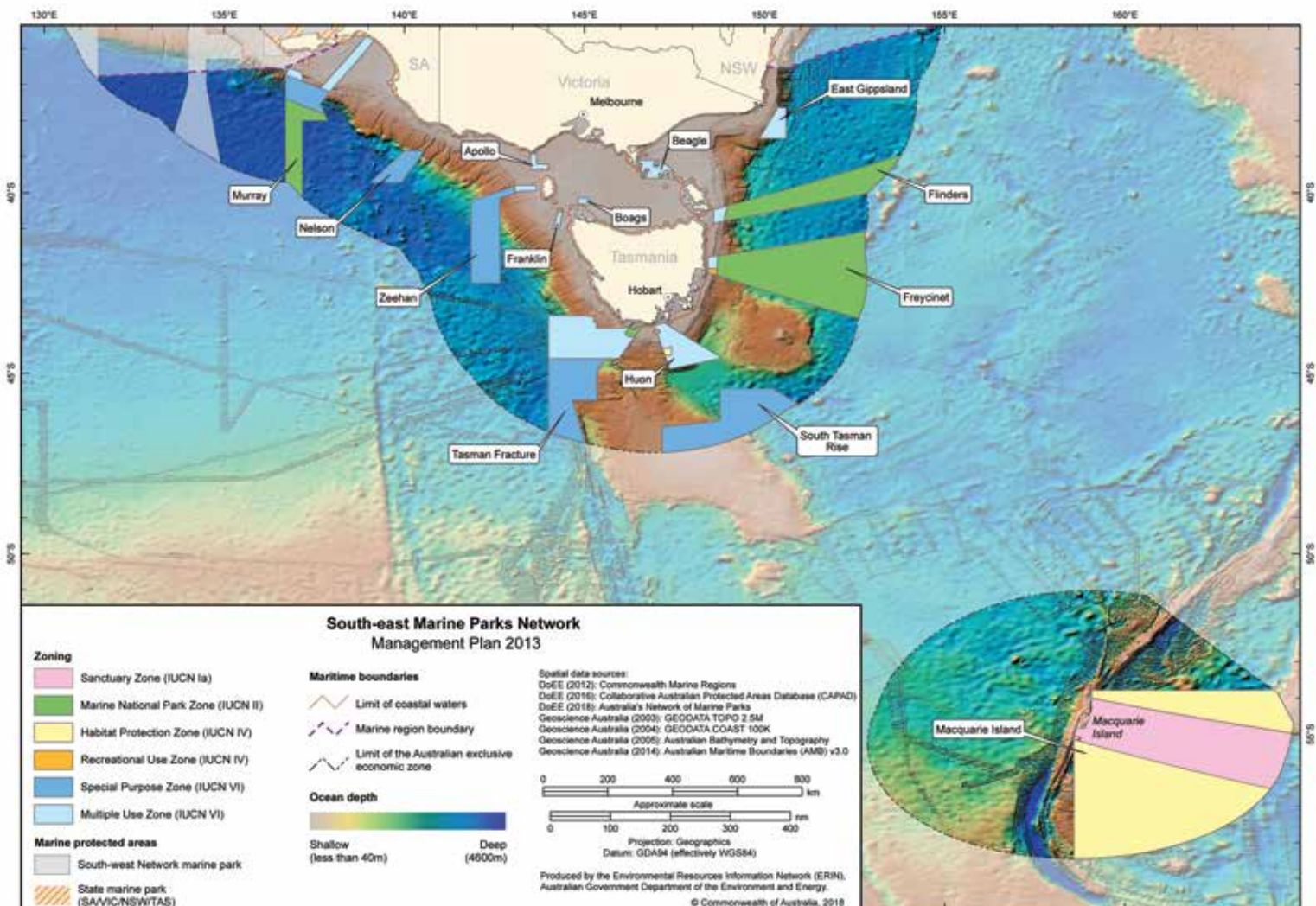
This involves discussions and input related to Indigenous Sea Country, tourism, fishing, marine transport, science, conservation, governance, communications and engagement.

Exploring the depths

You may not be able to explore most of these marine parks without an underwater submersible, or a deep scuba diving license, but you can visit them virtually at www.atlas.parksaustralia.gov.au/amps?featureId=AMP_SE

It is important that we are aware that, even so far off offshore, in the interconnected ocean web of life, these South-east marine ecosystems are highly connected with our lives, and ultimately our actions on land can impact even these underwater environments, and vice versa. • PW

South-east Marine Parks Network



The world is our oyster



AS THE OYSTERWATCH PROJECT CONCLUDES, OUR REEFWATCH PROJECT OFFICER **NICOLE MERTENS** SHARES WHAT WE LEARNED.

Oysters and mussels are wonderful – and important – marine creatures. They build habitat for other marine species, filter algae and nutrients from the water column, and help protect coastal areas from storms and erosion. What many people don't know is that Port Phillip used to have vast tracts of shellfish reefs providing these valuable ecosystem services – as well as feeding the people who lived along its coastlines.

Unfortunately, the arrival of European settlers to the bay region saw shellfish populations heavily overfished. Almost all of them ended up on plates, and their shells were crushed, burnt and used for mortar. The loss of an estimated 95 per cent of native oyster and mussel reefs from Port Phillip Bay reflects trends of population decline the world over.

Recently, however, work has begun to restore these precious ecosystems in Australian and throughout the world by artificially rebuilding the base reef structures – in the case of Port Phillip, a combination of limestone and shells – on which the new oysters and mussels can grow.

The first step is prioritising areas for future shellfish reef restoration works. Following a pilot study, Victorian National Parks Association partnered with The Nature Conservancy between 2018–2020 to expand a citizen science project called OysterWatch Phase 2 through our ReefWatch program. In this time, community groups monitored sites throughout Port Phillip Bay to gather information on the settlement, survival and growth of juvenile shellfish.



PHOTO: KADE MILLS

Citizen scientists assembled and deployed over 300 of these experimental settlement plate units at sites around Port Phillip Bay.

Opening Up OysterWatch

Project aims

Juvenile oysters and mussels are free swimming and can be carried great distances by water currents before settling onto a hard substrate, like a rock or pylon, and growing into the adults we all recognise.

For the OysterWatch Phase 2 project, citizen scientists placed 'settlement plate units' at sites throughout Port Phillip Bay. They then recorded the numbers of juvenile Australian Flat Oyster/Angasi Oyster and Blue Mussel attaching to these units (also known as recruitment). Combined with other tools such as DNA analysis of the water column, this gave us an insight into how juvenile shellfish are moving throughout the bay, and helped to map 'hot spots' where high numbers of juveniles were recruiting year to year.

Artificial reef-rebuilding isn't a cheap activity, so it's important for marine managers and conservationists to know where they're going to get the most bang for their buck in terms of natural recruitment.

Project outcomes

Our data collected suggests that there is indeed great variation in numbers of oysters and mussels settling at



Close up of juvenile oysters growing on a settlement plate.

PHOTO: NICOLE MERTENS



PHOTO AJ MORTON

Oysters growing on the settlement unit plate 'sandwiches' at the Mordialloc Pier site.

different locations throughout Port Phillip Bay. Timing was important – higher rates of recruitment were recorded during the first half of the breeding season (October to January) than the second half (January to April). Additionally, we found that 2020 had a much lower recruitment rate across all sites compared to 2018 and 2019, highlighting the importance of running future shellfish monitoring programs across multiple breeding seasons.

We captured recruitment rates on settlement plates facing both towards the surface and the sea floor, and found that there were higher numbers of oysters facing the bottom. This suggests that habitat complexity may be significant for reef-rebuilding projects – that is, providing oysters with three-dimensional substrates where they can face away from the surface will support healthy recruitment of new individuals to artificial reefs.

Continued overleaf

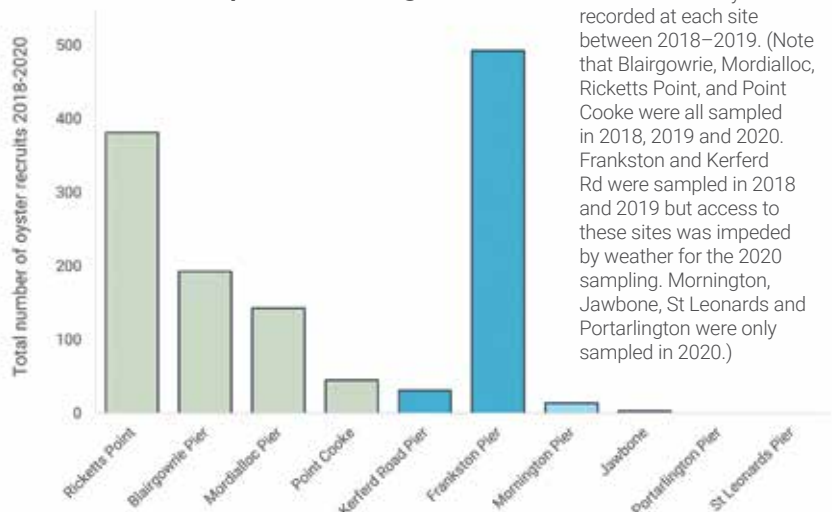


Locations of monitoring sites

Settlement plate units were deployed at a total of 10 OysterWatch sites throughout Phase 2 of the project.

The Nature Conservancy also deployed units on their existing reef restoration sites at Margaret's Reef and Wilson Spit so that they could monitor recruitment in active restoration areas.

Total abundance per monitoring site



Monitoring site with highest number of recruits:

Frankston Pier with 493 oysters recorded



Total number of oysters: **1286**



Total number of mussels: **610**

Continued from previous page

Project activities

OysterWatch Phase 2 involved our ReefWatch program supporting greater numbers of citizen scientists from community groups all around Port Phillip Bay. 64 individual citizen scientists from eight marine care groups, dive clubs or dive stores were involved in every stage of the project:

- assembly of the experimental settlement plate units
- deployment and retrieval dives
- monitoring the integrity of units in situ
- counting and measuring juvenile shellfish recruits

We also learned a lot about working with citizen scientists on what was a high-quality, but also high-intensity project. Our citizen scientists got a real taste of the challenges involved in marine research. They put in some long hours, and poor weather seemed to plague our sampling events. Our Frankston site was even destroyed (along with the end of the Frankston pier) in a storm in August 2019. Nevertheless, these fearless 'OysterWatchers' showed up with smiles and impressed us with the level of ownership and ingenuity when it came to managing their sites. Some groups used less-than-ideal conditions as a skill-building exercise for beginner divers; others saw the project as an opportunity to incorporate hands-on education and stewardship as part of their regular dive calendar.

Together the lessons we've learned will help groups in other regions develop shellfish monitoring projects of their own. • **PW**

OysterWatcher community groups

- Marine Care Ricketts Point
- Disabled Divers Association
- Marine Care Point Cooke
- Jawbone Marine Sanctuary Care Group
- Dive2U Dive Alliance
- Diveline
- Academy of Scuba
- Australian Diving Instruction

We also acknowledge the Albert Park Yachting and Angling Club, Blairgowrie Yacht Squadron and Beaumaris Yacht Club for their support of the project and providing access to their facilities during working bees and sampling events.

Along with these active community groups we were invited to speak with sustainability students from Caulfield Grammar and Albert Park College who were keen to learn more about our lost reefs.

Total number of settlement plates hand crafted:
300+

Total days citizen scientists spent building, deploying, retrieving and monitoring settlement plates and units:
270

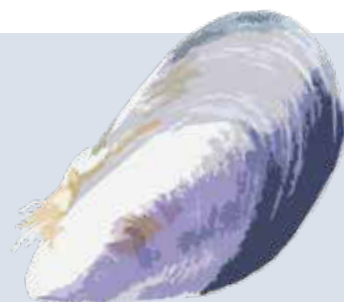


Citizen scientist AJ Morton of Dive2U gets ready to hit the water and collect some settlement plates at Point Cooke while Jawbone Marine Sanctuary Care Group's Nick Olliff provides support (and skips the boat).

PHOTO: NICOLE MERTENS

If you want to read more about the project methods, view results from the data we've collected, or get a taste for a day in the life of our OysterWatchers, visit vnpa.org.au/oyster-watch/ and www.youtube.com/user/VNPATV

Thank you to our project partners at The Nature Conservancy and to the community, marine care and dive groups who volunteered their time for this valuable citizen science work. OysterWatch Phase 2 was supported by the Victorian Government's Port Phillip Bay Fund.



'Cane toads of the sea' no more



PHOTO: CSIRO

THE NORTHERN PACIFIC SEA STAR IS NO LONGER CAUSING HAVOC IN WILSONS PROMONTORY NATIONAL PARK.

The Northern Pacific Sea Star may have a certain charming appearance, with their deep purple and yellows, but these marine pests can very much be referred to as the 'cane toads of the sea'. They consume and smother our native marine species – and in the perfect conditions, they can completely overtake marine habitats, leaving once diverse reefs completely barren.

The Northern Pacific Sea Star invasion was first discovered in Tidal River in 2012. If left undetected, it could devastate the surrounding Wilsons Promontory Marine National Park, known for its exquisite underwater caves and sponge gardens.

Ongoing efforts to eradicate the sea star by Parks Victoria, research organisations, and local groups and individuals has proven successful, with none found in almost two years.

However, the work is not yet over. It is important that monitoring continues to detect any future incursions which could occur from visitors to the park. Sea star larvae or adults could take refuge on any aquatic vessels or equipment.

What can you do?

To keep the Prom pristine and Tidal River pest-free, on your next visit be sure to exercise careful hygiene with any aquatic gear.

Parks Victoria is advising visitors using non-powered watercraft such as kayaks, paddle boards and boat users to thoroughly rinse in fresh water **before** bringing them into the park.

Adopt the **Check, Clean, Dry** process:

- Check your equipment (including kayak, snorkels, swimming gear, water play equipment) for any pests
- Clean equipment with fresh water to eliminate any marine pests you cannot see
- Dry boats and marine equipment thoroughly before moving to a new marine location

See more info at Parks Victoria website:
www.parks.vic.gov.au/get-into-nature/conservation-and-science/conserving-our-parks/marine-pests

SPHAGNUM MOSS

Sphagnum moss is quite a humble plant, but it supports many other species – including us.

There are around 285 species of sphagnum moss in the world, but only six in Australia. The most important of our species is *Sphagnum cristatum*, a truly remarkable plant of our high country where it forms bright green hummocks along streams and around quiet pools.

Sphagnum gathers water from alpine mists, melting snow and rain, and it can absorb and hold great quantities of water directly into its cells, like a sponge. On the high plains of Victoria's Alpine National Park, it has formed a multitude of remarkable water-filled blankets across the plains, sometimes over a metre deep and covering a hectare or more.

Over tens of thousands of years, as the lower layer of sphagnum moss decayed, deep beds of peat have formed below the moss layer. Peat is soil made entirely of compressed decaying plant material which, as long as it is kept wet and free from air, can remain in a semi-composted state for vast periods of time.

Sometimes called moss beds, peat beds mires, or bogs, these areas once totalled a remarkable 8500 hectares of Australia's alpine region.

Sphagnum can hold up to 20 times its own weight in water, and can slow the flow of groundwater, forming meandering streams and still pools. This enables water to flow gradually from the high country, feeding rivers all year round.

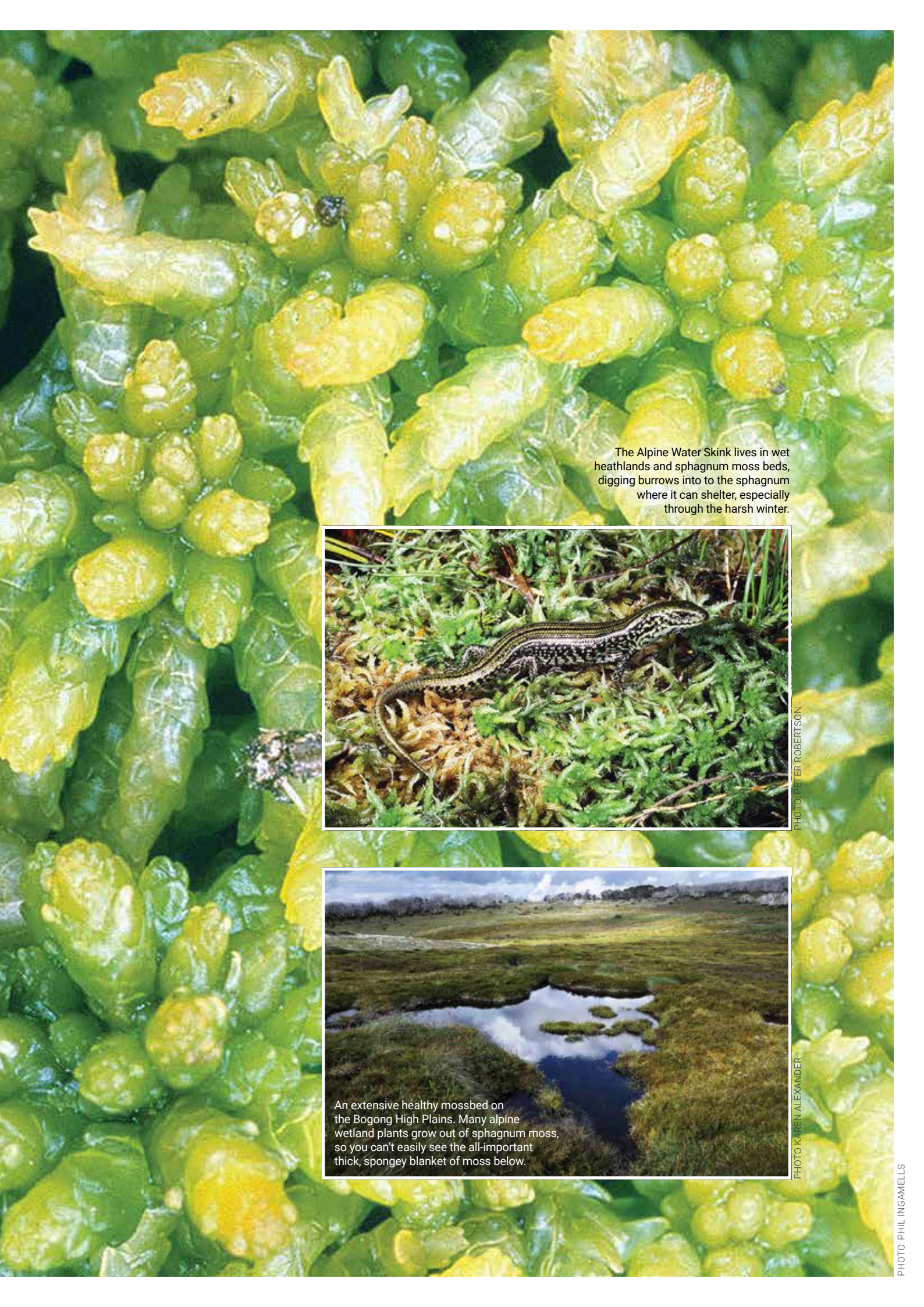
Sphagnum has even evolved its own chemical strategies to ward off insect and fungal attacks.

Over the last 200 hundred years, however, these ancient moss beds have had to confront something new that they had not evolved to deal with: hard-hooved animals. Sphagnum is unfortunately easily crushed by the hooves of animals like cattle, horses and deer. The once-protected peat below can then be trampled too, and exposed to air, which turns the peat to mud in spring and dust in summer.

Fortunately, most of Australia's alpine region is now protected in national parks, and park managers are working to remove feral hard-hooved animals so these remarkable peatlands, created and protected by sphagnum, can recover. They are now also given special protection under state and Commonwealth laws.

Thanks to David Meagher for additional information • PW

Sphagnum moss up close, showing how it holds water inside its thin-walled plant cells.



The Alpine Water Skink lives in wet heathlands and sphagnum moss beds, digging burrows into to the sphagnum where it can shelter, especially through the harsh winter.



PHOTO: PETER ROBERTSON



An extensive healthy mossbed on the Bogong High Plains. Many alpine wetland plants grow out of sphagnum moss, so you can't easily see the all-important thick, spongy blanket of moss below.

PHOTO: KAREN ALEXANDER

Tributes

Maxine Hawkins

1957–2020

We remember and acknowledge Maxine Hawkins, loyal VNPA Member and Direct Marketing Officer from 2009 to 2015. Maxine's dedication and thorough approach to her work were invaluable and she was instrumental in successfully launching a new logo and brand for the organisation, as well as improving communications with Members and supporters.

After leaving VNPA, Maxine spent happy times in a new home in Woodend, which she shared with her husband Don, and loved being able to see her daughter Rhonda and grandchildren who lived close by.

A lover of animals, nature and travel, Maxine was a very kind, friendly person and a good listener. A fond farewell to Maxine, a quiet achiever and a gentle soul.



Maureen Bond

1931–2020

Maureen was a person truly dedicated to defending the environment, especially her local patch in the Yarra Ranges where she lived in Badger Creek. Maureen, loyal VNPA Member since 1976, was also a keen participant on VNPA excursions and faithfully wrote submissions on many of the nature conservation issues that VNPA encourages supporters to write.

As a valuable long-term member of the Healesville Environment Watch Inc, which included performing the role of Secretary for 15 years, Maureen spent decades working on many revegetation projects. Her efforts helped restore the health of the Grace Burn and Watts River so platypus and other species could thrive.

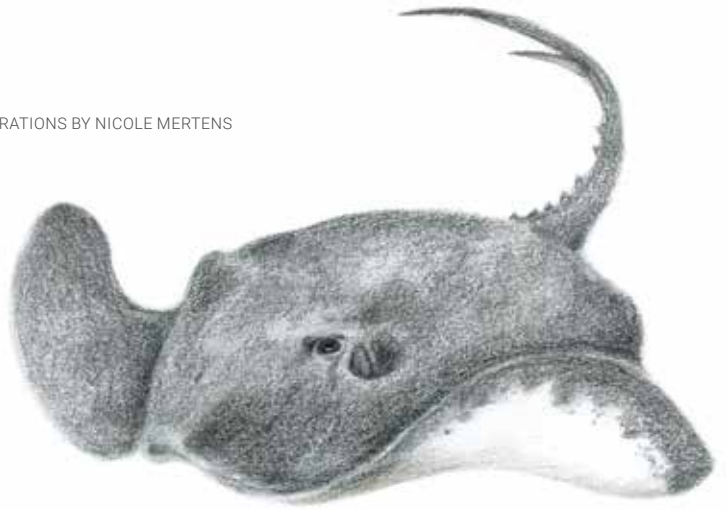
An advocate for nature and an outstanding member of the community, Maureen's legacy lives on in the natural areas she worked to protect and restore. • PW

QUIZ ANSWERS

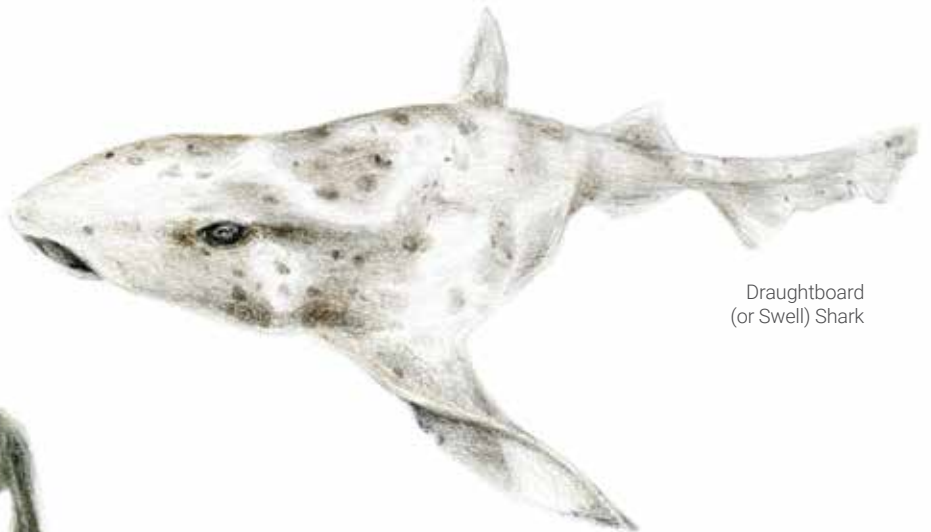
ILLUSTRATIONS BY NICOLE MERTENS

(From page 20)

- 1 1a: >500
1b: 180
- 2 **Answer is b. Pups.** Sharks have in history been referred to as 'sea dogs', which could explain the reason for 'pups.'
- 3 **True.** In fact, sharks can see 10 x better than humans.
- 4 **Humans.** Sharks are one of the most endangered marine species on the planet, and one third of all species are at risk of extinction. Every year we kill between 73–200+ million sharks, and are overfishing them faster than they can reproduce. They are targeted for the flesh (sold as 'flake' in fish and chip shops) and fins, caught as bycatch (by accident while targeting other species such as Tuna), and used in pharmaceuticals, and cosmetics.
- 5 **Yes.** However, unlike us, they do not have external ears, instead most sharks have tiny holes on each side of the head.
- 6 **True.** We can trace the origin of human limbs back to fish fins, so evolutionarily we are related.
- 7 **Answer is c.** Smooth Stingrays feed on **crabs and molluscs** dug up from the sediment. They also love a snack of spider crabs, which migrate into the Port Phillip Bay each winter.
- 8 **Answer is d. Elephant Shark.**
- 9 **Answer is b.** Port Jackson Sharks have **small sharp teeth** in the front of the jaws and molars at the rear for grabbing then crushing their prey of molluscs, crustaceans and fish. They are nocturnal and usually forage at night.
- 10 **Answer is d. All of the above.** Having a large disk-shaped body and a long tail I can kind of understand why you mistake me for any of the musical instruments mentioned!
- 11 **Answer is b.** Because of this I am also commonly known as a Swell Shark!



Smooth Stingray



Draughtboard
(or Swell) Shark



Port Jackson
Shark



Fiddler Ray

Afton Street Conservation Park



PHOTO: GEOFF DURHAM

A place of nature in the city.

GEOFF DURHAM TAKES A WALK THROUGH A MELBOURNE PARK – AND BACK THROUGH THE HISTORY OF OUR METROPOLITAN PARKS.

If you are a land owner in metropolitan Melbourne, you may be familiar with the annual 'Parks Charge' on water rates.

Formerly the 'Metropolitan Improvement Rate', it was introduced in the late 1950s to enable the old Melbourne and Metropolitan Board of Works, under Chairman Alan Croxford, to acquire land and set up a system of large metropolitan parks, notably Point Cook, Brimbank, Plenty Gorge, Westerfolds, Jells and Braeside.

The charge remains, but is now used to provide general funds through the Department of Environment, Land, Water and Planning (DELWP) for Parks Victoria, the Royal Botanic Gardens, the Shrine of Remembrance and the three zoos.

Lacking any Croxford-like vision, as Melbourne has sprawled, the creation of new parks in metropolitan

Melbourne has been largely ad-hoc. The demands on municipal councils for more housing and increased rate revenue leads to re-zoning of land, with pressure from determined developers and sometimes even corruption.

One answer to urban sprawl is high-density living with high-rise dwellings and apartments; no front or back yards; small, safe neighbourhood playgrounds, but nowhere for children, their parents and dogs, to run free. Residents have reduced opportunities to experience the health and wellbeing benefits of open green space.

Meanwhile, precious remnant native vegetation is lost.

Councils have traditionally provided local parks, and a notable example is Afton Street Conservation Park on the Maribyrnong River in the City of Moonee Valley.

This is land of the Wurundjeri clan of the Woiwurrung speaking people of the Kulin nation. Les Blake in *Place Names of Victoria* says "Maribyrnong is Aboriginal *mirring-gnay-birnong*, saltwater river". The river is tidal, but Smileys Creek in the east of the park and Steele Creek to the north would have supplied the Woiwurrung with fresh water. The park has two recorded archaeological sites with surface artefact scatters.

In 1803 the New South Wales Surveyor General, Charles Grimes, boated up the river accompanied by a trusted convict gardener, James Fleming, whose journal refers to the above freshwater tributaries as well as noting 'a place the natives had made for catching fish'.

The Essendon Historical Society advises that Afton Street was probably named by an early Scottish land speculator, Michael Fergusson, after



PHOTO: DUNCAN MCCASKILL, FLICKR CC



PHOTO: PARKS VICTORIA

a small river in Ayrshire, Scotland, made famous by the Robbie Burns poem 'Afton Water'.

The Commonwealth Defence Department had land on both sides of the river. In the 1980s there was community pressure, particularly by the Afton Street Hill Group, for the Afton Street Hill area on the eastern side of the Maribyrnong to be reserved as conservation parkland. In 1987 Defence offered to transfer the site to the City of Keilor, but the offer was rejected because of the cost of maintenance if development was not permitted. Following the Kennett government municipal restructuring in 1994, 17 hectares was purchased in 2003 by the Moonee Valley Council for \$900,000. On the other western side of the river, the large area of Defence land in the City of Maribyrnong has been identified as a future mixed-use development site, although extensive remediation work will be required.

The Afton Street Hill site has a large central ridge capped by newer volcanics underlain by Tertiary Age sand, with exposed columnar basalt. In the north is an old sand quarry, and then a very steep slope to the river. In the south are revegetated flood flats and a river terrace.

It is notable for its native grasses, including Kangaroo Grass, Wallaby grasses, Red-leg Grass, Weeping Grass, Blackheads and Silky Blue Grass. Swamp Wallabies, Echidnas, lizards and snakes, and birds, particularly waterbirds and birds of prey, are present in despite the parks urban surroundings.

Three ponds have been constructed on Smileys Creek to create wetlands, from which water irrigates five ovals along the river and there is an open mown grassed

From top left:

Eastern Great Egret's are among the diverse waterbirds that can be seen in the wetlands.

Room to move along the Maribyrnong River.

Green open-space is so important for our health and wellbeing.



PHOTO: GEOFF DURHAM

area. There have been many plantings of indigenous species, some by Green Corps workers, with mixed success.

Defence relics remain. Wire mesh fencing has been retained as has the abutment of an old bridge and concrete steps to a flag pole on which a red flag was flown to warn of explosions and movements of ammunition. During Defence occupation at various times there was grazing by cows, sheep and goats. The area had dumps of rubbish and was rampant with weeds. Weed control is ongoing – removal of Boxthorn in particular by the council has helped control rabbits.

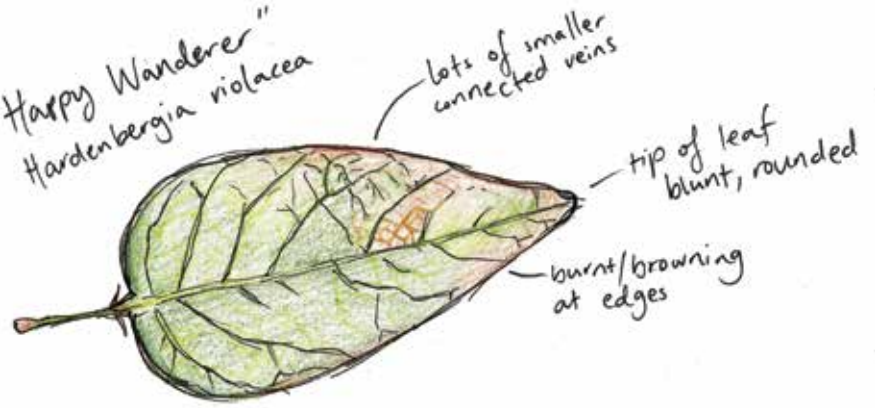
The park is 6 kilometres from the Melbourne CBD. Public transport is by train to Essendon Station and then Bus 465 along Buckley Street to Afton Street. A car park is at the end of the street. Pedestrian access is also available from the Lily Street Park and lookout, and from Prospect Street, and the recently restored Afton Street footbridge over the Maribyrnong offers other walking and cycling options.

The park is popular with walkers, joggers, bike riders and fishers. It has no BBQs, picnic tables or toilets, although these are available about 500 metres downstream at Riverside Park. Dogs are permitted on-lead. Bicycles but trail bikes are not allowed. The park has a network of tracks including part of the Maribyrnong River Trail which connects Footscray Road to Brimbank Park. The views of the city from the ridge are spectacular.

The Moonee Valley Council is to be commended for its vision in acquiring the land and designating it a Conservation Park, and for managing it in accordance with a detailed award-winning Master Plan. Much has been achieved with rubbish removal and in creating the wetlands, and a good start has been made on weed control and revegetation, but the park is very much a work in progress requiring ongoing, dedicated resourcing. It has important conservation and heritage values and is a significant green open-space and passive recreation area for both locals and visitors. • PW



"Happy Wanderer"
Hardenbergia violacea



About 7cm long and 4cm wide
and 4cm thick

Lovely leaves

Be a botanist

This activity is a chance for you and your family to try out being botanists (scientists who study plants) by getting to know some of the different leaves around you. These leaves could be near home, in the bush, in the school yard or park. Simply find a leaf (or many) and use the questions and activities below to get you looking closely at your leaf – just like a botanist. You may wish to grab some paper, pencils and/or crayons to record your discoveries.

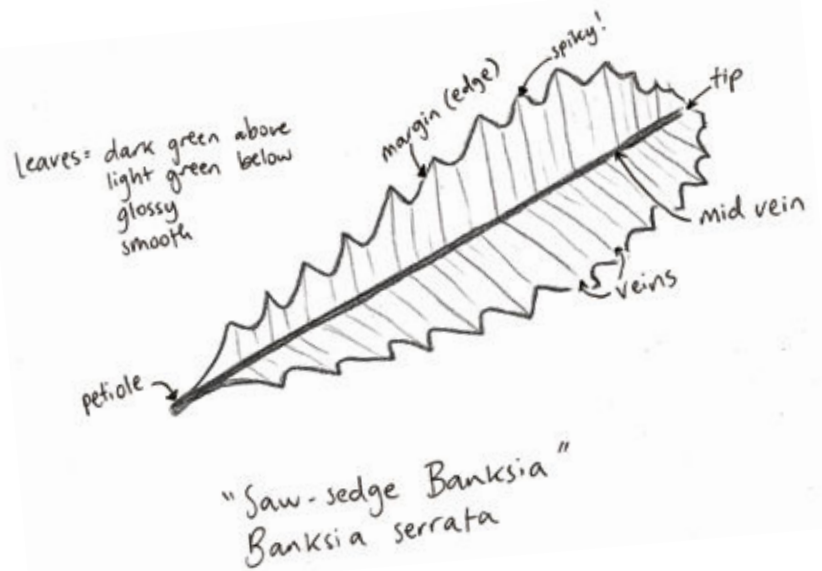
1. Create a picture of your leaf. Include the bumps, jagged edges, patterns and different shades and colours. Some ideas for doing this include:
 - a. Trace around the edge of your leaf and describe the shape
 - b. Do a leaf rubbing using crayons and admire the textures
 - c. Try a free-hand drawing
 - d. Paint your leaf
 - e. Use labels to name the different parts of your leaf
2. How many colours and shades are on your leaf? Is it the same on both sides?
3. What patterns can you see in the veins?
4. How long is your leaf? Longer than your fingernail? Longer than your finger? Longer than your arm?
5. What does your leaf feel like?
6. Is there anything living on your leaf?
7. What evidence can you see that an animal could have visited your leaf? What type of animal could it have been?
8. What type of plant did your leaf come from? Was it a tree, a grass, a bush? Something else?
9. How many other leaves do you think are on your plant? Count or guess!
10. Is there a pattern to the way the leaves grow on your plant? Do they grow all the way around a stem, or on opposite sides of the stem?
11. Why is your leaf important for your plant?
12. Who or what else might your leaf be important to?

Most leaves on a
branch 10-15 cm long

Leaves have a
red midvein and
margin

Stems, leaves and
flower buds coated
in white-grey powder





Leafy facts

A leaf is an 'organ' of a plant. Its job is to create food for the plant to give it energy to grow and reproduce.

Even leaves on the ground are important in the bush. They create what is known as leaf litter. The leaf litter protects the soil and provides habitat for tiny animals.

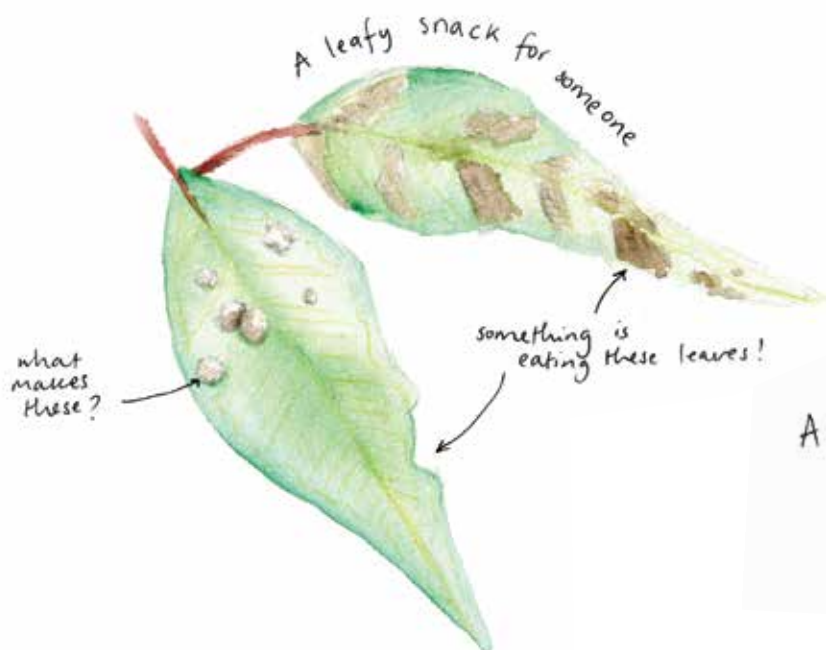
In wet forests and rainforests, leaves at the tree tops provide 'shade umbrellas' for the forest below. This helps keep the forest moist.

Leaves on mallee trees are usually very tough and leathery to keep them from drying out. This is because they grow in very dry places and need to hold on to as much water as they can.

Leaves from the bush are used by wildlife for all sorts of things. They can be used for food, warmth and shelter, a place to lay eggs and nests to raise babies. • PW



ILLUSTRATIONS BY NICOLE MERTENS





Sorting through your photos while staying home?

If you have some spectacular shots that show the beauty and wonder of Victoria's nature, from breathtaking landscapes to stunning macros, and you would like to see them possibly printed in *Park Watch* magazine, please reach out to the editor at meg@vnpa.org.au