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Parliamentary inquiry into ecosystem decline in Victoria

Final submission by the Victorian National Parks Association

31/08/2020

Thank you for inviting submissions into this important inquiry into ecosystem decline and examining the measures that should be taken to restore habitats and populations of threatened and endangered species in Victoria.

We hope that this inquiry will provide support for future strengthening of environmental legislation and that it will give more direction to government policy and programs in regards to biodiversity conservation and reversing ecosystem decline.

Our state has come a long way in nature conservation, but in 2020 we are still far from turning the corner to restoration. By addressing threatening processes and aiming towards restoration, we can greatly improve the health of our state's natural areas and ecosystems, recover our threatened flora and fauna, and preserve Victoria's marvellous natural heritage for generations to come.

Established in 1952, the VNPA is Victoria's leading community based nature conservation organisation. We are an independent, non-profit, membership-based group, which exists to support better protection and management of Victoria's biodiversity and natural heritage. We aim to achieve our vision by facilitating strategic campaigns and education programs, developing policies, undertaking hands-on conservation work, and by running bushwalking and outdoor activity programs which promote the care and enjoyment of Victoria's natural environment.

The following submission expands upon our preliminary submission from the 27th of July 2020 and includes our final recommendations for various management areas pertaining to nature conservation in Victoria.

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Executive summary

From the wildflower-filled woodlands of the west, to the tall wet forests of the east, to the seagrass meadows in our bays, Victoria has an exceptionally diverse range of ecosystems. Our terrestrial, freshwater and marine ecosystems provide natural habitats that support our rich biodiversity, and also provide essential ecosystem services that support healthy Victorians.

However, there are numerous threats that are the causing degradation of Victoria's ecosystems and natural habitats. Some are legacy issues that hark back to the early days of British settlement in Australia, while others are emerging threatening processes that make old problems worse by exacerbating habitat degradation and biodiversity loss.

In Victoria there has been an increasing trend in the number of critically endangered and vulnerable flora and fauna. Many of our state's plants, mammals, birds, reptiles, fish and amphibians, along with numerous invertebrates and ecological communities, are threatened with extinction.

This submission discusses 14 management areas pertaining to nature conservation in Victoria and provides practical recommendations on what can be done to manage threatening processes, restore populations of threatened species, and improve ecosystem health:

1. Threatened species laws – implementing the Flora and Fauna Guarantee Act 1988
2. Habitat fragmentation – reconnecting and restoring landscapes for nature
3. Managing environmental weeds
4. Managing feral animals and their impacts
5. Hard-hooved animals in Victoria's alpine region
6. Improving fire management for better ecological and safety outcomes
7. Native forest logging – transition out and protect critical habitats
8. Riverside rescue – rivers, streams, floodplains and riparian habitats
9. Wetland degradation and the need for better protection
10. Protecting marine and coastal ecosystems
11. The role and need for national parks and protected areas
12. Filling the gaps in the terrestrial reserve system – current opportunities
13. Protecting the threatened grasslands of the Victorian Volcanic Plain
14. Managing ecosystem decline under climate change

By addressing threatening processes and aiming towards restoration, we can greatly improve the health of our state's natural areas and ecosystems, recover our threatened flora and fauna, and preserve Victoria's marvellous natural heritage for generations to come.

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The following list is a compilation of the recommendations provided in this submission. It covers 14 management areas pertaining to nature conservation in Victoria and provides practical solutions on what can be done to manage threatening processes, restore populations of threatened species, and improve ecosystem health.

1. Threatened species laws – implementing the Flora and Fauna Guarantee Act 1988

It is important to ensure that the *Flora and Fauna Guarantee Act 1988* is adequately implemented. This includes:

- creating action statements and management plans to guide and implement conservation action for listed threatened species and communities – it should also be noted that the amended Act now provides for efficient management plans that can incorporate multiple action statements under the one plan
- creating ministerial guidelines that specifies when management plans must be made – this should be done under a consultation process
- making critical habitat determinations so that the environment Minister is able to use habitat conservation orders in urgent conservation situations – this may involve legislating for mandatory critical habitat determinations for threatened communities of flora and fauna and for conservation priority taxa
- identifying areas of critical habitat in action statements – this may assist with making decisions on official critical habitat determinations more efficient and should be particularly considered in cases where habitat conservation orders may be highly beneficial to the conservation and long term persistence (i.e. Guarantee) of threatened taxon and communities of flora and fauna
- ensuring that public authorities are aware of their new duty to consider biodiversity conservation and the objectives of the *Flora and Fauna Guarantee Act 1988* and ensuring that any making of guidelines relating to duty includes a vigorous public consultation
- updating and strengthening the Biodiversity Strategy so that it relates to the objectives of the FFG Act and so that it incorporates and commits to the use of the legal conservation tools available under the Act
- establishing specific long-term funding arrangements dedicated to the implementation of the tools of the FFG Act
- accepting the Victorian Auditor-General's recommendation to implement a "prioritised action plan" to address the backlog of action statements waiting to be prepared. The prioritised action plan should also be used to encourage the making of management plans and critical habitat determinations, and for keeping action statements up-to-date. A possible list of conservation priorities for action could include:

- Threatened communities of flora or fauna
- Highly threatened taxa in Victoria
- Threatening processes
- Umbrella taxa – who's conservation may help to conserve many other taxa simultaneously
- Keystone taxa – that have a central ecological role in a community
- Flagship taxa – iconic species that have high public appeal
- Indicator taxa – who's monitoring can indicate changes in environmental quality

2. Habitat fragmentation – reconnecting and restoring landscapes for nature

To address impacts of habitat fragmentation, the VNPA recommends that the Committee recommend to the Victorian Government the following:

- undertake on-going well-funded, strategic revegetation and Landcare programs to increase the size of fragmented areas and to provide biolinks between wetlands, waterways, existing protected lands and fragments of vegetation on private and public lands across Victoria
- increase financial support for both large and small scale biolink projects particularly in highly cleared and fragmented landscapes
- protect biolinks through planning or other legally-binding controls against loss of ecological integrity, particularly if public monies have been used to create the biolinks
- continue the funding and implementation of the successful Regional Riparian Action Plan with long term funding as a core part of government functions
- encourage local governments to prepare local biodiversity action plans and offer matching funds for implementation of these plans
- significantly reduce the impacts of fire on the flora and fauna of fragmented and isolated areas by ensuring that fuel reduction burns and wildfires do not burn large extents of the fragments
- develop stronger native vegetation laws and regulations to stop clearing – including a focus on avoiding vegetation loss
- dramatically increase funding for private land conservation through the Trust for Nature, including the establishment of a $30 - $40 million revolving fund
- protect high conservation value large remnant patches of vegetation on public land through reservation under the *National Parks Act 1975*
- upgrade protection for conservation reserves listed in schedules of the *Crown Land (Reserves) Act 1978* by:
    - transferring nature conservation reserves to schedule 2C of the *National Parks Act 1975* (with protection equivalent to that for properties under schedules 2, 2A and 2B)
    - transferring all other relevant reserves – cultural and natural heritage reserves, natural features reserves, historic and cultural features reserves, regional parks, miscellaneous reserves, water reserves and

forest parks – to the National Parks Act, listing them temporarily as a new schedule
    - commission the Victorian Environmental Assessment Council to assess the most appropriate future management arrangements for these properties
- increase funding for park management to at least 1% of state annual expenditure
- significantly increase funding, resources and expertise for habitat restoration programs and ecosystem management across all public land, especially national parks and conservation reserves
- significantly expand programs for ongoing biodiversity surveying and monitoring across Victoria's various terrestrial, riparian, freshwater, coastal and marine ecosystems as well as expanded support for citizen science programs
- include appropriate park employment programs, including Indigenous employment programs, as part of regional recovery plans
- support community engagement such as friends groups to increase community connection to parks and reserves

3. Managing environmental weeds

- Clearer governance arrangements around pest plant management on public and private land.
- A new regulatory body that focuses equally on environmental and agricultural harm done by invasive plant species.
- Increased funding and support for long term monitoring programs of weed invasions in natural areas to assess the effectiveness of control measures and to survey for increases in sleeper weeds.
- 5 yearly funding cycles for pest plant management to allow for targeted and consistent management of weed species – this is more cost effective and allows land managers to plan long-term management strategies for established or emerging weed species.
- Establishment of a permitted list approach for listing of potential pest plant species prior to species being brought into state – species would need to undergo a weed risk assessment prior to being permitted entry.
- The position of Biosecurity Minister should be created at state level to oversee issues with biosecurity in environmental and agricultural fields equally.

4. Managing feral animals and their impacts

Introduced pest animals and plants are one of the top contributors to ecosystem decline and the extinction of Victoria's threatened species. The VNPA recommends that the Committee recommend to the Victorian Government the following actions:

- significantly expand funding and planning for control measures and mitigating impacts of invasive pest animals and plants
- eradicate new invasive pants and animals as a priority
- ensure Federal biosecurity laws operate on a 'permitted' for import list of plant and animal species
- adequately declare invasive pest animals and plants in legislation
- specifically declare deer as a pest species, and release an effective detailed state-wide deer control strategy
- update the action statements under the *Flora and Fauna Guarantee Act 1988* pertaining to predation by cats and foxes on native wildlife – these action statements are significantly outdated (2004 and 2002 respectively) and require updating to reflect new programs, legislation and challenges and to set out intended management actions going forward
- substantially increase funding for research into the development of effective target-specific baits, and target-specific delivery mechanisms, for a range of pest animals – with particular research into baits containing a toxin to which native wildlife have a higher tolerance or that are less readily consumed by native wildlife

5. Hard-hooved animals in Victoria's alpine region

- Action should be taken on all hard-hooved animals in the alpine region.
- In line with scientific evidence, domestic cattle should not be reintroduced to alpine regions as a fire reduction strategy.

6. Improving fire management for better ecological and safety outcomes

For improved fire management and for better protection of people and nature from inappropriate fire regimes, the VNPA recommends the following:

- the ramping up of aerial point of ignition control, including further developing state-wide aerial firefighting capabilities to suppress ignition points in both urban and remote landscapes
- improved funding arrangements between the Federal and State governments in order to support aerial operational responses to wildfires in remote areas and to support the protection of environmental and cultural assets (Currently, federal funding is only available for aerial intervention if a fire is clearly threatening lives and infrastructure. This discourages critical point-of-ignition control in remote areas.)
- the assessment of the cost-effectiveness of successful aerial interventions, including estimating the avoided costs in life, infrastructure etc. whenever fires have been contained at or near the point of ignition

- the improvement of wildfire preparedness for citizens in towns and cities, including improved evacuation planning and procedures, and support for private bushfire shelters
- increased emphasis on strategic and regulated fuel reduction of understorey vegetation close to assets
- evidence-based and strategically planned fuel reduction burn programs with follow up monitoring of post-fire regrowth and fuel loads
- reduce the impacts of fire on the flora and fauna of fragmented and isolated habitats by ensuring that fuel reduction burns and wildfires do not burn large extents of fragmented areas
- the incorporation of the ecological and associated flammability outcomes of planned burns and wildfires in different forest types into wildfire risk modelling
- reducing the long term flammability of the landscape by setting targets to protect and promote the growth of older vegetation in those forest types where older growth is historically less flammable than younger post-fire growth
- protection of critical habitat features, such as (but not only) hollows in trees and coarse woody debris
- a cessation of blackout burning practices – blackout burning during fire response operations destroys natural unburnt habitat refuges and affects the survival and recovery of fauna and flora
- a cessation of post-fire salvage logging practices – salvage logging severely undermines efforts to protect areas of mature tree recovery within burnt areas
- the protection of long unburnt forest should be a high priority in fire management – due to frequent planned and wild fire, the extent of long unburnt forests has declined rapidly in recent decades
- a clarification of which legislation and regulations apply, and when, in regard to roadside clearing of vegetation before, during and after emergency response
- permanent clearing of roadside vegetation is not timber harvesting and should be subject to avoid-minimise-offset principles and relevant native vegetation clearing controls.

7. Native forest logging – transition out and protect critical habitats

The VNPA recommends that the Committee recommend to the Victorian Government the following:

- in light of widespread landscape scale fire, bring forward to as soon as possible the transition of the native forest logging industry to plantation only timber production
- make critical habitat determinations under the *Flora and Fauna Guarantee Act 1988* for forest dwelling wildlife that are significantly under threat from fire and logging

- conduct a binding 'major event' review (with public consultation) of all Regional Forest Agreements in the wake of the large landscape scale fires of 2019/20 fire season
- abandon the Western Regional Forest Agreement and rule out the renewal of the soon to expire $3.3 million grant which props up the logging industry in the region
- stop using tax payer's dollars to subsidize VicForests' detrimental logging of public native forests and threatened species habitat

8. Riverside rescue – rivers, streams, floodplains and riparian habitats

The VNPA recommends that the Committee recommend to the Victorian Government the following:

- undertake bipartisan action to reduce water consumption and restore more natural flow regimes to rivers – for the health of rivers, riparian and floodplain ecosystems and to protect the water security of Victoria's regional and rural communities
- optimise protection of high value, largely intact freshwater ecosystems by creating freshwater reference areas under the *Reference Areas Act 1978* – they provide a unique opportunity to serve as baseline reference areas and should be strictly protected
- continue the implementation of the successful Regional Riparian Action Plan with long term funding as a core part of government functions – to provide significant biodiversity conservation action, create important biolinks, improve river water quality, and provide significant regional job opportunities
- a Victorian Environmental Assessment Council investigation or similar into the conservation value of riparian vegetation adjacent to public land – to identify opportunities for better management and to help consolidate the reserve system
- conduct an independent comprehensive state wide scientific review of all freshwater dependent ecosystems – including the impacts of fish stocking and the expected impacts of Sustainable Diversion Limit Adjustment Mechanism projects
- DELWP to improve and update the following action statements pertaining to river-and-stream-related threatening processes listed under the *Flora and Fauna Guarantee Act 1988* (these were prepared in 2003 and are now outdated; they need to be updated to reflect new programs and legislation and to set out what is intended to be done going forward to manage the threatening processes degrading Victoria's river, stream and riparian habitats):
    - Alteration to the natural flow regimes of rivers and streams
    - Alteration to natural temperature regimes of rivers and streams

  - Degradation of native riparian vegetation along Victorian rivers and streams
  - Increase in sediment input into Victorian rivers and streams due to human activities
  - Introduction of live fish into waters outside their natural range within a Victorian river catchment after 1770.
  - Prevention of passage of aquatic biota as a result of the presence of instream structures.
  - Removal of wood debris from Victorian streams.
- DELWP to prepare action statements for the following relevant threatening processes (these are yet to be prepared and action statements are a mandatory requirement under the FFG Act):
  - Input of organotins to Victorian marine and estuarine waters.
  - Input of petroleum and related products into Victorian marine and estuarine environments.
  - Input of toxic substances into Victorian rivers and streams.
  - Introduction and spread of Spartina to Victorian estuarine environments.
  - The discharge of human-generated marine debris into Victorian marine or estuarine waters.
  - Wetland loss and degradation as a result of change in water regime, dredging, draining, filling and grazing.

9. Wetland degradation and the need for better protection

The local and international significance of Ramsar sites needs far more acknowledgment and we ask that the Government consider the recommendations of the recent Public Accounts and Estimates Committee parliamentary inquiry, (the full inquiry report can be accessed here) particularly:

- Establish long-term funding for Ramsar site management so that monitoring programs and appropriate management can be maintained, to protect migratory birds and other species as well as our international reputation.
- Implement the Yorta Yorta joint management plan for Barmah National Park, especially in relation to management of feral animals and weeds. A commitment to these objectives allows the Environmental Water Holder to implement a timely flooding regime for the Barmah Ramsar wetlands.
- Stopping large scale development in Ramsar sites, such as the proposed AGL LNG port in Western Port Bay.

Further, the VNPA recommends that the Committee recommend to the Victorian Government the following:

- the enforcement of a ‘wetlands overlay’ for planning schemes that prohibits development that would destroy or degrade high-value wetlands – high-value wetlands to be strictly protected would include all Ramsar sites

- the preparation of an action statement under the *Flora and Fauna Guarantee Act 1988* (which is mandatory and long over-due) to set out what is intended to be done to manage the listed threatening process of wetland loss and degradation – the action statement should incorporate Ramsar wetlands and wetlands on both private and public land and the intended actions should address the management of a range of threats including grazing, cropping, vehicles and duck hunting
- undertake an independent comprehensive assessment of wetland health, land management and threats on both public and private land, by a body such as Victorian Environmental Assessment Council or similar

10. Protecting marine and coastal ecosystems

For better management and nature conservation in our marine and coastal areas, the VNPA recommends that the Committee recommend to the Victorian Government following:

- the removal of the ban on new marine national parks
- the creation of new marine national parks and sanctuaries
- an independent review, of current Victorian marine national parks and sanctuaries (and other marine protected areas) against the NRSMPA's key principles of comprehensiveness, adequacy and representativeness, as recommended by the Victorian Environmental Assessment Council's Statewide Assessment of Public Land Assessment, 2017
- the creation of a state-wide ecosystem based marine spatial plan and that Victoria's marine national parks and sanctuaries be considered as a key conservation pillar in the current Victorian process of marine spatial planning
- that the Victorian government invest adequate funding into marine science and into management of our marine national parks and sanctuaries
- stopping large scale development in RAMSAR sites, such as the proposed AGL Liquid Natural Gas (LNG) Import Terminal Facility (i.e. an LNG port) in Western Port Bay
- the prohibition of commercial racehorse training along any of Victoria's beaches, including the Belfast Coastal Reserve
- that the Victorian Government implement either the accepted or proposed recommendations from the Victorian Environment Assessment Council in relation to the planning and management of marine parks (the VEAC Coastal Reserves Assessment 2020, VEAC Public Lands Assessment 2017, and the VEAC Marine Investigation 2014)

11. The role and need for national parks and protected areas

- increase funding for the management of Victoria's national parks be to at least 1% of the state budget

- Parks Victoria to substantially increase its staff expertise in biological and ecological fields, including (but not only) mycology and entomology
- Parks Victoria to increase public education in the role that national parks play, and their benefits to the community

12. Filling the gaps in the terrestrial reserve system – current opportunities

The VNPA recommends that the Committee recommend to the Victorian Government the following:

- make a decision on the proposals to create 60,000 hectares of new national parks and reserves in Victoria's central west Wombat, Wellsford, Mt Cole and Pyrenees Forests – this decision is now well overdue it's statutory timelines under the *Victorian Environment Assessment Council Act 2001*.
- initiate new Victorian Assessment Council Investigations (across all terrestrial, riparian, freshwater, coastal and marine environments) to identify how to fill gaps in the reserve system, including under represented habitat areas, areas with high numbers of threatened species and areas under threat
- initiate a Victorian Assessment Council Investigation of Victoria's central highlands to investigate the best way to manage public land use in the region to inform the creation of a Great Forest National Park
- immediately deliver on promises to protect endangered temperate grasslands and grassy woodlands and establish the Western Grassland Reserve and the Grassy Eucalypt Woodland Reserve
- formally recognize the Holden Bushlands under the Distinctive Areas and Landscapes Statement of Planning Policy and undertake a review of Extractive Industry Interest Area mapping within Bass Coast with a view to having the Holden Bushlands and surrounding remnant forests protected from sand mining
- the Victorian government should take significant steps to secure the site for public ownership as a high quality addition to Victoria's conservation estate in the highly under-represented Gippsland Plain bioregion – If direct purchase is not achievable, permeant protection such as Trust for Nature Covenants for high conservation value parcels should be considered, to ensure they remnants are secured

13. Protecting the threatened grasslands of the Victorian Volcanic Plain

The VNPA recommends that the Committee recommend to the Victorian Government the following:

- Ensure that all of Victoria's diverse vegetation communities, including native grasslands, are adequately represented and properly managed within the reserve system to better secure the future of threatened species

- Immediately deliver on promises to protect endangered temperate grasslands and grassy woodlands and establish the Western Grassland Reserve and the Grassy Eucalypt Woodland Reserve as part of the MSA program.
- Prioritise the acquisition of the highest conservation value grasslands within the urban growth boundary through the MSA program
- Investigate and implement co-management of grasslands with Traditional Owners to revitalise cultural management of grasslands and to give grassland ecosystems the appropriate fire regimes needed for healthy ecosystem function.
- Undertake a state wide audit of all grasslands on the Victorian Volcanic Plains on public land to assess their ecological condition and potential for restoration and protection.
- Create a broad-scale management plan for all grasslands on the Victorian Volcanic Plains as recommended in the EPBC recovery plan decision "A broad-scale bioregional plan would make the greatest contribution to the conservation of the large number of threatened species and ecological communities concerned"
- Make a legislated commitment to no loss of any medium to high quality grasslands outside of the Urban Growth Boundary on public land, and acquire any high conservation value grasslands on private land.

14. Managing ecosystem decline under climate change

- Because climate change will add a range of stresses to species and ecosystems, there is a greater need to increase resources to fight current stressors, such as invasive species.
- Increase funding and support for biolink projects to link fragmented natural habitats and restore natural gene flow between fragmented and isolated populations of flora and fauna.
- Develop a detailed understanding on the implications of climate change on ecosystems, and a detailed assessment at fine scale (e.g at least 5 kilometre blocks) should be undertaken to model the potential changes for key natural areas
- A series of Climate Future Plots should be set up across Victoria, particularly for plant species predicted to be most sensitive to climatic change, giving us the knowledge and capacity to introduce stronger genetic variants of species that might fail under a changed climate.

1. Threatened species laws – implementing the Flora and Fauna Guarantee Act 1988

Victoria has a very large number of flora and fauna species threatened with extinction. Due to recent amendments of the *Flora and Fauna Guarantee Act 1988,* the classification of threatened species in Victoria is changing, and the official numbers of threatened species in Victoria protected under the Act is unclear for the time being.

The Department of Environment, Land, Water and Planning is in the process of undertaking an assessment of threatened taxa in Victoria and will amalgamate taxa listed as threatened under the Act and taxa listed on DEWLP's non-statutory advisory lists. It is envisaged that the new Threatened List will increase species listed under the legislation from around 900 to over 2000. There are also likely to be many other rare species of flora and fauna in Victoria that are data deficient and which will remain unprotected by Victoria's threatened species legislation.

The *Flora and Fauna Guarantee Act 1988* is the main piece of legislation protecting Victoria's threatened flora and fauna, ecological communities and habitats. Great name with great intent, but unfortunately the Act has historically been poorly implemented. Limited obligations on public authorities have resulted in many of the legal tools available to protect flora and fauna never being used.

Many of the listed threatened species do not have recovery action statements and no management plans have been made to guide and enable the implementation of action statements. Just one critical habitat determination and zero conservation orders have been made in the 32 year history of the Act.

The new amendments to the FFG Act that came into effect on the 1st of June 2020 somewhat improved the legislation but, fundamentally, threatened species protection is still at the discretion of government ministers and departments. Our government and government agencies need far more political will to implement the legal conservation tools available under the Act, or better still, need to be legally obligated to act.

There are number of new and refreshed legal tools in the amended or 'modernised' FFG Act which are yet to be utilised. These tools are discussed below.

A new flora and fauna duty on public authorities

The amended FFG Act requires ministers and public authorities to give proper consideration to the objectives of the Act, which notably include a "Guarantee" on the persistence of Victoria's flora and fauna in the wild and an objective "to protect, conserve, restore and enhance biodiversity". There are also requirements for ministers and public authorities to give proper consideration to biodiversity impacts, and to any instrument made under the Act including the Biodiversity Strategy, action statements, critical habitat determinations and management plans.

The Minister is able to make guidelines in regards to how public authorities properly consider the objectives and instruments of the Act, and the Minister has the power to request information about action taken in a sort of 'name and shame' model. This is a significant new compliance power and there needs to be clear avenues for concerned individuals and organizations to request that the Minister exercise this power, to ensure that it does not become yet another unused tool.

Threatened List and Processes List

Victoria has opted to adopt the Common Assessment Method (CAM) for species but so far not for ecological communities. The listing will be similar to what is used nationally, and includes categories such as 'Critically endangered'. Listed taxa will also have either a Victorian or national risk scale.

However, we note that although there are provisions for a separate Victorian risk scale, issues could still potentially arise with national species that are particularly at threat in Victoria. Conservation *in Victoria* must remain a key priority.

Biodiversity Strategy

The amended FFG Act has strengthened the requirements for a Biodiversity Strategy and these requirements now need to be reflected in the current strategy. The strategy must relate to the Act's objectives and must include proposals for achieving the objectives, targets to measure the achievement of the objectives, and a framework for monitoring and evaluating the implementation of the strategy. To help with ensuring that the tools of the FFG are finally utilised, the Strategy should also incorporate and commit to the use of the legal conservation tools available under the Act. The Commissioner for Environmental Sustainability must report on the progress of the Biodiversity Strategy in achieving its proposals and targets every 5 years.

Action statements

Action statements are a mandatory conservation tool available under the Act. These are legal statements to be prepared by DELWP "as soon as possible" with the purpose of setting out and guiding the recovery of listed threatened species and communities of flora or fauna and the mitigation of threatening processes. The action statement must set out what has been done to conserve and manage that taxon or community or process and what is intended to be done, and may include information on what needs to be done. Importantly, ministers and public authorities now have a duty to properly consider action statements.

In the past Victoria has been decades behind in producing meaningful action statements. Many existing action statements are also old and out of date. In 2009 the

Victorian Auditor-General's Report[1] into the administration of the FFG Act found that at the rate of listing at the time it would take 22 years to develop action statements for the remaining listed items and recommended a "prioritised action plan" to address the backlog. The VNPA has outlined some possible priority categories for such an action plan in our recommendations for this section below.

Flora and fauna management plans

The intention of management plans under the FFG Act is to follow on from action statements and guide the actual implementation of actions for conserving flora and fauna and mitigating threatening processes. While the amended Act does slightly strengthen provisions, it is really still a question of resources and political will if any new management plans will actually be undertaken. It is unacceptable that not even one management plan has been created in the history of the Act.

The amended Act now allows for greater flexibility in management plans particularly in that they may now deal with one or more taxa or communities or potentially threatening processes. The Minister may also now make guidelines in relation to the circumstances in which the Secretary **must** make a management plan under section 21 of the Act. These can effectively provide "triggers" that obligate, instigate and prioritise the making of a management plan by DELWP. The FFG Amendment Bill 2019 explanatory memorandum explains that these guidelines "*allow the Minister to balance the community's strong desire for certainty in the making of management plans, and the need to appropriately apportion resources to on-ground actions, allowing greater flexibility in decision making.*"

Critical habitat determinations

To date, critical habitat determinations have essentially been unused. One of the purposes of the FFG Amendment Bill 2019 was "to deliver effective protection for taxa and communities of flora and fauna and important habitats by creating critical habitat determinations and habitat conservation orders". The Scientific Advisory Committee can now make a recommendation to DELWP to make a critical habitat determination, and DELWP **must** then make a decision and publish the reasons for it on the internet. DELWP can only make a critical habitat determination if it considers that the area contributes significantly to the conservation in Victoria of a listed (or recommended to be listed) species or community, or the area supports "ecological processes or ecological integrity" that significantly contribute to the conservation of the species or community.

There are no provisions specifying conditions when critical habitat determinations *must* be made by DELWP. It would therefore be highly beneficial if action statements and management plans included efforts to recommend/identify/propose areas of critical

[1] https://www.audit.vic.gov.au/report/administration-flora-and-fauna-guarantee-act-1988

habitat. It would also be useful if there were avenues for individuals and organizations to make recommendations to the Committee regarding critical habitat determinations.

Habitat conservation orders

In the 32 year history of the *FFG Act in* Victoria, conservation orders have *never* been used by a Victorian environment minister. Habitat conservation orders (formerly known as interim conservation orders) provide for a Ministerial power to order the conservation, protection or management of flora, fauna, land or water within a critical habitat (or proposed critical habitat), as well as to order the prohibition of any activity, land use or development within the critical habitat. The order can also provide for prohibitions outside the critical habitat if the activity is likely to adversely affect it. If a critical habitat determination is for a community or a critically endangered species, the Minister *must* now consider whether or not to make a habitat conservation order for that critical habitat within 2 years of the determination. Ultimately, conservation orders are still optional, so a will to implement both critical habitat determinations and habitat conservation orders are paramount.

Enforcement and powers of authorised officers

Amendments to the FFG Act provide a broader power for authorised officers, enabling the seizure of any equipment, material or other thing if the authorised office holds the belief, on reasonable grounds, that it is necessary in accordance with section 57. Penalties have also been increased. However, enforcement relies on the actual implementation of the provisions of the Act, most of which are optional.

Many Victorian nature protection laws do not include specific provisions to enable enforcement by individuals or environment organisations. Expensive and complicated legal action under common or administrative law is needed for individuals to challenge failures to comply with nature protection laws. The establishment in 2019 of the Office of the Conservation Regulator to oversee regulatory functions in conservation and environment was a step in the right direction to enhance DELWP's regulatory capability.

Recommendations

It is important to ensure that the *Flora and Fauna Guarantee Act 1988* is adequately implemented. This includes:

- creating action statements and management plans to guide and implement conservation action for listed threatened species and communities – it should also be noted that the amended Act now provides for efficient management plans that can incorporate multiple action statements under the one plan
- creating ministerial guidelines that specifies when management plans must be made – this should be done under a consultation process

- making critical habitat determinations so that the environment Minister is able to use habitat conservation orders in urgent conservation situations – this may involve legislating for mandatory critical habitat determinations for threatened communities of flora and fauna and for conservation priority taxa
- identifying areas of critical habitat in action statements – this may assist with making decisions on official critical habitat determinations more efficient and should be particularly considered in cases where habitat conservation orders may be highly beneficial to the conservation and long term persistence (i.e. Guarantee) of threatened taxon and communities of flora and fauna
- ensuring that public authorities are aware of their new duty to consider biodiversity conservation and the objectives of the *Flora and Fauna Guarantee Act 1988* and ensuring that any making of guidelines relating to duty includes a vigorous public consultation
- updating and strengthening the Biodiversity Strategy so that it relates to the objectives of the FFG Act and so that it incorporates and commits to the use of the legal conservation tools available under the Act
- establishing specific long-term funding arrangements dedicated to the implementation of the tools of the FFG Act
- accepting the Victorian Auditor-General's recommendation to implement a "prioritised action plan" to address the backlog of action statements waiting to be prepared. The prioritised action plan should also be used to encourage the making of management plans and critical habitat determinations, and for keeping action statements up-to-date. A possible list of conservation priorities for action could include:
    - Threatened communities of flora or fauna
    - Highly threatened taxa in Victoria
    - Threatening processes
    - Umbrella taxa – who's conservation may help to conserve many other taxa simultaneously
    - Keystone taxa – that have a central ecological role in a community
    - Flagship taxa – iconic species that have high public appeal
    - Indicator taxa – who's monitoring can indicate changes in environmental quality

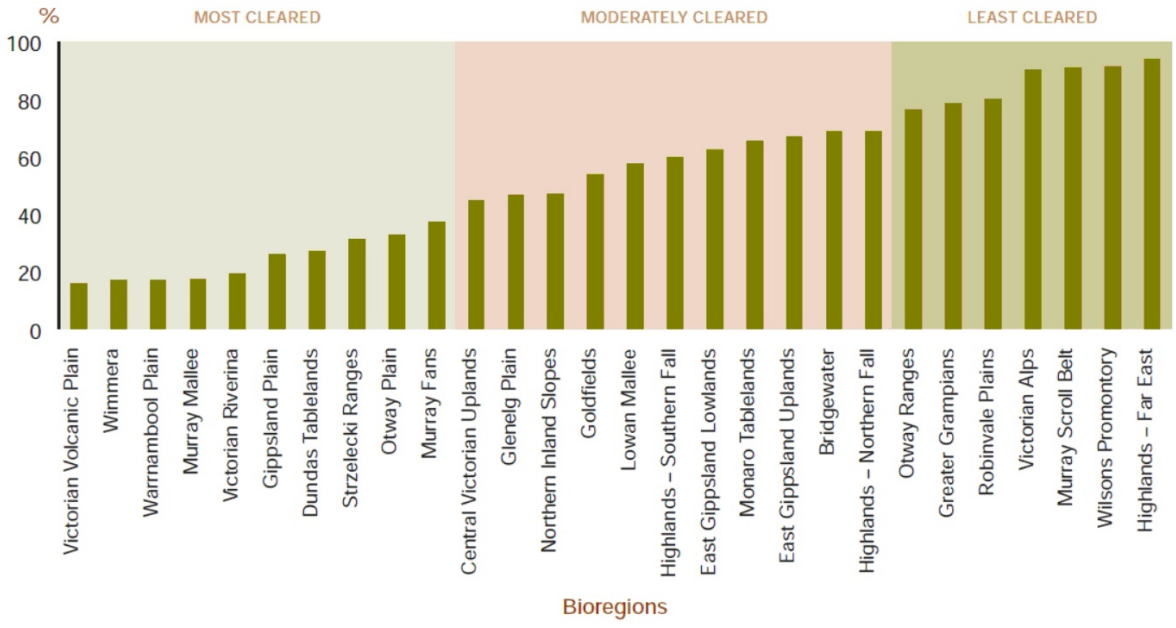
2. Habitat fragmentation – reconnecting and restoring landscapes for nature

Habitat fragmentation due to historical land clearing is one of the oldest, most pressing and often neglected legacy issues contributing to ecosystem and biodiversity decline in Victoria. This is because habitat fragmentation can make a whole array of threatening processes worse due to remnant flora and fauna being confined to small and isolated populations.

Fragmented habitats and isolated populations are more vulnerable to 'edge effects' and the impacts of weed invasion, fires (planned and wild), grazing pressure, predation by foxes and cats, and to changes in climate, vegetation and habitat. Furthermore, pollination and seed dispersal is limited, animals are isolated, and the population genetics of flora and fauna can be vulnerable to genetic bottlenecks.

Victoria's most fragmented bioregions

Centuries of land clearing, particularly beginning during waves of agricultural expansion and in the gold rush era of the mid 1800's, has left Victoria as the most cleared state in Australia. The below graph from the VEAC Remnant Native Vegetation Investigation 2010 discussion paper[2] demonstrates that for the ten most cleared bioregions in Victoria (with the exception of the Strzelecki Ranges which has an unusual land-use history) all have relatively flat terrain and fertile soils, and less than 40% of their original extent of native vegetation remaining. As a result, habitat loss and isolation of remnants are a major cause of biodiversity loss in these landscapes.



[2] Victorian Environmental Assessment Council (2010). Remnant Native Vegetation Investigation Discussion Paper. http://www.veac.vic.gov.au/investigation/remnant-native-vegetation-investigation/reports

These mostly cleared bioregions typically contain many small patches of remnant native vegetation, little native vegetation in larges patches, and patches that rarely adjoin largely-intact landscapes. They are also characterized by a high proportion of remnant native vegetation on private land, poor conservation reserve representation, a high proportion of native vegetation on roadsides, generally poor site condition and generally poor landscape context (especially on private land).

The landscape context (that is, consideration of components such as patch size, distance to core area, and extent of nearby vegetation) in these bioregions is particularly bimodal, with much of the remaining native vegetation in a small number of large patches (usually on public land) and otherwise large areas with little native vegetation (mostly on private land). The landscape context is especially poor in the Victorian Volcanic Plain, Wimmera and the Victoria Riverina bioregions.[3]

Continued loss of remnant vegetation

Native vegetation continues to be lost in Victoria at approximately 4,000 habitat hectares per year (which is roughly equivalent to 8,000 to 10,000 hectares of varying quality and this includes counting alleged gains in vegetation quality made up through the management of other areas).

Using satellite to imagery to analyse landscape scale change, Victoria's 2018 State of the Environment Report[4] indicated that there have been decreases for the following habitats in Victoria between the years 1990 and 2015:

- native grasslands and herblands from 2,282,992 hectares to 1,820,093 hectares (20% decrease)
- native scattered trees from 542,201 hectares to 393,147 hectares (27% decrease)
- native shrubs from 165,262 hectares to 116,620 hectares (29% decrease)
- intermittent wetlands 47,286 hectares to 42,133 hectares 2015 (11% decrease)
- seasonal wetlands 418,611 hectares to 342,955 hectares (18% decrease) respectively

Stronger native vegetation laws and regulations are necessary to remove exemptions and stop clearing. The current "Guidelines for the removal, destruction or lopping of native vegetation 2017" do not state how, or what, biodiversity will actually be protected and clearing is based on the "avoid, minimize and offset" model, implemented through planning laws. There are also dozens of exceptions in the current regulations.

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[3] Victorian Environmental Assessment Council (2010). Remnant Native Vegetation Investigation Discussion Paper. http://www.veac.vic.gov.au/investigation/remnant-native-vegetation-investigation/reports

[4] Commissioner for Environmental Sustainability Victoria (2018). Victorian State of the Environment 2018 Scientific Assessments (B). https://www.ces.vic.gov.au/sites/default/files/SoE2018ScientificAssessment_B.pdf

There needs to be far more focus on avoiding loss of native vegetation as there is no evidence to show that offsetting is achieving required "gains".

We support the three step process for assessing native vegetation, if used correctly. In any proposed development or use decision affecting natural habitat, ecosystems, or environmental heritage values, the process should be to:

> **Avoid:** In the first instance, the options to avoid any adverse ecological impacts should be investigated, including options to relocate, redesign or use alternate methodology, or to abandon nonessential activities. This includes avoiding offsite impacts.
>
> **Minimise:** Where some ecological impacts, including offsite impacts, cannot be totally avoided, measures such as siting, design and implementation/operation techniques should be investigated and appropriate measures implemented to minimise the impacts.
>
> **Offset:** Any unavoidable impacts should be mitigated by measures to offset the loss or impact and should result in an overall net environmental gain for the local ecosystems that have been affected.

Although the three-step approach outlined above should be applied in all cases, there must be a higher priority given to preventing losses of higher quality and higher significance indigenous ecosystems, particularly those that are threatened communities or are critical for the survival of threatened species, whether or not those species have been recorded there, as determined by accepted scientific assessment methods and accurate for that area or site.

Some ecosystems, such as old-growth forests, areas containing large old trees, or ecosystems that take centuries to recover from disturbance, should not be damaged or destroyed because it is not possible to offset such losses in any meaningful timeframe.

The VNPA is opposed to the use of offsets that permit destruction of medium to high quality ecosystems where there is no evidence that the offset can achieve the same or better conservation value.

For all unavoidable losses of indigenous ecosystem values in aquatic (including marine) or terrestrial environments, including that for fire protection, associated with a development, an offset must be required.

VNPA opposes the clearing of remnant vegetation where the habitat attributes of that vegetation, such as hollows, are locally limited in availability and unable to be replicated locally.

Clearing of native vegetation should never be considered a right of land ownership. Prospective landowners should be forewarned that native vegetation may limit their rights to develop land.

Actions, such as a change in tenure, which do not result in a physical improvement in ecological values, are not considered by VNPA to be an offset.

If an offset is to be used then –

- The offset should be – in place, transparent (e.g. specified on land titles for private land), supported by an effective enforcement program, and be legally protected before any losses of native vegetation are permitted.
- The offset should result in an enduring and measurable net gain in extent and quality of indigenous ecosystems, including species and genetic diversity, ecosystem function, and ecosystem services.
- Existing conservation reserves should not be used as offsets unless restoration (revegetation or understorey re-establishment) or enlargement is involved.
- The offset should be in the same geographical area and include the same ecosystems and species that are being adversely affected by a development.
- The offset must be able to be managed appropriately, such as with fire, to enable ecosystem function, and not be subject to restrictions.

Restoration offsets must apply to ecological standards, and allowance must be made for an uncertain outcome, such as loss of an offset due to fire, changed hydrology, or land use, by using a multiplier (e.g. every hectare of land to be cleared or every nesting site lost requires compensation of at least X hectares or X nesting sites where X>five).

Meaningful public consultation should occur for all projects which would result in significant degradation of indigenous ecosystems and clear lines of responsibility should be established for offset delivery, monitoring, evaluation and maintenance over the long term.

Subsequent auditing must occur to ensure that there is compliance with regulations concerning the management of the offset and funding for such auditing must be paid in advance by the proponent via a bond. Reporting to the public of offset compliance and effectiveness must be timely and transparent.

The proponent must take full responsibility for paying all the costs associated with locating, establishing, and maintaining and evaluating the effectiveness of the offsets over the long-term.

Native vegetation regulations also need to reflect that public authorities are one the largest clearers of native vegetation in the state. See our discussion of recent roadside clearing in our fire management section 6 of this submission.

Urgent action is also required on related issues such as native forest logging and excessively frequent fire (both planned fire and wildfire) which are significantly altering the vegetation composition and structure of our forested landcapes and further contributing to habitat fragmentation and degradation. For further discussion and recommendations about native forest logging and fire management see sections 6 & 7 of this submission.

Reversing habitat fragmentation – reservation, restoration and reconnection

To address habitat fragmentation as a threatening process we need to protect and carefully manage remnant habitats and, crucially, we need well-funded, strategic revegetation and land care programs to reconnect landscapes. Reconnecting and restoring habitats through 'biolinks' on both public and private land is one of the top things Victorians can do to restore the health of our vulnerable ecosystems and assist with threatened species recovery.

The conservation actions needed to reverse habitat fragmentation can be thought of in three categories:

- reservation – to protect large areas of remnant vegetation on public land; transferring existing nature reserves to be protected under the *National Parks Act 1975;* protecting high conservation value private land under conservation covenants
- restoration – to restore the health of remnant vegetation on both public and private land, including actions such as: managing invasive weeds and exotic animals; exclusion of livestock grazing; revegetation works to improve the condition or increase the size of fragmented areas; nest box installation and other species-specific conservation action; protection from too frequent fire; restoration of natural water regimes etc
- reconnection – creating biolinks on both public and private land including the revegetation of cleared land to link isolated and fragmented remnant vegetation

Reservation

Large patches of remnant native vegetation on public land in fragmented landscapes are of high conservation value and need urgent protection through reservation. In our 2014 Nature Conservation Review[5], the VNPA analysed the extent of protection of the different ecological vegetation classes across Victoria and found that there are substantial gaps in our national park and conservation reserve system, particularly of the vegetation communities most depleted by clearing and subject to degradation.

The 2016 Victorian Environmental Assessment Council's Statewide Assessment of Public Land Discussion Paper[6] identified three regions of Victoria with distinctly under-

[5] https://vnpa.org.au/nature-consevation-review/

[6] http://www.veac.vic.gov.au/investigation/statewide-assessment-of-public-land

represented Ecological Vegetation Classes: South West Victoria, the Strzelecki Ranges-Gippsland Plain and the Central Victorian Uplands.

Despite the state government's long-held goal to achieve a comprehensive, adequate and representative reserve system and despite significant progress (mostly resulting from regional investigations by the VEAC and its predecessors) about three-quarters of Victoria's subregions remain poorly protected.

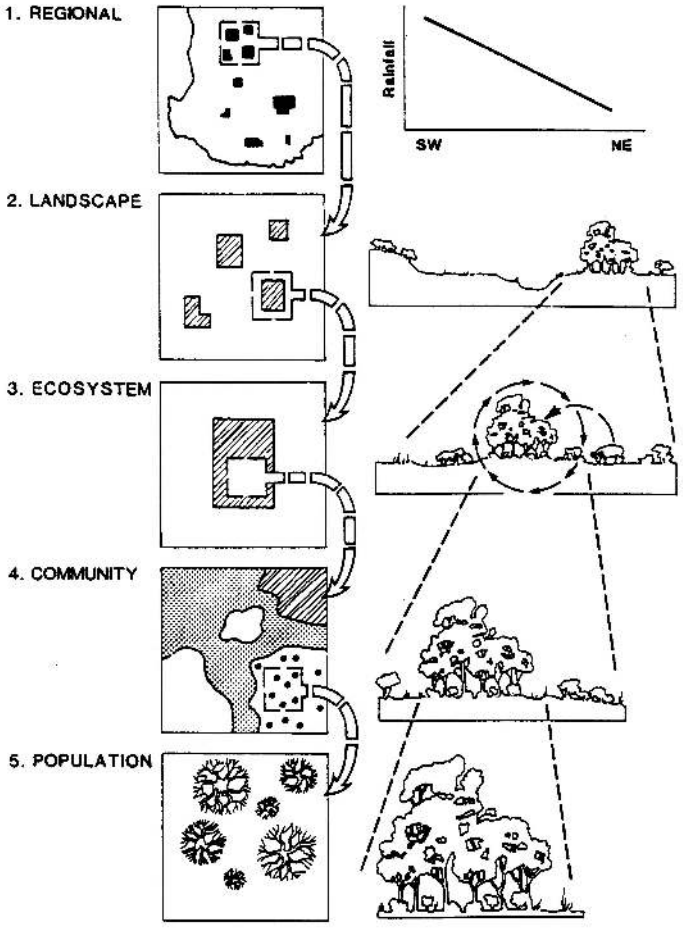
For example, the current government has struggled to make a decision about proposals for 60,000 hectares of new national parks in Victoria's central west, in the Wombat, Wellsford, Mt Cole and Pyrenees Forests which is currently seeing logging and mining exploration in the Wombat and Mount Cole Forests (see more here). After four years of government sponsored investigation and consultation by VEAC, the government missed its statutory deadline to make a decision in late February 2020.

In existing protected areas, conservation of some fragmented habitats on public lands can be improved by upgrading protection for some reserves under the *Crown Land (Reserves) Act 1978*. These reserves, including those designated as nature conservation reserves, currently do not have any requirement to manage them to any particular standard and activities such as mining may be permitted. They should be transferred for protection under the *National Parks Act 1975*, which provides a stronger statutory basis for conservation management and for preventing damaging activities.

Protection of habitats on private land is also critical in addressing habitat fragmentation, and one of the key mechanisms for achieving this is through Trust for Nature conservation covenants. For further discussion on private land conservation see the end of this section below. For further discussion and recommendations about reservation on public land and filling the gaps of our reserve system, see section 12 of this submission.

Restoration

Fragmented areas are particularly vulnerable to various threatening processes and therefore remaining remnant vegetation needs careful management and restoration. This includes a consideration of the landscape and flora and fauna at various levels of organisation including at the regional, landscape, ecosystem, community and population level (see the illustration below).



Levels of organisation that need to be considered in management of fragmented landscapes. Source: Saunders, D. A. Hobbs R. J. & Arnold G. W. (1993). The Kellerberrin project on fragmented landscapes: a review of current information. *Biological Conservation* 64, 185–92.

The need to mitigate the impacts of invasive plants and animals is particularly urgent, especially in landscapes recently impacted by fire. For further discussion and recommendations on invasive plants and animals in Victoria see sections 3 and 4 of this submission.

New restoration programs and Landcare projects for remnant areas on private and public land should be created and existing successful programs should be expanded and supported. A key state government program over the last four years has been the Regional Riparian Action Plan which has been working with landholders to manage riparian vegetation and has been delivering tangible improvement to public and privately-owned riversides. Riparian vegetation has high conservation and ecological value in the wider landscape and the current program should continue to be implemented and funded long term as a core part of government functions. For further discussion and recommendations about restoration of rivers and riparian land, see section 8 of this submission.

To achieve better restoration outcomes in our remnant natural areas within parks, funding for parks management needs far greater allocation in the state budget. Currently, Parks Victoria manages 18 per cent of Victoria and approximately five per

cent of our marine waters, yet it receives less than 0.5 per cent of state government expenditure. Our parks must not be allowed to decline in condition due to inadequate resourcing. (See our call for at least 1% funding for parks here.)

Reconnection – biolinks

The key method for reversing habitat fragmentation is through the establishment of 'biolinks' to create ecologically functional linkages between areas of native vegetation. Biolinks provide an avenue for isolated fauna and fauna to move between fragments, protected areas and other native vegetation, and are a high priority for retention, revegetation and in the maintenance of ecological processes and the dynamics of ecological communities across the landscape.

Established biolinks allow fauna and flora to repopulate fragmented areas, and also provide an important buffer and avenue for species movements during times of environmental change such as changes in climate, vegetation and habitat and during natural disturbance such as fire or flood.

Well planned biolinks are placed in the ecologically most useful locations, regardless of tenure, to enhance viable remnants of ecological communities throughout their distribution. This may require cooperative programs between private and public entities to provide biolinks between wetlands, waterways, existing protected lands and fragments of vegetation on private and public lands.

Established biolinks should be protected through planning or other legally-binding controls against loss of its ecological integrity, particularly if public monies have been used to create it. Research and monitoring of biolinks should occur to ensure that stated goals are being achieved and that any potential adverse consequences are adequately managed.

Government support for large scale strategic habitat conservation and landscape restoration projects appears to have dropped off the agenda. Projects such as Habitat 141 in far south west Victoria have widespread community support and great potential for habitat restoration, as do an array of smaller scale biolink projects. Such projects would benefit greatly from extra funding and support and could be a great way to get people out into nature after a year of isolation and economic depression due to the current pandemic.

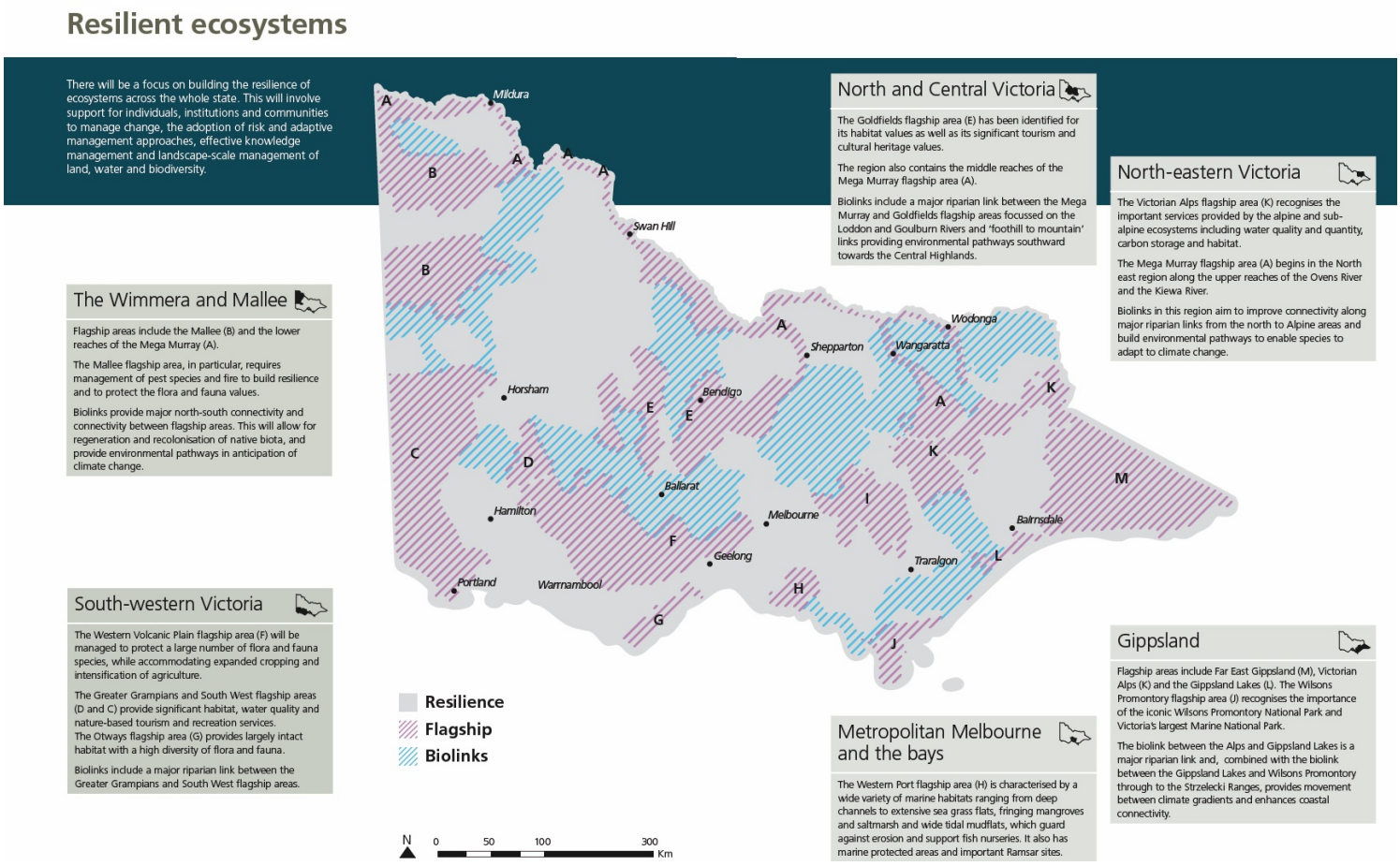
The Department of Sustainability and Environment's white paper summary from 2009 titled "Securing our natural future"[7] had an agenda to:

[7] Dept of Sustainability & Environment (2009). Securing our natural future: a white paper for land and biodiversity at a time of climate change Summary. Melbourne: The State of Victoria.

- Build ecosystem resilience across Victoria
- Manage flagship areas to maintain ecosystem services
- Improve connectivity in areas identified as biolinks.

As illustrated by the map below, the paper stated that "*a system of regional scale biolinks will be developed to focus activity on restoring connectivity. On private land, biolinks will be implemented through a range of voluntary approaches including conservation covenants and BushTender agreements.*" However, this has not come to fruition.

The current Biodiversity Strategy 2037 has set a target of 200,000 hectares of revegetation in priority areas for connectivity between habitats. A clear government strategy to support the creation of regional scale biolinks could help to meet and improve on this target and would have high conservation, social and economic value.



Private land conservation

Protection and restoration of habitats on private land is critical in addressing habitat fragmentation, and one of the key mechanisms for achieving this is through Trust for Nature conservation covenants. The state biodiversity strategy, *Protecting Victoria's Environment – Biodiversity 2037*[8] states that "The estimated gap in additional protected areas required to meet Australia's criteria for a comprehensive, adequate and representative reserve system is 2.1 million hectares. In some bioregions… this can only be achieved by land purchase or additional formal protection of habitat on private land." Our own estimates are around 3.1 million hectares of vegetation on both public and private land including 1.5 million ha on public land and 1.7 million hectares of private lands.

A key recommendation from the State of the Environment Report was "*That DELWP improve biodiversity outcomes on private land by accelerating private land conservation. This will require resourcing permanent protection measures that focus on high priority ecosystems and landscapes, and investing in local government capability to enforce the existing Guidelines for the Removal, Destruction or Lopping of Native Vegetation and the Invasive Plants and Animals Policy Framework.*"[9]

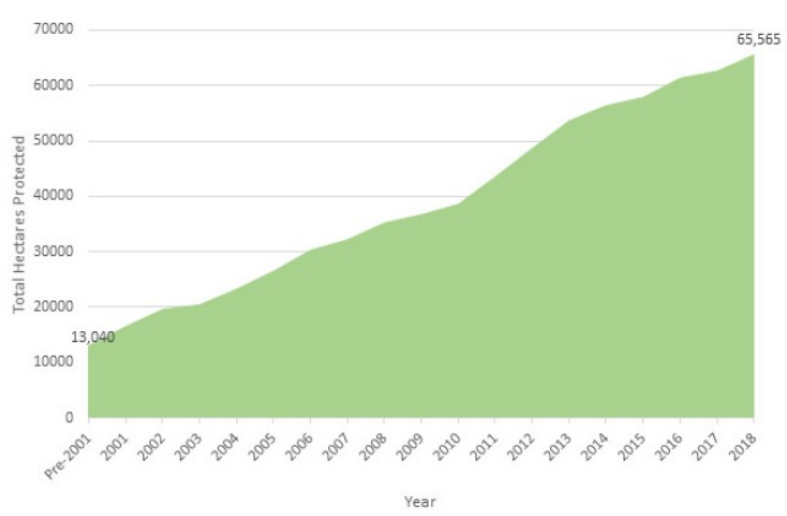


Figure B.4 Growth in total hectares of private land under covenant, 2001–18

(Data source: TfN 2018)

The report identified private land conservation as the only biodiversity indicator to be trending upwards, which is a positive sign. However, although the Biodiversity Strategy has set a target of 200,000 hectares (about 10,000 ha per year to 2037) of new permanently protected areas on private land, little of the money provided to implement the state biodiversity strategy has been spent on supporting land stewardship or expanding the number of Trust for Nature covenants. Since 2000-2001, TFN has seen average annual growth of 2,654 hectares per year (see graph on left).

[8] Department of Environment Land Water and Planning (2017). Protecting Victoria's Environment – Biodiversity 2037. Port Melbourne: The State of Victoria. Page 49. https://www.environment.vic.gov.au/biodiversity/biodiversity-plan

[9] https://www.ces.vic.gov.au/sites/default/files/SDG_Presentation_16.08.2019_FINAL_0.pdf

The Trust for Nature Statewide Conservation Plan[10] has identified 12 focal landscapes (areas of at least 20,000 hectares in size that contain extensive private land areas with important biodiversity values) assessed as being capable of making the greatest contribution towards nature conservation on private land and maintaining the viability of ecosystems and species.

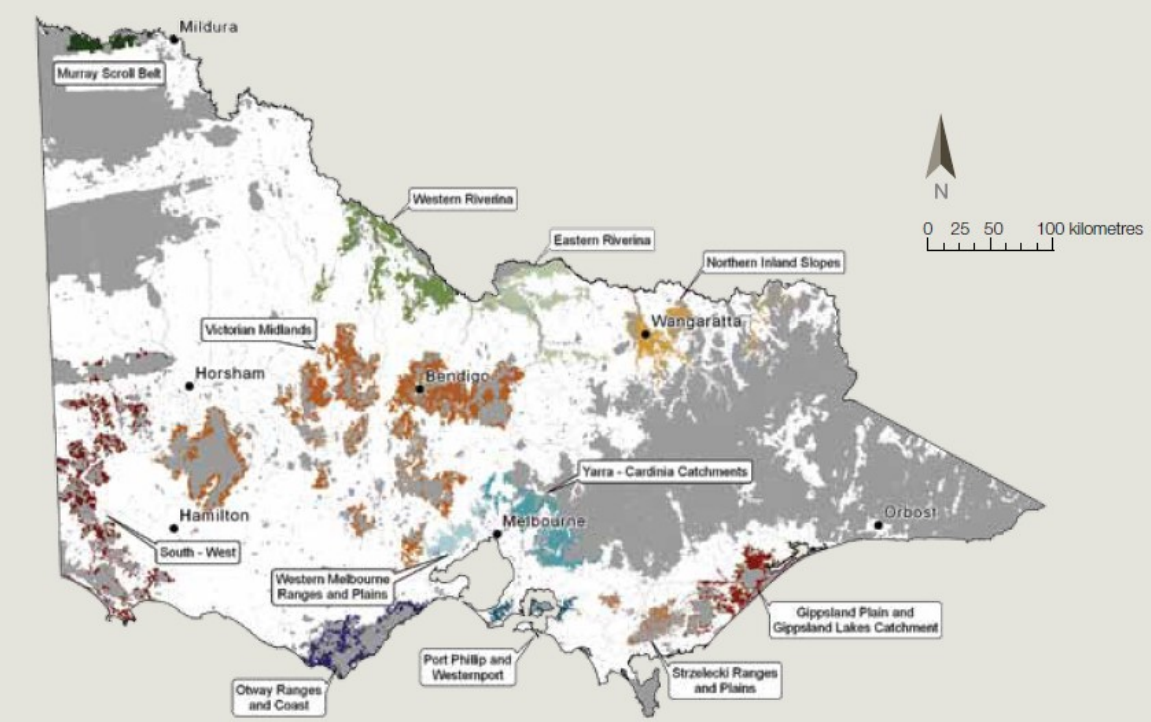


Figure 1: Locations of the focal landscapes identified in the Statewide Conservation Plan in relation to private land.

"Collectively, the 12 focal landscapes cover 12% of Victoria's private land area; almost two million hectares. They contain more than 30% of the most poorly represented ecosystems on private land, more than 50% of the priority native plants and wildlife identified for conservation on private land identified by the Statewide conservation plan, and most of Victoria's internationally significant wetlands. These focal landscapes enable the Trust to work in the most effective and efficient way possible."

There is a need for a significant increase in funding for private land conservation through the Trust for Nature, including the establishment of a $20 - $30 million revolving fund. Focal landscape areas could also be useful in identifying areas for increased support for Landcare restoration projects on private land.

[10] https://www.trustfornature.org.au/statewide-conservation-plan

Recommendations

To address impacts of habitat fragmentation, the VNPA recommends that the Committee recommend to the Victorian Government the following:

- undertake on-going well-funded, strategic revegetation and Landcare programs to increase the size of fragmented areas and to provide biolinks between wetlands, waterways, existing protected lands and fragments of vegetation on private and public lands across Victoria
- increase financial support for both large and small scale biolink projects particularly in highly cleared and fragmented landscapes
- protect biolinks through planning or other legally-binding controls against loss of ecological integrity, particularly if public monies have been used to create the biolinks
- continue the funding and implementation of the successful Regional Riparian Action Plan with long term funding as a core part of government functions
- encourage local governments to prepare local biodiversity action plans and offer matching funds for implementation of these plans
- significantly reduce the impacts of fire on the flora and fauna of fragmented and isolated areas by ensuring that fuel reduction burns and wildfires do not burn large extents of the fragments
- develop stronger native vegetation laws and regulations to stop clearing – including a focus on avoiding vegetation loss
- dramatically increase funding for private land conservation through the Trust for Nature, including the establishment of a $30 - $40 million revolving fund
- protect high conservation value large remnant patches of vegetation on public land through reservation under the *National Parks Act 1975*
- upgrade protection for conservation reserves listed in schedules of the *Crown Land (Reserves) Act 1978* by:
    - transferring nature conservation reserves to schedule 2C of the *National Parks Act 1975* (with protection equivalent to that for properties under schedules 2, 2A and 2B)
    - transferring all other relevant reserves – cultural and natural heritage reserves, natural features reserves, historic and cultural features reserves, regional parks, miscellaneous reserves, water reserves and forest parks – to the National Parks Act, listing them temporarily as a new schedule
    - commission the Victorian Environmental Assessment Council to assess the most appropriate future management arrangements for these properties
- increase funding for park management to at least 1% of state annual expenditure

- significantly increase funding, resources and expertise for habitat restoration programs and ecosystem management across all public land, especially national parks and conservation reserves
- significantly expand programs for ongoing biodiversity surveying and monitoring across Victoria's various terrestrial, riparian, freshwater, coastal and marine ecosystems as well as expanded support for citizen science programs
- include appropriate park employment programs, including Indigenous employment programs, as part of regional recovery plans
- support community engagement such as friends groups to increase community connection to parks and reserves

3. Managing environmental weeds

Invasive plants and animal species cause considerable ecological damage in Australia and have been found to affect 1257 or 82% of all species listed as threatened under the *Environment Protection and Biodiversity Conservation Act 1999.*[11] After habitat destruction, environmental weeds in particular are possibly one of the most significant causes of biodiversity loss and habitat degradation.

Threats of invasive plants

Many exotic plant species have been introduced into Australia by agriculturalists as feed and pasture or as escaped garden plants. Of about 1000 exotic plants established in native vegetation in Victoria, about 580 are known to threaten biodiversity, landscape or social values.

Weeds such as invasive pasture grasses, blackberry and willows can out-compete and crowd out other plants and create weed monocultures. Weeds can modify and add to fuel loads and increase fire risk. Waterways can be swamped by dense masses of weeds that deplete oxygen. Invasive animals can find food and shelter amongst weeds. And severe weeds like blackberry, English broom, phalaris and tall wheat grass can completely transform ecosystems by replacing almost all native plants.

The core problem with weeds is that they invade natural ecosystems and compete with native species for space, light, water, nutrients and pollinators. They can have the capacity to cause considerable reduction in biodiversity, changes in ecosystem structure and function, changes to disturbance regimes (such as fire and grazing) and ultimately reduce ecosystem resilience. As well as decreasing plant diversity, weed invasions can impact on the habitat requirements of fauna and drive local extinctions.

A key driving factor in weed establishment and spread across the landscape is disturbance to natural areas. Many weeds take advantage of disturbances such as clearing, grazing and fire. Habitat fragmentation can make it even easier for weeds to invade Victoria's ecosystems.

In addition to incalculable environmental impacts, the spread of invasive plant species can have major economic and social impacts across landscapes and land tenures. Competition with food crops and impacts on pollination services affects agricultural production. Incursion of weed species into recreational parks reduces enjoyment, access and aesthetics of natural areas making them less attractive to visitors and can impact on health and wellbeing.

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[11] Kearney, S.G., Carwardine, J., Reside, A.E., Fisher, D.O., Maron, M., Doherty, T.S., Legge, S., Silcock, J., Woinarski, J.C.Z., Garnett, S.T., Wintle, B.A. and Watson, J.E.M. (2019). The threats to Australia's imperilled species and implications for a national conservation response. *Pacific Conservation Biology*, 25(3), pp.231–244. https://www.publish.csiro.au/pc/Fulltext/PC18024

Impacts on indigenous communities by invasive weed species include out-competition of traditional food plants such as Murnong or Yam-daisy (*Microseris lanceolata*), invasion of culturally significant sites such as middens, rock scatter sites and housing sites, displacement of plant and animal totems on country, diversion of natural creek and river flow and access to country being impeded by weeds such as willows, gorse and blackberry.

There are significant concerns held by scientists, community groups and land managers about the impact of climate change on sleeper weeds and the possible increase in the abundance and distribution of weeds due to increasing temperatures.

Unfortunately, new introductions are also a continuous threat with people deliberately importing seeds, the possibility of garden escapees, and soil and seeds being inadvertently imported into Australia on farm machinery and other equipment.

Weed management

Weed management in natural areas is shared across different departments and levels of government in Victoria, with a majority of the works done by local governments and state government agencies. The main state agencies dealing with weed management in Victoria are Agriculture Victoria (listing and enforcement), Department of Environment Land Water and Planning (DELWP) (funding and planning), Parks Victoria (active management), Catchment Management Authorities (planning and management) and statutory authorities that manage much of the water systems in the state (planning and active management).

With so many organisations working across many land tenures, management and targeted management of pest plant species can be difficult with different organisations having different levels of priorities and funding across sites. Although legislated noxious weeds can help align priorities, legislated lists of weed species are out of date and focus on agricultural impacts over ecological impacts.

Weed management is vital to the protection of Victoria's diverse range of natural areas, to recover threatened species and ensure ecosystem function continues as it has for millennia. Without targeted and consistent weed management on public and private land we will see continued decline in the health of Victoria's ecosystems and loss of its unique plant and animal species.

With weed species already present in the state, it is pivotal to protect high value conservation areas from weed invasion while also battling the eradication of emerging weeds.

Many land managers cite a need for sustained long term funding to adequately fund the planning and removal of pest plant species. Sustained rolling 4 to 5 year funding blocks, with decade's long horizons for pest weed management programs would lead to a strategic and long term reduction of weeds and allow landscape scale approaches to weed removal to be more effective and sustained.

The need to adequately monitor the effectiveness of current weed management programs in achieving their proposed goals is also vital to understand what techniques are working and if public money is being well spent on management or if different techniques and methods should be used.

The Department of Environment, Land, Water and Planning's "Weeds and Pests on Public Land" program has many programs running under its funding but would benefit with increased funding and an expansion of programs into areas on both public and high conservation private land. The program also seems to focus heavily on pest animals.

However, the Weeds at the Early Stage of Invasion (WESI) project funded through the program is a great step in the right direction for strategic weed management in Victoria. It lays out a clear and useable approach for land managers to deal with high risk early invaders that threaten biodiversity.

The best way to stop invasive pest plant species from damaging natural areas and agricultural areas is to prevent the import of high risk species into the state. A new framework is needed to assess the environmental risk of plants prior to them being able to be sold and distributed across the state and into areas where they will cause serious ecological harm.

This is lacking in the state's current framework where emphasis is placed on plants that do harm to agricultural assets but mostly does not investigate or legislate against the ecological damage done by pest weed species on the environment. This could be due to the easy nature of calculating the economic costs of pest plants on agriculture and the impossible task of calculating the cost of pest weed species on natural areas, ecosystem function and ecosystem services.

Weed costs are virtually impossible to predict or calculate in advance. And when environmental harm is involved there is no real acceptable way of measuring it. After a plant becomes a significant established weed it is likely to remain in the landscape forever.

Greater enforcement of current laws is needed. Species of plants can be declared as noxious weeds under the *Catchment and Land Protection Act 1994*. The Act defines noxious weeds in Victoria into four categories. State Prohibited Weeds are the highest category of declared noxious weeds in Victoria and are either not yet in Victoria, or are here in small numbers, where their eradication is still possible. Agriculture Victoria is

responsible for state prohibited weeds on all land in Victoria. Regionally Prohibited Weeds are not widely distributed in a region but land owners, including public authorities responsible for crown land management, must take all reasonable steps to eradicate them on their land. Regionally Controlled Weeds are usually widespread in a region and land managers must take all reasonable steps to prevent the growth and spread of these weeds on their land. Restricted Weeds include plants that pose an unacceptable risk of spreading in Victoria and are a serious threat to another State or Territory of Australia. Trade of restricted weeds is prohibited.

With the categories for species varying between Catchment Management Areas, this makes understanding regulations difficult and makes it easy for those selling restricted or controlled weeds to sell these species and continue to help their spread. The Act is also policed and administered by Agriculture Victoria, which leads to a heavy focus on impact to agriculture by weeds and can be seen to neglect environmental concerns. The list can be found here.

To improve regulations, Victoria should establish a permitted or 'white list' approach for listing of potential pest plant species prior to species being brought into state. As highlighted in the Invasive Plants and Animals Policy Framework (2010), currently in Victoria there are no legislative restrictions on trade or cultivation of most non-native plants, unless they are proclaimed as noxious weeds.

With a permitted species list, all species would need to undergo a weed risk assessment prior to being permitted entry into the state. This type of assessment would be undertaken on existing traded species and require risk assessments of all new taxa proposed for introduction into the state.

Western Australia has undertaken this approach of weed listing since 1997. See more on the permitted list approach to weeds here:
https://invasives.org.au/wp-content/uploads/2014/02/fs_weedwhitelist.pdf
The current listing system or black list system, results in bans on species that have already established, which is often too late to eradicate them. This system can also be slow and onerous and does not operate with the urgency needed to avoid new infestations of pest plants.

Our changing climate is likely to activate many "sleeper weeds", which are plants that appear benign for many years but which may suddenly spread rapidly following events such as flood, fire, drought, climate change or change in land or water management.[12] Victoria requires a more precautionary system of weed listing and assessment in order to see less species in the long term entering our state and impacting on ecosystems and agriculture.

[12] https://www.environment.gov.au/biodiversity/invasive/weeds/weeds/lists/sleeper.html

The current Invasive Plants and Animals Framework is now 10 years old and outdated. As concluded in the Victorian Auditor General's Office report on Control of Invasive Plants and Animals in Victoria's Parks (2010)[13] "Complicated governance arrangements, combined with a reliance on increasingly outdated and disparate invasive species databases, have hindered effective coordination of efforts to control invasive species. This is particularly pronounced for new and emerging threats".

Increased funding of long-term management of weed species and enforcement of biosecurity laws is needed to address the real and growing threat of invasive plant species across both public and private land.

An increase in focus on the physical removal and control of pest plant species in natural and surrounding areas will increase employment opportunities. Adequate training to conduct such works can be gained through the Certificate 3 in Conservation and Land Management (AHC 31416) and Diploma of Conservation and Land Management (AHC51116). Providing secure funding for pest plant management and other much needed works around natural areas could secure long term skilled jobs for rural and regional communities. First Nations communities should be involved in the planning of pest weed management and employed to control weeds on their traditional lands where possible.

Recommendations

- Clearer governance arrangements around pest plant management on public and private land.
- A new regulatory body that focuses equally on environmental and agricultural harm done by invasive plant species.
- Increased funding and support for long term monitoring programs of weed invasions in natural areas to assess the effectiveness of control measures and to survey for increases in sleeper weeds.
- 5 yearly funding cycles for pest plant management to allow for targeted and consistent management of weed species – this is more cost effective and allows land managers to plan long-term management strategies for established or emerging weed species.
- Establishment of a permitted list approach for listing of potential pest plant species prior to species being brought into state – species would need to undergo a weed risk assessment prior to being permitted entry.
- The position of Biosecurity Minister should be created at state level to oversee issues with biosecurity in environmental and agricultural fields equally.

[13] https://www.audit.vic.gov.au/report/control-invasive-plants-and-animals-victorias-parks

4. Managing feral animals and their impacts

Invasive species have major impacts on Victoria's native flora and fauna and are a serious conservation concern. Species of animals can be declared as an established pest animal in Victoria under the *Catchment and Land Protection Act 1994*. The Act requires all land owners to prevent the spread of, and as far as possible eradicate, established pest animals. The Act applies to both public and private land.

Invasive predators

In Victoria foxes and cats have already contributed to the extinction of a number of small native marsupials and are a threat to many remaining threatened species. Australia's native wildlife has not evolved to survive alongside predation by cats and foxes and many birds and mammals are vulnerable particularly if they have small populations in fragmented areas.

It was only in 2018 that feral cats were listed as an established pest animal (on specified Crown Land). The control of feral cats and foxes is currently an urgent land management priority to protect fragile populations of various mammals and birds that are recovering from fire.

"Predation of native wildlife by the cat, *Felis catus"* and "Predation of native wildlife by the introduced Red Fox, *Vulpes vulpes*" are listed as a threatening process under the *Flora and Fauna Guarantee Act 1988.* The corresponding action statements are significantly outdated, with the action statement for cats being prepared in 2004, and the action statement for foxes last revised in 2002. Both are need of improvement and updating to reflect new programs, legislation and challenges and to set out intended management actions going forward.

The use of baits to control feral animals

A range of poison baits, especially 1080, have been used for decades now in the control of feral animals. They have had wide application, especially in the control of wild dogs where both buried baits and the aerial dropping of baits have been applied.

There is significant capacity for baits to be taken by non-target native species such as the endangered Spot-tailed Quoll. This has driven research into a range of new baits, and new bait delivery mechanisms. Research into feral cat baits, for example, has produced at least two new baits: Eradicat® and the Curiosity®, but even these have the potential to be taken by native wildlife.

A recent study on western Kangaroo Island trialed a non-toxic version of 'Eradicat' to examine its potential impact on non-target species. The researchers concluded that although feral cat baiting has the potential to significantly benefit wildlife on Kangaroo

Island, impacts on non-target species (particularly the bush rat and common brushtail possum) may be high.[14]

In the study, bait take and consumption was assessed both by remote cameras and by the presence of a biomarker in mammalian whisker samples taken post-baiting and found the following key results were found:

"Cats encountered baits on very few occasions and took a bait on only one occasion in August (<1% of 576 baits deployed). Non-target species accounted for over 99% of identifiable bait takes. In both seasons, >60% of all baits laid was taken by either the common brushtail possum (Trichosurus vulpecula), bush rat (Rattus fuscipes) or Australian raven (Corvus coronoides). In November, Rosenberg's goanna (Varanus rosenbergi) and southern brown bandicoot (south-eastern subspecies; Isoodon obesulus obesulus), listed nationally as endangered, also took baits (3% and 1% respectively). The Kangaroo Island dunnart (Sminthopsis fuliginosus aitkeni), listed nationally as endangered, approached a bait on only one occasion, but did not consume it. Evidence of bait consumption was visible in the whiskers of captured common brushtail possums (100% of post-baiting captured individuals in August, 80% in November), bush rats (59% in August and 50% in November), house mice (Mus musculus) (45% in November) and western pygmy-possums (Cercartetus concinnus) (33% in November)."

The researchers suggested that alternative cat baits, such as those containing a toxin to which native species have a higher tolerance or that are less readily consumed by native wildlife, are more appropriate.

Other research has also produced a new bait delivery mechanism for cats: Felixer. Felixer can distinguish a cat from other animals and delivers a gel to a cat's fur, which it subsequently licks. The mechanism is solar-powered, and records all animal interactions. Recently research has also been conducted developing targeted baits and delivery mechanisms for both goats and deer.

The Felixer mechanism

There is plenty of scope, and a great need, for increased research into more humane and effective targeted baits and delivery mechanisms for a large range of feral animals.

[14] Hohnen R., Murphy B. P., Legge S. M., Dickman C. R., Woinarski J. C. Z. (2019). Uptake of 'Eradicat' feral cat baits by non-target species on Kangaroo Island. *Wildlife Research*, https://doi.org/10.1071/WR19056

Invasive herbivores

Introduced herbivores can also be highly destructive to ecosystems. Grazing by pest animals such as rabbits, deer and horses can limit the regeneration of trees, shrubs and grasses, alter the composition of plant communities, and allow weeds to establish in disturbed areas. They also compete with native mammals and birds for food and alter, trample and destroy habitats. The European Rabbit is declared as an established pest animal, mandating its control. However there are other significant pest grazing animals, such as deer and horses that are not declared.

Over a million deer are wreaking havoc in Victoria's state forests and national parks, and instead of being managed as a serious pest, deer are oddly protected under the *Wildlife Act 1975* in order to support hunting interests. (See the VNPA's submission on the Victorian Government's yet to be released deer management strategy.) The government released a poorly written draft deer strategy in late 2018, and a final has yet to be released, well over year later. Meanwhile deer are creating havoc. See our joint statement from over 100 groups and individuals calling for decisive action: Call for Andrews' Government to act decisively on feral deer.

Feral horses are also trampling and exerting grazing pressure on critical habitats in Victoria's Alpine National Park and Barmah National Park. "Degradation and loss of habitats caused by feral horses" is listed as a threatening process under the *Flora and Fauna Guarantee Act 1988.* Recent plans to cull the horses have been slowed by interest groups seeking to protect brumbies for their cultural heritage value (a stance that has now been rejected in three court cases). See our recent FAQ on feral horse management in Barmah National Park and the Alpine National Park: Feral horses in national parks

Currently, imports of new plant and animal species are possible unless they are on a 'prohibited' list. This allows the import of potential weeds and pest animals until they have become a problem, at which point eradication may be impossible. Federal biosecurity controls should be based on a 'permitted' list of plants and animals. The import of new species should not be allowed until they are proven to be safe.

Eradication of new invasive species should be a high priority, exercising the precautionary principle before they become widespread.

Recommendations

Introduced pest animals and plants are one of the top contributors to ecosystem decline and the extinction of Victoria's threatened species. The VNPA recommends that the Committee recommend to the Victorian Government the following actions:

- significantly expand funding and planning for control measures and mitigating impacts of invasive pest animals and plants

- eradicate new invasive pants and animals as a priority
- ensure Federal biosecurity laws operate on a 'permitted' for import list of plant and animal species
- adequately declare invasive pest animals and plants in legislation
- specifically declare deer as a pest species, and release an effective detailed state-wide deer control strategy
- update the action statements under the *Flora and Fauna Guarantee Act 1988* pertaining to predation by cats and foxes on native wildlife – these action statements are significantly outdated (2004 and 2002 respectively) and require updating to reflect new programs, legislation and challenges and to set out intended management actions going forward
- substantially increase funding for research into the development of effective target-specific baits, and target-specific delivery mechanisms, for a range of pest animals – with particular research into baits containing a toxin to which native wildlife have a higher tolerance or that are less readily consumed by native wildlife

5. Hard-hooved animals in Victoria's alpine region

Hard-hooved animals (horses, pigs, goats, deer, sheep and cattle etc) are not native to Australia, and generally speaking our native ecosystems have not evolved with the level of disturbance brought by these animals.

The highly sensitive alpine regions of SE Australian have been particularly impacted by these animals since the mid 19th century, and those impacts are well-documented. Most of the evidence has come from the impacts of licensed cattle and sheep grazing, but are broadly applicable to all hard-hooved animals. Impacts include erosion of alpine soils, destruction of mossbeds/peatbeds, damage to water catchments, adverse impacts on state and federally listed threatened species and animals, and the spread of weeds.

Importantly, periodic assertions that high country cattle grazing can act to reduce the severity of landscape-scale fires have been consistently rejected by a long series of scientific studies, and a century or more of independent inquiries.

See Appendix 2 *'The Impacts of High Country Hard-hooved Grazing'* for a summary of the evidence that has led to the removal of domestic grazing from all national parks in Victoria, the ACT and NSW.

Recommendations

- Action should be taken on all hard-hooved animals in the alpine region.
- In line with scientific evidence, domestic cattle should not be reintroduced to alpine regions as a fire reduction strategy.

6. Improving fire management for better ecological and safety outcomes

The threat of fire to Victoria's natural heritage is one of the most critical issues of our time. Over recent decades, overly frequent large wildfires and inappropriate fuel reduction burning regimes have had considerable impacts on our biodiversity and ecosystems. We are in a period of increasing fire weather, fire frequency and fire severity, a situation that will continue to threaten human lives, the economy and the natural environment. We strongly believe, however, that managing fire to increase protection for biodiversity is compatible with significantly increased protection for human lives and infrastructure.

Primarily, significantly increasing our capacity for aerial attack at ignition points, concentrating fuel reduction management close to assets, and protecting and promoting the growth of older, less fire-prone forests (along with other strategies), can:

- better protect lives
- reduce impacts on our natural heritage
- reduce impacts on infrastructure
- reduce impacts on agriculture
- relieve overburdened firefighters
- and reduce impacts on tourism

Frequent planned and wild fire and the impacts of logging have taken their toll on long unburnt forests, creating a landscape skewed towards younger and more fire-prone vegetation, particularly in our state's east. This is creating landscape fire traps and has developed into a wicked problem that is being further exacerbated by a warmer and drier climate.

The extent of the 2019/2020 wildfires in Australia were unprecedented and exceeded predictions of wildfire in risk assessment models and climate science models. There is no single solution to the situation and a range of tools and measures will be required to mitigate future wildfire risks and prevent further devastation to our state's natural heritage.

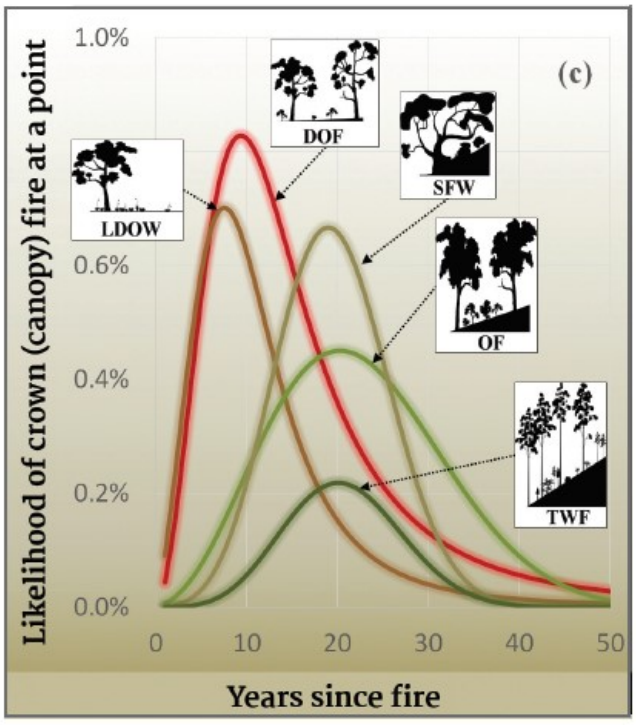
Some of the issues and risks that fire poses to Victoria's natural heritage are discussed below.

The risk of young post-fire regrowth

The occurrence of fire, both planned and wild, in Victorian landscapes has increased significantly in recent decades. There have now been three wildfires over 1 million hectares in Victoria since 2003: in 2003, 2007 and 2020. Planned burning has also occurred at relatively high levels with over 700,000 hectares treated in the last 5 years alone. Between 2003-04 and 2016-17 the Snowy district in East Gippsland had more

planned burning than any other district in Victoria.[15] But how useful was that planned burning?

How fire can increase fuel



Immediately after a fire, understory flammable shrubs etc are largely gone (year zero here), so any new fire is unlikely to generate enough flame height to reach the canopy. However the shrub layer quickly regenerates after a fire, soon greatly increasing the possibility of a canopy fire developing. In long-unburnt forests, the flammable shrubs die off, reducing the likelihood of a canopy fire.

LDOW = Low, dry open woodland.
DOF = Dry open forest.
SWF = subalpine forest and woodland.
OF = Open forest.
TWF = Tall wet forest.

Source: Zylstra, PJ. *Flammability dynamics in the Australian Alps.* Austral Ecology 2018.

An issue that is not widely discussed (or recognised) in public discourse is the extent and composition of the regrowth that takes place after fire. Post-fire regrowth, the age of vegetation, and the extent and frequency of planned and wild fire in the landscape is highly relevant to wildfire risk management.

Fire can change the structure and composition of vegetation and fuel loads to become more fire-prone**.** In many forest types in Victoria, a fire will initially (for a few years) reduce undergrowth, but then the young post-fire regrowth can actually be more extensive, more flammable and more prone to wildfire than before the fire occurred – a condition that can extend for decades. In other words, young post-fire regrowth can be more flammable than older long unburnt forests. This is particularly the case in the Australian Alps[16] and in the damp and relatively high rainfall eucalypt forests and rainforests in the east of our state, but is also evident in other forest such as some central Victorian box-ironbark regions.

Before last summer's fires, because of so much recent fire in the landscape much of the vegetation of public land in Victoria was in an adolescent or juvenile growth stage. This was especially the case in Gippsland. In 2019 about 50% of public land in Victoria was below its minimum tolerable fire interval.[17] The implications of this as one of the causal factors of the devastating 2019/20 fire season must be given thorough consideration.

Post-fire young regrowth from last summer's wide-scale fires has the potential to significantly increase wildfire risk in the near future. There is an urgent need to shift

[15] Commissioner for Environmental Sustainability Victoria, 2018. Scientific Assessments Part III Fire. https://www.ces.vic.gov.au/reports/state-environment-2018/fire
[16] Zylstra, P. J. Flammability dynamics in the Australian Alps. *Austral Ecology* 43, 578–591 (2018).
[17] Victorian fuel management report 2018-19.

focus from fire-based fuel management to other methods of reducing wildfire risk, such as seriously ramping up control of ignition points by a range of means. There is also a need to overhaul fuel reduction programs through more risk-based and strategic planning that incorporates ecological outcomes. Ecological outcomes have high environmental and public value and are closely related to fire risk-reduction outcomes. Ecological outcomes and risk reduction outcomes are not mutually exclusive, and this needs to be far better reflected in Victoria's fire management policies and programs.

A significant flaw in current plan burning programs is that they do not include follow up monitoring of post-fire regrowth and fuel loads to build ecological understanding and assist adaptive management.

Currently there is no monitoring of the after-effects of fuel reduction programs; a burn in some ecosystems can counterproductively increase medium-term (c. 5-30 years) fuel loads, but those medium-term burn impacts are rarely assessed. There is a need to establish monitoring programs to build our understanding of the composition and fuel loads of post-fire regrowth in different forest types.

The ecological and associated flammability outcomes of planned burns and wildfires in different forest types must be incorporated into wildfire risk assessment and modelling. Land managers should aim to reduce the long term flammability of the landscape by setting targets to protect and promote the growth of older vegetation in those forest types where older growth is historically less flammable than younger post-fire growth.

The impacts of frequent fire

If fire occurs too frequently it can impact many species before they get a chance to grow to reproductive maturity, kill young trees and cause ecosystem decline or potentially even collapse. Frequent fire can encourage the growth of grasses and other fire loving plants and, as mentioned above, this can in turn influence fire dynamics and the spread of future wildfire. Species less tolerant of fire can be thinned out, or even wiped out, and the composition of the vegetation can be replaced with more fire-loving species, resulting in extensive biodiversity impacts as well as compromising community safety.

For example, fires in 2003, 2007 and 2009 burnt over 87% of Victoria's Alpine Ash forests, with some areas being burnt a second or third time within a decade by a fire in 2013. This resulted in local elimination of Alpine Ash seedlings in parts of the landscape; an aerial sowing program was implemented in an attempt to mitigate the impacts.[18]

The frequency of fire both planned and wild in Victorian landscapes has increased significantly in recent decades. As previously mentioned there have now been three

[18] Bassett, O. D., Prior, L. D., Slijkerman C. M., Jamieson D. & Bowman D. M. J. S. Aerial sowing stopped the loss of alpine ash (Eucalytus delegatensis) forests burnt by three short-interval fires in the Alpine National Park, Victoria, Australia. *Forest Ecology and Management* 342, 39–48 (2015).

wildfires over one million hectares in Victoria since 2003, as well as very high levels of planned burning with over 700,000 hectares treated in the last 5 years alone. Between 2003-04 and 2016-17 the Snowy district in East Gippsland had more planned burning than any other district in Victoria.[19]

In the course of refining our understanding of appropriate fire, we should welcome knowledge of Aboriginal burning, incorporate those understandings and monitor the results. To the best of our understanding, Indigenous burning was generally cool, localised, carefully controlled and directed to specific purposes.

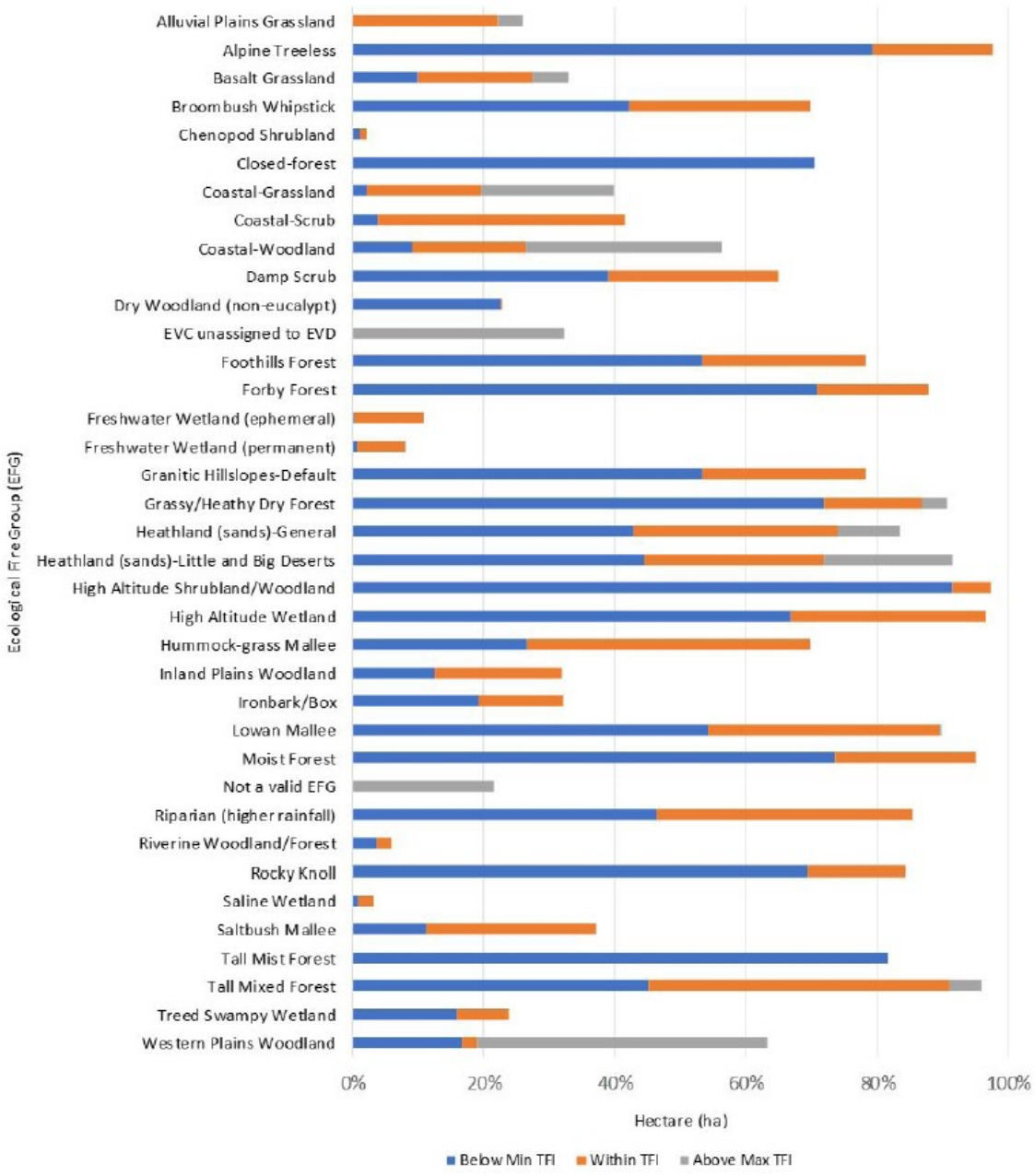
Unfortunately the excessive use of fire in the landscape is often justified and normalised by unsubstantiated claims regarding the extent and location of historical Aboriginal burning. For example, palaeoecological evidence suggests a low frequency of fire in East Gippsland during the Holocene period prior to British settlement and then a dramatic increase in fire after colonisation. "Burning by aboriginal people was not frequent in at least some parts of south eastern Australia and the modern, regular use of fire is not necessarily reflective of pre-European patterns." (Gell, Stuart and Smith, 1993)[20].

The presence of rainforests and long unburnt old growth eucalypt forests in the damp and relatively high rainfall forests of East Gippsland are themselves an indicator that fire was historically infrequent in the landscape. The excessive amount of recent wild and planned fire in East Gippsland is likely to have long lasting consequences – both ecological consequences and on future wildfire risk.

By 2019 a significant proportion of the vegetation on public land in Victoria had recently experienced fire and was in an adolescent or younger growth stage, particularly in the east of the state. As illustrated by the figure below, in 2017 many Ecological Fire Groups in Victoria had much of their distribution below their estimated minimum tolerable fire interval, including many groups that occur in East Gippsland and which have been impacted by the 2020 wildfires.

[19] Commissioner for Environmental Sustainability Victoria, 2018. Scientific Assessments Part III Fire. https://www.ces.vic.gov.au/reports/state-environment-2018/fire

[20] Gell, P. A., Stuart, I. and Smith J. D. The response of vegetation to changing fire regimes and human activity in East Gippsland, Victoria, Australia. *The Holocene* 3(2), 150-160 (1993).



Proportion of area below minimum TFI, within TFI and above maximum TFI in each EFG, 2016–17.
Source: Victorian State of Environment 2018

The table below collates Victorian ecological fire groups that are present in East Gippsland with their estimated minimum TFI, maximum TFI and percent area in Victoria below minimum TFI in 2017. (Data sourced from the 2018 Victorian State of the Environment report and Cheal 2010). After the wide-scale fires of last summer the extent of vegetation below minimum tolerable interval will now be even more extensive.

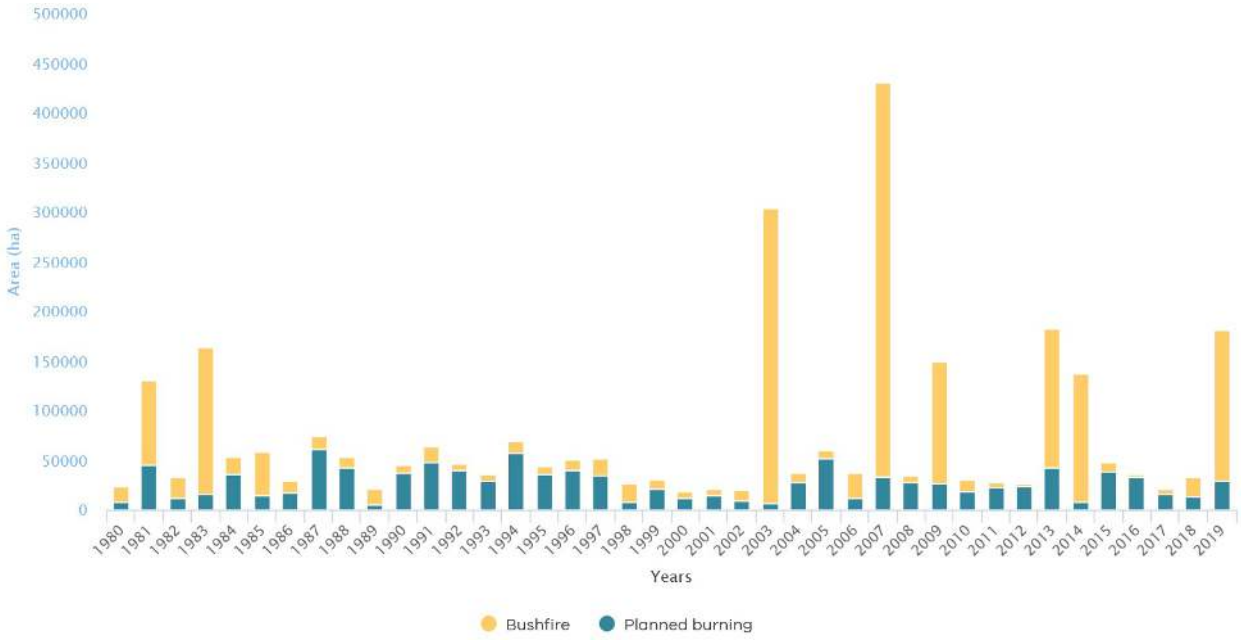
Ecological Fire Group	**Minimum tolerable fire interval for high severity fires (years)**	**Maximum tolerable fire interval (years)**	**% area of EFG in Victoria below minimum tolerable fire interval in 2016-17**
Freshwater Wetland (permanent)	8	∞	0 – 10 %
Saline Wetland	20	∞	0 – 10 %
Coastal-Grassland	5	40	0 – 10 %
Coastal-Scrub	10	90	0 – 10 %
Coastal-Woodland	25	70	0 – 10 %
Ironbark/Box	30	150	10 – 20 %
Damp Scrub	20	90	30 – 40 %
Heathlands Sands	15	45	40 – 50 %
Riparian (higher rainfall)	30	120	40 – 50 %
Tall Mixed Forest	25	60	40 – 50 %
Granitic Hillslopes	25 (eucalypt canopy) 45 (non-eucalypt canopy)	90 (eucalypt canopy) ∞ (non-eucalypt canopy	50 – 60 %
Foothills Forest	25	100	50 – 60 %
Rocky Knoll	20	80	60 – 70 %
High Altitude Wetland	60	∞	60 – 70 %
Grassy/Heathy Dry Forest	15	45	70 – 80 %
Alpine Treeless	55	120	70 – 80 %
Forby Forest	15	150	70 – 80 %
Moist Forest	25	150	70 – 80 %
Closed Forest	80	∞	70 – 80 %
Tall Mist Forest	80	300	80 – 90 %
High Alititude Shrubland / Woodland	50	125	90 – 100 %

Although minimum and maximum tolerable fire interval data is based on estimates and is variable within the landscape, the proportion of public land below minimum tolerable fire interval for many types of vegetation in East Gippsland is nevertheless very concerning, particularly where fire (both planned and wild) has excessively impacted

historically less flammable and wetter forest types that typically develop and/or persist after a long absence of fire.

Furthermore, even some of the EVDs with low proportions of area below minimum TFI in Victoria are of concern if you consider local scale impacts of fire. In the Martins Creek Nature Conservation Reserve in the East Gippsland Uplands, there are small patches of a vulnerable and highly restricted Box Ironbark EVC described as 'Foothill Box Ironbark Forest' which occurs nowhere else. Its total extent covers only about 603 hectares. Fire swept through the area during a large wildfire in 2014 and it now appears that the area has burnt again just 6 years later.

The 2020 fires in East Gippsland will have burnt through many areas that had already recently experience fire and were below their estimated minimum tolerable fire interval. This is putting species at risk and encouraging the growth of fire loving plants and the transition of forests into more fire-prone vegetation. Indeed planned burns and wildfires in Victoria have been routinely burning areas below minimum TFI for many years (see figure below).



Area of public land burnt while below minimum tolerable fire interval.
Source: Fuel Management Report 2018-19

The 2018 State of the Environment Report discusses that frequent fire is likely to result in flora and fauna in many natural areas remaining vulnerable for extensive periods of time:

"…future subsequent fires before minimum TFI is reached may have a large ecological impact, with the potential to drive localised extinction of some plant species. When a subsequent fire occurs in young forest at an immature stage, and where there is an absence of mature vegetation, the area dominated by young forest has potential to preclude the development of new cohorts of old-growth forest, with corresponding negative impacts on the persistence of biodiversity. Many bushfire affected vegetation types have relatively long minimum TFIs (between 15 and 80 years), so the reported increases in areas below minimum TFI can remain for a considerable time."

The report also acknowledged the biodiversity impacts of the recent decline in the extent of long unburnt forests and draws attention to the importance of older long unburnt vegetation:

"Recently burnt vegetation can be created in a single season. Some important habitat features occur only in mature to senescent vegetation and thus take decades, or even centuries, to develop. The decrease of long unburnt area is a great concern as these habitats are very hard to re-establish once lost."

The loss of long unburnt forests

Long unburnt vegetation has high conservation value and provides stable habitat values such as food and shelter for a variety of flora and fauna (especially abundant hollows). Long unburnt habitat is limited in the landscape by the extent of fire; it has become an increasingly serious issue across much of the state.

Some forested areas in Victoria have no recorded fire history due to chance and/or low flammability (or a lack of clear records). According to Victoria's 2018-19 Fuel Management Report, in 1980 47% or 3.52 million hectares of public land in Victoria had no recorded fire history. By 2019 this figure had dropped to just 22% or 1.66 million hectares, corresponding to the increase in large bushfires and fuel reduction burning over the last decade.[21] Of course, after last summer, this figure will have now dropped further after rainforests and long unburnt eucalypt forests tragically burnt in the east of the state.

In David Cheal's DELWP report[22] on *Growth Stages and tolerable fire intervals for Victoria's native vegetation data sets* there were some important caveats in regards to the presumed tolerable fire intervals of vegetation and the consideration of older growth in fire management:

> *"Early growth stages can be created far more easily than can late (mature) stages. Recently burnt vegetation can be created in a single season. Some*

[21] Victorian fuel management report 2018-19. https://www.ffm.vic.gov.au/fuel-management-report-2018-19/statewide-achievements/bushfire-risk

[22] https://www.ffm.vic.gov.au/research-and-publications/fire-research-and-adaptive-management-publications

important habitat features occur only in mature to senescent vegetation and thus take decades, or even centuries, to develop."

"Maximum conservation value is achieved with a variable fire regime (Bradstock et al. 1995, 1996). Applied fire regimes that reduce landscape variability can adversely affect conservation outcomes. Maximum habitat diversity includes a consideration of variance in the fire regime(s)."

Unlike recently burnt vegetation, long unburnt vegetation is not something that can be created within a short or even medium time frame. Even if land managers were to aim to protect existing long unburnt forests from fire and allow other areas to mature into older growth, there is always a chance that a wildfire could come through and homogenize the landscape into younger growth. The protection of all remaining patches of long unburnt forest should be of high priority in fire management.

The loss of rainforests in East Gippsland is a pressing concern as they can take many decades, even hundreds of years, without fire to re-develop after a major fire event. A recent Arthur Rylah Institute report into post-fire dynamics of cool temperate rainforests[23] outlines that rainforests are only burnt when surrounding forests carry the fire into them, and therefore conservation of rainforests is largely dependent on protection of the ecotone vegetation and its eucalypt forest buffer. Rainforests and wet forests are not suited to fuel reduction burning ecologically or in a practical sense.

Our forests are becoming more flammable and this is leading to ecosystem decline, as well as decreasing public safety. The causal issues of this increased flammability must be addressed. Such issues include: changes in fuel dynamics due to frequent fire; a drier and warmer climate; and the flow-on impacts of native forest logging.

A warmer and drier Victoria

Climate and weather are significant drivers of fire. The Bureau of Meteorology's temperature trend maps from 1970 to today show that south-eastern Australia has been experiencing a pronounced decrease in the annual number of cold days (maximums less than 15oC).[24] Immediately prior to last summer's fires, East Gippsland (large areas of which have traditionally been wet forests difficult to burn) also experienced three consecutive years of significant rainfall deficits.[25]

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[23] Tolsma, A., Hale, R., Sutter G. & Kohout, M., 2019. Post-fire dynamics of cool temperate rainforest in the O'Shannassy Catchment. Arthur Rylah Institute for Environmental Research Technical Report Series No. 298. *Department of Environment, Land, Water and Planning*, Victoria.

[24] Australian climate extremes – Trend Maps (cold days). Australian Bureau of Meteorology http://www.bom.gov.au/cgi-bin/climate/change/extremes/trendmaps.cgi?map=CD15&period=1970

[25] Archive – Twelve-monthly rainfall totals for Victoria. Australian Bureau of Meteorology http://www.bom.gov.au/jsp/awap/rain/archive.jsp?colour=colour&map=totals&year=2019&month=12&period=12month&area=vc

Victorians were warned by the Bushfire and Natural Hazards Cooperative Research Centre in August 2019 of the potential for increased bushfire activity in the coastal and foothill forests of East Gippsland "with severe levels of underlying dryness persisting in soils and heavy forest fuels, along with higher abundance of dead fuel components and higher flammability of live vegetation".[26]

Unnaturally frequent planned burns and wildfires are significantly changing older long unburnt vegetation into younger more fire prone vegetation. Australia's climate is warming, promoting fire weather conditions and exacerbating fire risk. Reform to fire management is needed.

The impacts of unseasonal fire

Another significant issue is the damage that unseasonal fire can have on our flora and fauna. Late autumn, winter and early spring burns are uncommon naturally and many of our plants and animals are unable to cope with fire at such a time. Many orchids for example can fail to flower and set seed if they are burnt during their active growth period. For some species of orchid it has been suggested that the least damaging *practical* season for a prescribed burn is in late spring, soon after seed dispersal.[27] Burns at other times can have significant negative impacts on orchid populations.

While Indigenous burning practices may have taken place "unseasonally" at times, we understand that it was usually to promote specific food plants, and likely to have been highly localised. We have much to learn about Indigenous use of fire.

The impacts of planned burns on wildlife and fragmented habitats

Whether it is hollow dependent mammals, nesting birds, invertebrates or hibernating reptiles, the direct impact of fire on animals and their habitat is significant. And when fires occur in winter, the habitat of the animals, their food resources and their shelter can be significantly depleted during a challenging time of the year when resources are already limited.

Furthermore, in some cases, large portions of fragmented remnant areas are burnt in planned fuel reduction burns – this impacts on fauna and their ability to persist in the area regardless of the time of the burn. Burning in fragmented and isolated areas should be given the utmost consideration as the impact on wildlife is significant. Large burns and wildfires in fragmented areas should be avoided.

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[26] Australian seasonal bushfire outlook: August 2019. Bushfire and Natural Hazards Cooperative Research Centre. https://www.bnhcrc.com.au/hazardnotes/63

[27] N. U. Jasinge, T. Huynh and A. C. Lawrie (2017). Consequences of season of prescribed burning on two spring-flowering terrestrial orchids and their endophytic fungi. *Australian Journal of Botany 66(4)* 298-312 https://doi.org/10.1071/BT17179

Native forest logging and fire risk

Forest ecologists are advising policy makers to recognize that the historical and contemporary logging of forests in Australia has had profound effects on fire frequency and the severity of the 2019/2020 fires.

In an article published by *Nature Ecology and Evolution*, Lindenmayer et al (2020)[28] contend that logging regimes have not only significantly impacted on biodiversity and threatened species but have made many Australian forests more fire prone and have contributed to increased fire severity and flammability. They explain that the ecological impacts of logging include changes in forest composition and structure, such as the creation of extensive, dense stands of young trees with a scarcity of elements such as tree ferns and rainforest plants, which in turn can influence fire dynamics and the spread of wildfire. They point out that fires have spread from logged areas and burnt into adjacent old growth eucalypts and rainforests dominated by ancient Gondwanan lineages. "The former have either never burned since establishment or are subject to extremely rare fires (for example, every 300–500 years), and the latter have never burned, with fire only at the rainforest edges at intervals of ~1,000 years."

The impacts of post-fire salvage logging

At a time when Victoria's public forests need urgent care and protection, VicForests' salvage logging of burnt trees subjects forests to mechanical pressures during the fragile post-fire recovery stage of the vegetation, compounding the pressures of fire and logging.

In the aftermath of a wildfire, both living and dead trees serve critical ecological functions. Most of Victoria's eucalypts (other than alpine and mountain ash) are excellent re-sprouters and can fairly rapidly re-establish an extensive elevated leaf area after medium and even high intensity fires. This simultaneously shades lower recovering vegetation, including other re-sprouting plants and seedlings.

Operating logging machinery in a forest recovering from fire has direct impacts on recovering vegetation. Additionally, the logging of old and dead cavity bearing trees is a considerable threat to forest animals such as the Greater Glider and many other mammals, parrots, owls and other birds that require tree cavities in their habitat.

Research examining the separate impacts of wildfire, conventional logging and salvage logging on plant functional groups of the mountain ash forests of south-eastern Australia has found that salvage logging results in an overall loss of species richness,

[28] Lindenmayer, D. B., Kooyman, R. M., Taylor, C., Ward, M. and Watson, J. E. M. Recent Australian wildfires made worse by logging and associated forest management. *Nature Ecology & Evolution* (2020). https://doi.org/10.1038/s41559-020-1195-5

including a disproportionate loss of ferns and midstory trees.[29] Several trees such as Myrtle Beech and Banyalla that were present in all unlogged categories were absent from both logged and salvage logged areas. Salvage logging also had particularly noticeable impacts on otherwise common midstory trees such as Blanket Leaf, Rough Tree Fern, Australian Mulberry, Forest Lomatia, Native Olive and Tasmanian Pepperberry. Furthermore, salvage logging was found to increase the abundance of bracken and shrubs. When bracken fern was excluded from the analyses, there was a far more pronounced decline in other ferns.

Such research must be considered by Vicforests and fire management agencies when planning for conservation, forest management and fire management. For example, bracken, a weedy colonizer of open ground that responds well to fire and logging, had only accounted for 13% of all fern occurrences in long unburned forest but this increased significantly to 64% on clearcut sites and 93% on salvage logged sites. This can have significant implications for biodiversity and future wildfire risk. Bracken can dominate the area, crowd out other plants, compete for moisture and nutrients, and can contribute significantly to near-surface fuel and elevated fuel layers.

The importance of retention of unburnt 'island' refuges

Another common and serious threatening process to flora and fauna during fire response management is blackout burning. A blackout burn is when you have green areas within a fire footprint that remain unburnt but which are then subsequently blacked out by a deliberately lit fire. This destroys unburnt habitat refuges for wildlife at a critical time. Blackout burning can also have significant negative impacts on the post-fire recovery and recolonisation of flora and fauna. Blackout burning should be dicouraged as a fire management practice.

Salvage logging also undermines efforts to protect areas of mature tree recovery within the burn area. This "island retention" is critical for recovery of flora and fauna in the aftermath of a broadscale wildfire. Patches of unburned green trees, and patches with green trees intermixed with dead trees need protection and not further disturbance by logging or fire.

Research has shown that retaining patches of unlogged forest within logged or post-fire salvage logged forests assists in the survival of wildlife. In 2018, the British Ecological Society published in their peer-reviewed journal, *Journal of Applied Ecology*, a paper[30] outlining an 8-year study of bird responses across a spectrum of disturbance types in Australian mountain ash forests following wildfires in 2009. The study showed that

[29] Blair, D. P., McBurney, L. M., Blanchard, W., Banks, S. C. & Lindenmayer, D. B. Disturbance gradient shows logging affects plant functional groups more than fire. *Ecological Applications* 26, 2280–2301 (2016).

[30] Lindenmayer, D. B., McBurney, L., Blair, D., Wood J. & Banks S. C. From unburnt to salvage logged: Quantifying bird responses to different levels of disturbance severity. *Journal of Applied Ecology 55*, 1626–1636 (2018).

levels of bird species richness were highest in areas with increased amounts of the original stand remaining after disturbance, both following fire and following logging. Bird species richness was the lowest in salvaged logged sites without island retention.

Action must be taken to end the serious biodiversity impacts and ecological consequences of native forest logging in Victoria. The use of tax payers' dollars to subsidise VicForests' logging and degradation of public native forests and threatened species habitat should end, and the transition of the native forest logging industry to plantation only timber production should be brought forward. For further discussion and recommendations regarding native forest logging see section 7 of this submission.

Hazardous tree removal in preparation for prescribed burning

In Victoria, in recent years, there has been an extensive program for the removal of unsafe trees, primarily aimed at protecting fire crews. This has resulted in the loss of thousands of mature trees, including hollow-bearing trees, throughout the state. While we acknowledge the importance of maintaining a safe workplace for crews, the process has generally not taken place under rigorous guidelines or oversight consistent with procedures developed for land clearing elsewhere. Many apparently safe trees have been removed.

Since May 2018, roadsides and other clearing on crown land, including lands managed by Parks Victoria, must follow the "Procedure for the removal, destruction or lopping of native vegetation on Crown land". This policy does not however include assessment under national environmental laws and it is not clear if it includes fire preparation works. The procedure aims to "ensure a robust and transparent approach to the removal, destruction or lopping and counterbalance of all native vegetation managed by, or on behalf of DELWP and PV on Crown land". It is not clear if the extensive number of trees, many hollow bearing, cleared in preparation for planned burning are assessed, accounted for or "counter balanced" by additional protection elsewhere under this policy. See:
https://www.environment.vic.gov.au/__data/assets/pdf_file/0033/408489/CrownLandProcedure.pdf

Clarity needed in regulations for roadside clearing

There is a need for a clearer understanding, in the context of the 2019/2020 fire season bushfire recovery, of the interaction between native vegetation rules exemptions (the crown land procedure, roadside safety procedure, emergency management arrangements) and timber harvesting rules and legislation.

There has been extensive roadside clearing of trees and other vegetation in East Gippsland – some of burnt forest; some of unburnt forest; some within emergency periods; some outside emergency periods. Clearing has occurred on crown land of

various sorts, and while we recognize that there are exemptions, these exemptions are conditional.

There are questions surrounding when the crown land procedure or roadside procedures apply (or should apply). Most of the activity seems to be approved under timber harvest rules. See:
https://www.vicforests.com.au/fire-management-1/vicforests-starts-post-fire-timber-recovery

The Emergency Management Acts and current native vegetation clearing rules exempt emergency work under specific conditions. See:
https://www.environment.vic.gov.au/__data/assets/pdf_file/0018/91251/Exemptions-from-requiring-a-planning-permit-to-remove,-destroy-or-lop-native-vegetation-Guidance.pdf

For emergency works, this exemption comprises seven separate parts, each with a specific purpose including: fuel breaks and firefighting access tracks being "expressly for bushfire management purposes and not for other purposes" and "Firefighting covers activities required to fight an active bushfire. It does not include activities that are in preparation for a bushfire or after a bushfire has occurred."

Likewise the road safety procedure has many conditions. See:
https://www.environment.vic.gov.au/__data/assets/pdf_file/0024/408480/RoadSafetyProcedure.pdf

However, while roadside 'salvage logging' is used for commercial purposes, it is not intended to be 'regrown' for future harvest, and is therefore permanent clearing. Crown land regulations should apply rather than timber harvesting because it is resulting in permanent clearing outcomes. There are also questions surrounding how permanent clearing fits the Code of Practice for Timber Production, and questions around when emergency provisions start and end.

While we understand that vegetation may need to be cleared during the process of combating fire, at this stage there appears no detailed assessment of vegetation lost by emergency management activities in the 2019/2020 fire season, either pre or post fire, or when the exemptions under the Emergency Management Act start or finish.

It seems clear that there has been significant areas of clearing along roadsides post fire in East Gippsland and elswhere, which do not appear to be "expressly for bushfire management purposes and not for other purposes", as required by the exemptions. Much of this clearing appears to be driven by commercial interests and handed to the timber industry rather than reasonable emergency management needs of landholders.

Point of ignition funding arrangements

Australia could benefit from greater national coordination in wildfire suppression and emergency response. In particular, with wildfire risks increasing, the capacity for aircraft to quickly get to the point of ignition of a wildfire is paramount for the protection of both the community and of our natural heritage. There is a need for an expanded aerial firefighting fleet and a radical increase of secure state and federal funding to support the operational costs of fighting wildfires before they become uncontrollable in both remote and populated areas.

A number of fire managers and conservation organisations have expressed concerns about Disaster Recovery Funding Arrangements where maximum funding from the Federal government to cover operational costs of firefighting only flows to States when firefighting is targeted at "imminent" risks to lives and property. These funding arrangements only serve to discourage fire agencies from being equipped with enough capacity to get sufficient aircraft in a timely manner to ignitions in remote areas[31] – essentially leaving remote fires to burn until they become larger, harder to manage, and pose a significant risk to communities. As was also evident this last summer, such fires can unfortunately cause considerable environmental destruction in their wake.

While Victorian aerial operations are relatively well-resourced, we still don't have the capacity to deal with multiple ignitions.

Recommendations

For improved fire management and for better protection of people and nature from inappropriate fire regimes, the VNPA recommends the following:

- the ramping up of aerial point of ignition control, including further developing state-wide aerial firefighting capabilities to suppress ignition points in both urban and remote landscapes
- improved funding arrangements between the Federal and State governments in order to support aerial operational responses to wildfires in remote areas and to support the protection of environmental and cultural assets (Currently, federal funding is only available for aerial intervention if a fire is clearly threatening lives and infrastructure. This discourages critical point-of-ignition control in remote areas.)
- the assessment of the cost-effectiveness of successful aerial interventions, including estimating the avoided costs in life, infrastructure etc. whenever fires have been contained at or near the point of ignition

[31] Foley, M. & Smith, A. Ex-fire chiefs say 'ridiculous' bushfire funding stymies waterbombing. *Sydney Morning Herald*, 28 February 2020. https://www.smh.com.au/politics/federal/ex-fire-chiefs-say-ridiculous-bushfire-funding-stymies-waterbombing-20200228-p545dz.html

- the improvement of wildfire preparedness for citizens in towns and cities, including improved evacuation planning and procedures, and support for private bushfire shelters
- increased emphasis on strategic and regulated fuel reduction of understorey vegetation close to assets
- evidence-based and strategically planned fuel reduction burn programs with follow up monitoring of post-fire regrowth and fuel loads
- reduce the impacts of fire on the flora and fauna of fragmented and isolated habitats by ensuring that fuel reduction burns and wildfires do not burn large extents of fragmented areas
- the incorporation of the ecological and associated flammability outcomes of planned burns and wildfires in different forest types into wildfire risk modelling
- reducing the long term flammability of the landscape by setting targets to protect and promote the growth of older vegetation in those forest types where older growth is historically less flammable than younger post-fire growth
- protection of critical habitat features, such as (but not only) hollows in trees and coarse woody debris
- a cessation of blackout burning practices – blackout burning during fire response operations destroys natural unburnt habitat refuges and affects the survival and recovery of fauna and flora
- a cessation of post-fire salvage logging practices – salvage logging severely undermines efforts to protect areas of mature tree recovery within burnt areas
- the protection of long unburnt forest should be a high priority in fire management – due to frequent planned and wild fire, the extent of long unburnt forests has declined rapidly in recent decades
- a clarification of which legislation and regulations apply, and when, in regard to roadside clearing of vegetation before, during and after emergency response
- permanent clearing of roadside vegetation is not timber harvesting and should be subject to avoid-minimise-offset principles and relevant native vegetation clearing controls.

7. Native forest logging – transition out and protect critical habitats

Native forest logging in Victoria is a serious ecosystem threatening process that is historically responsible for, and continues to be responsible for, the degradation of many forest ecosystems in our state.

In November 2019 the Victorian government made a historic announcement that it would immediately cease logging of old growth native forests in Victoria, immediately protect threatened species habitat, and end native forest logging by 2030.

In the months since the announcement Victoria has had a devastating fire season in East Gippsland that impacted significantly on threatened species habitats, on old growth eucalypt forests and rainforests, on proposed immediate protection areas and on areas marked for logging. By April 2020, after community led litigation, the Victorian Supreme Court had ordered that logging be temporarily halted in 26 unburnt areas of public native forest in Victoria.

In May 2020, the Federal Court of Australia ruled that VicForests had breached national environmental protection laws when it logged the habitat of Greater Gliders and critically endangered Leadbeater's Possums. VicForests has not been complying with the Code of Practice for Timber Production 2014 in respect of threatened species, particularly in applying the precautionary principle, and as a result has not been acting in accordance with their Regional Forest Agreement – agreements which are already poor in their consideration of Victoria's flora and fauna.

In August 2020, the Federal Court's final orders granted final injunctions to protect the 66 areas of Greater Glider and Leadbeater's Possum habitat subject to the case. The Judge also made formal declarations of unlawful logging by VicForests in those 66 areas and ordered VicForests pay Friends of Leadbeater's Possum's costs of running the case. The case has national implications for species threatened by logging under Regional Forest Agreements across the country which will now face much greater scrutiny.[32]

RFA's – ready for abandonment

Regional Forest Agreements are regulatory relics. They allow unjustified special treatment for the native forest logging industry while other Victorian industries have to follow the law. The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the main piece of federal environmental legislation, yet the *Regional Forest Agreements Act 2002* provides that RFAs, and by extension the native forest logging industry, are exempt from the national environmental laws (EPBC Act).

[32] https://www.envirojustice.org.au/federal-courts-final-orders-in-landmark-legal-win-protect-forests-home-to-threatened-possums-from-logging/

Many of the Regional Forest Agreement standards for the protection of ecosystems fall below international and national benchmarks. For example, elements of the JANIS criteria embedded in the RFAs are inconsistent with the National Reserve System strategy adopted by all Australian Governments in 2009, and the Convention on Biological Diversity (CBD) Aichi Biodiversity Targets (specifically Target 11), adopted in 2010. For further discussion of JANIS criteria see our submission on RFA's here.

RFAs are clearly out of date in their consideration of the conservation of Victoria's flora and fauna and our natural heritage in general. They have continued to allow logging to occur in high conservation value forest habitats despite, for example, Mountain Ash forest (one of the key target species for logging) being listed in 2015 as critically endangered on the International Union for the Conservation of Nature (IUCN) Red List of Ecosystems. Leadbeater's Possum were also up-listed to critically endangered, and the Greater Glider was added to federal and state threatened species lists.

While RFAs have been in effect in East Gippsland, populations of the Greater Glider have declined by 50 per cent in the region – and that was before last summer's wildfires burnt through 32% (21% at high severity) of modelled Greater Glider habitat in Victoria.[33] According to analyses by WWF Australia, more than 840,000ha of native forest is approved for logging in Victoria and 73 per cent of that area is likely to be Greater Glider habitat – and that's just in areas that are mapped properly.[34]

Despite the enormous environmental impacts of last summer's fires, the Victorian government renewed all of its Regional Forest Agreements for another 10 years in order to allow the government backed logging enterprise, VicForests, to be exempt from national environmental protection laws while it continues its ecologically damaging operations. See further discussion of RFA renewals here: another decade.

This included the renewal of the obsolete Western RFA which allows logging operations in what's left of Victoria's highly fragmented, high conservation value native forests in the west of the state. Although an independent review in 2010 recommended that the Western RFA be cancelled, revised ecologically-damaging logging plans were released in mid-2017 for targeted logging of woodlands right across the west. This includes around the Grampians, Wombat forest near Daylesford and Mt Cole west of Ballarat. Some of the issues of this plan are:

- 60 areas of state forest are targeted for logging and to take place in areas known to harbour more than 20 threatened native animals and 14 threatened native plants
- 70% of the area targeted for logging contains native vegetation types that are either endangered (19%) vulnerable (11%) or depleted (40%) – in the Horsham Forest Management Area 54% of the vegetation is endangered

[33] https://www.wildlife.vic.gov.au/home/biodiversity-bushfire-response-and-recovery
[34] https://www.wwf.org.au/news/news/2020/destruction-of-greater-glider-habitat-jumped-by-52-after-vulnerable-listing

- threatened species have been found either within or near 33% of planned logging coupes, even higher in some regions

In 2014 VicForests was given management of forestry in the west, and received a $3.3 million grant in advance to run its so-called "Western Community Forestry". In their 2018–19 Annual Report, VicForests reported that total revenue from western native forest logging was around $700,000. State government funding to VicForests' Western Community Forestry" in that same period was $678,000. That's a surplus of only $22,000 for Victorian taxpayers, in return for the logging of publicly-owned, high conservation value native forests. The $3.3 million grant is due to expire this year, and should not be renewed just to prop up the logging industry in the region. See our recent article The wicked Regional Forest Agreement of the west.

RFAs also fail to account for non-wood forest values such as water, ecosystem services, recreation and tourism that are contributing significant sums to the state's economy, and could contribute further. The method of harvesting native forest, that is, clear fell logging, has not changed significantly in 30 years and has a dramatic impact on native habitats and drinking water production.

More info:
Our 2017 report on how VicForests' Timber Utilisation Plan for the west is putting our western our western risk can be accessed here.
Our 2018 submission outlining why RFAs have failed and are obsolete and should not be renewed, can be accessed here.

Logging and wildfire

Regional Forest Agreements ignore the impacts that logging has on fire regimes. Ecologists are urging policy makers to recognize that the historical and contemporary logging of forests in Australia has had profound effects on fire frequency and the severity of the 2019/2020 fires.

In an article recently published by *Nature Ecology and Evolution*, Lindenmayer et al (2020)[35] contend that logging regimes have not only significantly impacted on biodiversity and threatened species but have made many Australian forests more fire prone and have contributed to increased fire severity and flammability. They explain that ecological impacts of logging include changes in forest composition and structure, such as the creation of extensive, dense stands of young trees with a scarcity of elements such as tree ferns and rainforest plants, which in turn can influence fire dynamics and the spread of wildfire. They point out that fires have spread from logged areas and burnt into adjacent old growth eucalypts and rainforests dominated by

[35] Lindenmayer, D. B., Kooyman, R. M., Taylor, C., Ward, M. and Watson, J. E. M. Recent Australian wildfires made worse by logging and associated forest management. *Nature Ecology & Evolution* (2020). https://doi.org/10.1038/s41559-020-1195-5

ancient Gondwanan lineages. "The former have either never burned since establishment or are subject to extremely rare fires (for example, every 300–500 years), and the latter have never burned, with fire only at the rainforest edges at intervals of ~1,000 years."

Another issue of concern is the post-fire salvage logging of dead and living burnt trees. This directly impacts on forests during the critical recovery stage of the vegetation. Salvage logging is a threat to biodiversity and also potential factor in future wildfire risk. Research in the Mountain Ash forests of south-eastern Australia has found that salvage logging results in an overall loss of species richness, including a disproportionate loss of ferns and midstory trees and in increase in the abundance of bracken and shrubs.[36] Such research must be considered by governments and logging industries when planning for conservation, forest management and fire management.

RFAs also fail to consider the successive or cumulative impacts of logging and bushfires, even though there have been extensive fires in the last 10 years. Our 2018 submission on Regional Forest Agreements (accessible here) stated the following:

"Estimates from DELWP show that at least 40 – 60% of state forest has, since 1960, already been logged or burnt or is proposed to be logged in the next few years. Assuming that many of the easier and non-constrained areas of forest have been logged first, there is limited resource left, particularly if future fires are taken into account. There is no clear provision in the RFAs to consider the impacts or cumulative implications of these scales and rates of fire plus logging."

By 2020 this has indeed turned out to be the case. The megafires in East Gippsland burnt through approximately 1.5 million hectares including nearly half of the forest areas marked for logging.

Most native forest logging in Victoria now occurs to supply pulplogs to the Maryvale pulp and paper mill. A quarter of the mill's wood is supplied through VicForests but this demand could be covered by the plantation timber industry which exports high volumes of woodchips, especially if appropriate transport subsidies were in place. The mill already uses plantation timber for more than two-thirds of its products.

The amount of sawn timber used in construction has dropped dramatically and supply is shaky, to the point that the Victorian Government bought out the main native hardwood sawmill in 2017 (more here).

Native forest logging in Victoria is producing unsustainable, unprofitable and ecologically damaging outcomes at a time when our natural heritage needs urgent care

[36] Blair, D. P., McBurney, L. M., Blanchard, W., Banks, S. C. & Lindenmayer, D. B. Disturbance gradient shows logging affects plant functional groups more than fire. *Ecological Applications* 26, 2280–2301 (2016).

and protection. Victorian taxpayers should not have to foot the bill of propping up such an industry. The planned transition to a plantation only timber industry should be brought forward from 2030 to as soon as possible.

Recommendations

The VNPA recommends that the Committee recommend to the Victorian Government the following:

- in light of widespread landscape scale fire, bring forward to as soon as possible the transition of the native forest logging industry to plantation only timber production
- make critical habitat determinations under the *Flora and Fauna Guarantee Act 1988* for forest dwelling wildlife that are significantly under threat from fire and logging
- conduct a binding 'major event' review (with public consultation) of all Regional Forest Agreements in the wake of the large landscape scale fires of 2019/20 fire season
- abandon the Western Regional Forest Agreement and rule out the renewal of the soon to expire $3.3 million grant which props up the logging industry in the region
- stop using tax payer's dollars to subsidize VicForests' detrimental logging of public native forests and threatened species habitat

8. Riverside rescue – rivers, streams, floodplains and riparian habitats

The Platypus, a riparian specialist species with immense natural and cultural heritage for Australians, and one of the most unique animals in the world, is under threat of extinction in Victoria. The highly elusive species has been long suspected of being in decline. It has continued to disappear from more and more of our rivers, streams and creeks, resulting in widely distributed but severely fragmented populations. This month, the Scientific Advisory Committee has recommended that the Platypus be listed for protection as a threatened species under the *Flora and Fauna Guarantee Act 1988*.

The primary threat to platypuses appears to be reduction in surface water and flows due to drought, altered flow regimes and water extraction. Widespread clearing of native vegetation along waterways has led to degradation of platypus habitat, and habitat modification due to bank erosion and stream sedimentation threatens platypus nesting and foraging habitats.

"Habitat characteristics considered favourable for platypuses are generally those associated with stable banks for burrowing, the presence of benthic invertebrate prey, intact riparian vegetation, complex benthic substrate (including large woody debris), and reliable flow regimes".[37] Unfortunately, such natural characteristics are increasingly hard to come by, as our rivers and water flow are being increasingly modified and regulated to meet the water demands of agricultural intensification and its export-focused aspirations.

Much of Victoria's landscape is densely woven with rivers and streams – the greatest concentration of waterways on Australia's mainland – and includes many heritage rivers, high-value wetlands and floodplains and important bird and biodiversity areas.

Victoria's freshwater ecosystems have great diversity and complexity and support more than 100 waterbird species, over 50 freshwater fish, 38 frogs, 40 crayfish and a large number of freshwater invertebrates. Some groups of freshwater organisms – crayfish, galaxiid fish and stygofauna (groundwater-inhabiting organisms) – have high levels of endemism in Victoria, and close to half or more of Victoria's frogs, freshwater fish and freshwater crayfish are threatened. Additionally, more than 800 vascular plants are associated with Victoria's wetlands.

There is just as much need for comprehensive, adequate and representative protection of freshwater ecosystems as there is of terrestrial and marine ecosystems but Australia-wide, only about 2% of named rivers are protected within national parks. Heritage rivers

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[37] Nomination No. 884 Flora and Fauna Guarantee – Scientific Advisory Committee preliminary recommendation on a nomination for listing *Ornithorhynchus anatinus*.
https://www.environment.vic.gov.au/__data/assets/pdf_file/0030/484086/01-Platypus-PRR-FinalSign-1.pdf

are only protected from the construction of major on-stream dams and not from other alterations to flow regimes and are poorly policed.

Nonetheless there are parts of Victoria with large areas of native vegetation and freshwater environments managed as part of largely intact ecosystems in extensive parks, reserves or forests, opening up opportunities for better protection. Victoria is also unique in that of the estimated 170,000 kilometres of river frontage in the state, about 30,000 kilometres are Crown land (about 100,000 hectares). This opens up great opportunities for riparian restoration – with which Victoria's Regional Riparian Action Plan is already producing positive outcomes.

River, stream, and floodplain conservation is dependent on restoring natural flow regimes and riparian vegetation as well as addressing major threats such as damage by cattle and vehicles, pollution, and invasion by weeds, introduced fish and feral animals. To save the Platypus and an array of other freshwater flora and fauna, now is the time for a riverside rescue in Victoria.

The importance of natural flow regimes

Our freshwater ecosystems have largely evolved in response to natural flow regimes – that is, the patterns of water flow resulting from interactions of climate, geology, topography and vegetation. Flow patterns are disrupted by over extraction of water from rivers, by physical changes to rivers due to dredging, straightening and levee banks, and by changes to catchments. Unnatural deviations from natural flow regimes are placing our freshwater ecosystems and the species that depend on them at great risk.

Variations in natural flow regimes, from times of no flows to times of flood, facilitate different riverine functions and processes. 'Freshes' increase river height, flush stagnant water, create new habitat patches and turn pools to runs enabling the movement of sediments and organisms. 'Bankfull flows' completely fill a channel without breaking the banks and maintain channel shape. 'Overbank flows' are vital for floodplain productivity and for organic inputs to rivers. The variability between seasons and years, ranging from drought to floods, often creates essential ecological disturbance, without which these systems become more uniform and less able to sustain a variety of life.

River headwaters and segments that flow through arid landscapes often dry out or contract to isolated pools. They are tough times for many aquatic species, with high levels of predation, competition and physiological stress, but this variability maintains species diversity by limiting domination by any particular groups of organisms. Organisms in dryland river systems are adapted to persist in harsh conditions and to prevent displacement by dominant but less tolerant species. In the short-term they can suffer localised extinctions, with natural recovery occurring as species recolonise from local refuges or from elsewhere.

Ecosystem function depends on flows to transport nutrients, organic materials, and organisms into and out of habitat patches. Flows are needed to disperse animals for breeding or to complete a life history stage, access resources or recolonise areas where local extinction has occurred. Waterbirds need particular flood durations and temperatures before breeding, many plant seeds require flooding prior to germination, and some fish need specific flows to migrate or breed. Murray cod, for example, migrate upstream with early spring flows, female tupong migrate downstream to spawning grounds during high flows in late autumn and winter, and broad-finned galaxias need a rise in water level for spawning along stream edges, then another high flow to cover the exposed eggs before hatching.

Waterways facilitate connections at multiple scales. At the landscape scale waterways enable seasonal movement of species, and at the local scale they facilitate daily movements and dispersal. Streamside vegetation is also essential for connectivity for aquatic and terrestrial plants and animals.

Conserving habitat diversity requires maintaining the natural variability of interactions of water flow with features such as pools, runs, bars, benches, overhanging banks and anabranches and structural elements such as sediment, pebbles, boulders, tree roots, coarse woody debris and aquatic plants. These interactions produce fine-scale flow patterns such as slackwaters, eddies, transverse flows and velocity gradients. The slackwater habitats created provide refuge from currents, and hatching, rearing and feeding environments for zooplankton and the young of crustaceans and fish and other freshwater creatures.

Water extraction and altered flow regimes

One of the biggest problems for Victoria's rivers and streams is over-extraction of water. There are 134 declared water supply catchments across Victoria and about 52 major storages, with at least one major on-stream storage constructed in 19 of Victoria's 29 river basins, and hundreds of smaller dams and weirs on waterways. There are about 450,000 farm dams in Victoria and most of Victoria's water use is by irrigated agriculture. Australia's ever-increasing push for agricultural exports is driving agricultural intensification and placing further pressure on water resources.

In 2017-18 Victorian farming businesses used an estimated 2.3 million megalitres (ML) of water to irrigate about 630,000 hectares of agricultural land, with 2.2 million ML used to irrigate crops and pastures.[38] Six thousand farms applied water to their land. About 1.4 million ML or 60% of all water applied was applied to pastures. About 750,000 ML

[38] Food and fibre economic fact sheet, June 2019. Agriculture Victoria. http://agriculture.vic.gov.au/agriculture/food-and-fibre-industries

was applied to crops (32 per cent of all water applied) with 51 per cent of this applied to fruit trees and 15 per cent to grapevines.

While diversion caps and regulations on consumption are in place in Victoria to assure some allocation of held water to the environment, flow regimes in irrigation areas are largely dictated by consumption needs rather than environmental requirements. In such areas, seasonal flow regimes can be reversed because large volumes of water are released for irrigation during summer and autumn when flows would typically be lower, and less water is released during winter when flows would typically be greater. In Victoria there has been an overall decrease in streamflow of approximately 50% over the past 20 years.[39]

The 2018 Victorian State of the Environment Report found that the that "the basins that experienced the lowest proportions of water naturally leaving the basin as a percentage of total flows in 2015–16 were the Avoca (0%), Wimmera (7%), Moorabool (14%), Werribee (25%), Loddon (29%), and Maribyrnong (30%) basins. This indicates that consumption is exerting more pressure on aquatic ecosystems in these basins." Annual runoff was projected to decrease by 5-15% across most of Victoria by 2040 and 10-30% by 2065 (relative to a baseline period from 1975-2014), with the largest reductions expected to occur in the south west. The report also found that only 26% of the river basins assessed from 2010 to 2017 were rated as having good water quality.

The Victorian Environmental Water Holder's *Reflections 2018-19* annual report[40] lamented that "much of Victoria is experiencing drier than average conditions and some regions are struggling with restricted water availability. As a result, many rivers, wetlands and farming communities are under stress."

"Below average rainfall across large parts of Victoria and the Murray Darling Basin created significant challenges for many water users in 2018-19, including environmental water holders. Low on-farm rainfall across entire regions meant there was increased demands on water for irrigation, while persistent dry conditions since late 2016 meant that water availability was relatively low, particularly in New South Wales, as many storages were at their lowest levels since the Millennium drought. With only relatively small volumes of water available on the market, the price of available water rose to levels that only a few industries could reasonably afford. From an already high $250 per megalitre in July 2018, prices rose to $550 per megalitre in May 2019, creating big challenges for many prospective buyers."

The pressures of water extraction are at their worst during dry times when consumptive uses are given even greater priority over environmental health. For example, during the

[39] https://www.ces.vic.gov.au/reports/state-environment-2018/water-resources
[40] https://www.vewh.vic.gov.au/__data/assets/pdf_file/0011/515783/VEWH-Reflections-2018-19_web_REV.pdf

drought in 2007–08, the environment received less than 7% of its already inadequate entitlement while irrigators received 30–35% of their much larger entitlements. The volume of environmental entitlements was just 6% of total entitlements but only 1% was delivered for the environment that year. In 2009-10, flow was less than 10% of natural levels in six basins.

Groundwater extraction can have its consequences too. Groundwater and surface water systems are intimately linked, with groundwater reserves relying on surface recharge and many surface ecosystems relying on groundwater sustenance. Aquifers regulate parts of the hydrological cycle, absorbing runoff and stream flows through river channels as well as floodplains. This process buffers changes to rates of flow during flooding. When floods recede, aquifers release water back to the stream, sustaining flow rates and again buffering rates of flow and river level changes.

A study[41] in the Murray-Darling basin showed that water stress in river red gums was lower between flood events in areas underlain by shallow aquifers, implying groundwater dependency. Because only small changes in the depth to groundwater can substantially reduce water available to vegetation, groundwater-dependent ecosystems are likely to be vulnerable to changes in groundwater flow.

Floodplain degradation

Overbank flooding of rivers is crucial for many vegetation communities, for freshwater fauna on floodplains and for maintaining ecological connectivity along and across floodplains, and between rivers and floodplains.

The imposition of water regimes suited to agriculture and human consumption has had profound ecological impacts on river and floodplain ecosystems. Many rivers are now so heavily regulated that only rare extreme flood events result in extensive overbank flows.

Overbank flooding is integral to biological processes such as regeneration, dispersal and growth, and to geomorphological processes such as the deposition of silts and the regulation of ground water depth and chemistry. After prolonged periods of no overbank flows (eg due to river regulation or drought), flooding can lead to ‘blackwater’ events and death of fish, crustaceans and other organisms. They occur when large accumulations of organic material are washed into streams and consumed by bacteria, leading to a sudden depletion of dissolved oxygen and increased acidity. Mass fish deaths have been a significant public concern in recent years.

[41] Bacon PE, Stone C, Binns DL, Leslie DJ, Edwards DW (1993). Relationships between water availability and Eucalyptus camaldulensis growth in a riparian forest. Journal of Hydrology 150:541-61.

An assessment of flooding requirements for floodplains of the Murray, Goulburn, Ovens and King Rivers in northern Victoria,[42] the first such assessment in Victoria, found at least 110 ecological vegetation classes across 224,000 hectares and 124 rare or threatened plant taxa and 62 threatened vertebrate fauna taxa (excluding fish) depend on flooding. For about 30 ecological vegetation classes, the critical interval to maintain healthy ecosystems is one flood event about every two years.

Victorian floodplains have suffered widespread and increasing decline due to regulation of river flows preventing pulse flooding. Currently, large overbank flows occur only when water storages are full, and for most of the Murray River floodplain the frequency of small and moderate floods has declined by two-thirds or more compared to the natural flood frequency.[43] As a consequence, growing numbers of river red gums and black boxes are dying or dead, river red gum growth rates have declined and acid sulphate soils have developed due to the drying of once-permanent wetlands. In 2010, an estimated 79% of the area of river red gum, black box and other box communities in 'the Living Murray icon sites' was in a stressed condition (moderate to severely degraded condition).[44]

Environmental watering programs (discussed further below) tend to focus only on the largest floodplain blocks ('icon' sites) and a small set of values such as colonial nesting waterbirds. The reason for their selection over other sites is often unclear or based on the potential to use engineering works as an alternative to buying water licences. This is based on the often flawed notion that the same, limited water supply can be divided further for multiple uses, and is being used to 'offset' or justify reduced allocation of water to wetlands in the Murray-Darling Basin.

Environmental watering programs

The Victorian environmental watering program has been helping to bring water to Living Murray icon sites such as Gunbower Forest, an internationally recognised Ramsar wetland and one of the most significant remaining areas of River Red Gum forest in Australia. The Reflections 2018-19 report and the North Central Catchment Management Authority's Program Delivery Executive Manager, discuss the benefits that the Victorian environment watering program has had on the Gunbower Forest:

"Before regulation of the River Murray, Gunbower Forest would have flooded roughly seven out of every 10 years, with large widespread flooding lasting for up to six months

[42] Fitzsimons JA, Peake P, Frood D, Mitchell M, Withers N, et al (2011). Flooding requirements for biodiversity values along the Victorian floodplain of the Murray Valley. The Victorian Naturalist 128: 48–85

[43] Peake P, Fitzsimons J, Frood D, Mitchell M, Withers N, et al (2011) A new approach to determining environmental flow requirements: Sustaining the natural values of floodplains of the southern Murray-Darling Basin. Ecological Management & Restoration 12: 128-37

[44] Cunningham S, Griffioen P, White M, Mac Nally R (2011). Mapping the Condition of River Red Gum (Eucalyptus camaldulensis Dehnh.) and Black Box (Eucalyptus largiflorens F.Muell.) Stands in The Living Murray Icon Sites. Stand Condition Report 2010. Murray - Darling Basin Authority, Canberra

in four of those seven years. In the past 22 years, between natural floods and allocated water for the environment, key sections of the forest floodplain have been inundated only eight times – stretching the tolerances of wetland and floodplain plants to breaking point… even in a dry year such as 2018, the forest would still have received water in spring if Murray River flows weren't regulated by dams and weirs… Thanks to the watering, understorey vegetation in the red gum forests and box woodlands is in the healthiest condition it has been since we began monitoring it in 2005, though it still has some way to go towards making a full recovery. The Forest is also an incredibly important refuge site for waterbirds, particularly when such large areas of New South Wales and Queensland are so dry."

These issues are also very evident in Barmah National Park and its (once extensive) Ramsar-listed wetlands – the largest floodplain wetlands in the state. Barmah was facing the extinction of its characteristic Moira Grass floodplains community if no action was taken to improve management. There have recently been significant improvements in Moira grass communities in Barmah Forest due to a combination of water for the environment and fenced areas which exclude grazing from feral horses and other pest animals.

Both Gunbower Forest and Barmah National Park are among 9 sites for a proposed "Victorian Murray Floodplain Restoration Project" as a "Sustainable Diversion Limit Adjustment Mechanism" where infrastructure such as pumps, weirs, levees and regulators will be constructed to artificially and directly irrigate floodplains in an attempt to offset the need for Commonwealth buy-backs of water for the environment that would ordinarily be required to overflow the river. The fact sheet for the Gunbower National Park project[45] states that the project "will improve environmental outcomes using less water than a natural flood while keeping more irrigation water in the region" and explains that "without this, major releases from storages would be needed to raise river levels high enough for it to spill into wetlands and overbank floods onto the floodplain. Using the proposed infrastructure saves water; keeps it in the region and aims to achieve similar environmental benefits that natural flooding provides."

However, the benefits of such projects come with a highly limited consideration of ecological values and there will be many unascertained ecological impacts that will certainly arise if floodplains are treated as separate to the river and if the river is prevented from overflowing for extended periods of time. There are many ecological and geomorphological processes that depend on river waters rising, flooding and falling as well all the ecological connections that the flow of water provides. There are also questions in regards to who will be responsible for ongoing maintenance, management and monitoring of such projects within National Parks and how will it be supported and funded.

[45] https://www.vmfrp.com.au/projects/gunbower-national-park/

Scientific reviews of freshwater ecosystems are needed

Victoria requires an independent comprehensive state wide scientific review of freshwater dependent ecosystems. There is an urgent need to reduce water extractions to sustainable levels and restore natural flow variability. The conservation of Victoria's high value rivers and wetlands can be improved by strengthening protection in existing protected areas and revamping the Heritage Rivers framework. Freshwater habitats require a much higher level of protection that is consistent with their ecological values. For further discussion and recommendations pertaining to wetland degradation see section 9 of this submission.

Identifying all flood-dependent natural values and estimating their water requirements should be a high priority for all Victoria's river basins with flood-dependent biota. Floodplain watering strategies should be based on the flooding requirements of the entire range of terrestrial and aquatic species, and be focused on maintaining natural values including for the following:[46]

- sites likely to assist the recovery of threatened species
- sites of high species richness
- sites for colonial breeding species
- sites that may be in poor condition at present but would recover with watering and be likely to support significant natural values
- habitat corridors – such as flight paths for the daily movements of Superb Parrots between breeding and feeding areas

Freshwater fishes under threat

In a recent study investigating the Australian freshwater fishes at the most imminent risk of extinction within the next two decades, 10 out of 22 species were Victorian.[47] Victoria has already lost 3 freshwater fishes that we know of and significant conservation action is urgently needed to prevent further losses. 29 species are listed under the FFG Act's threatened list (prior to upcoming amendments) and a number of others are listed on the advisory list.

The poor status of native fish in Victoria is a telling indication of the pervasive deterioration of freshwater habitats. Key threats to our native fishes are highly altered water regimes, introduced exotic fish species, and man-made barriers impeding water flow and movement of fish and other freshwater fauna.

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[46] Fitzsimons JA, Peake P, Frood D, Mitchell M, Withers N, et al (2011). Flooding requirements for biodiversity values along the Victorian floodplain of the Murray Valley. *The Victorian Naturalist* 128: 48–85

[47] Lintermans Mark, Geyle Hayley M., Beatty Stephen, Brown Culum, Ebner Brendan C., Freeman Rob, Hammer Michael P., Humphreys William F., Kennard Mark J., Kern Pippa, Martin Keith, Morgan David L., Raadik Tarmo A., Unmack Peter J., Wager Rob, Woinarski John C. Z., Garnett Stephen T. (2020) Big trouble for little fish: identifying Australian freshwater fishes in imminent risk of extinction. Pacific Conservation Biology. https://doi.org/10.1071/PC19053

Eight exotic fish species have established in Victorian waterways including Brown Trout, Rainbow Trout, European Carp, Goldfish, Tench, Roach, Redfin Perch and Gambusia (mosquitofish). All were introduced for fishing, except mosquitofish which were introduced for biological control of mosquitoes (for which it is of little value). The impacts of invasive fish include domination of habitat and exclusion of native fish, predation of native fish and frogs, damage to aquatic habitats and spread of disease.

Predatory introduced trout have been released into almost all waters of the Murray-Darling Basin thought to be suitable for them. And every year, for the benefit of recreational fishers, the Victorian government releases millions of hatchery-bred fish into the environment, including the predatory introduced rainbow trout and brown trout. Some native fish species are also released, mostly golden perch and Murray cod.

Stocking no longer occurs in some streams and dams where threatened species are known to occur. But more research and monitoring of the impacts of stocking of both exotic and native fish is needed.

Brown trout and rainbow trout impose substantial predation pressure on native fish and frog larvae, and have been implicated in the decline of small native fish, especially galaxiids. Victoria has many endemic galaxiids with tiny ranges, most threatened by trout, and it is suspected that undiscovered species may have already been lost due to predation by introduced trout. Brown trout are also suspected of contributing to declines of trout cod and Macquarie perch.

The highly regulated rivers of Victoria provide lots of still water habitats that have allowed carp to become the dominant freshwater fish in many Victorian waterways (this is also a significant concern about the Victorian Murray Floodplain Restoration Project). Adult carp are the largest exotic fish in Victoria and have no natural predators. Unfortunately, potential native predators of juvenile carp have suffered massive declines. Carp displace native fish, increase water turbidity and damage plants. They are superabundant in the Murray-Darling Basin where they can achieve densities of up to 1000 fish per hectare. In the Murray-Darling system as whole, native fish populations are estimated to be at 10% of their pre-British colonisation levels, and most of the fish biomass consists of introduced species.

The movement of freshwater fish and other fauna is greatly impeded by man made barriers such as weirs, dams and other constructions. Migration is an essential part of the life cycle of at least 18 native fish species. Golden perch, for example, spawn in the flooded reaches of lowland rivers, use floodplains as nurseries, and then disperse, sometimes for more than 2000 kilometres. All aquatic fauna is likely to be affected in various ways – due to reduced availability of accessible habitat, ecosystem changes resulting from exclusion of migratory species, the loss of recolonisation opportunities, fish kills, increased predation and fishing pressure and reduced genetic diversity. A few

barriers have a benefit in preventing movement of harmful introduced fish and can protect threatened galaxiids from predatory trout.

Alterations to natural seasonal flow regimes can occur when large volumes of water are released for irrigation during summer and autumn when flows would typically be lower, and less water is released during winter when flows would typically be greater. This is increasingly a problem in the lower Goulburn River. Very high summer flows due to water trading in recent years is impacting on species such as Murray Cod. The Arthur Rylah Institute have detected a 30% reduction in young of year Murray cod during this high flows which are also causing erosion of the lower bank and the loss of trees and vegetation that stabilise the river banks. The loss of fish habitat and increased erosion means a muddier river and higher rates of siltation of deep refuge pools. Both environmental groups and recreation fishers have been concerned about the impacts of this trade in water. See: https://www.vrfish.com.au/2020/05/07/saving-the-lower-goulburn-before-its-flushed-away/

Thermal pollution is another threat to freshwater fish and other fauna. This occurs as a consequence of regulated flows when water discharged from the bottom layer of a dam is substantially colder than the river or stream into which it is released. Many native fish require particular temperatures for spawning, and cold water releases can prevent or slow reproduction. They can reduce growth rates of young animals, reduce overall biological production, and displace temperature-sensitive species.

In addition to native fishes, high proportions of other freshwater groups are also threatened including about two thirds of crayfish and turtles and more than a third of frogs. Victoria is hotspot for endemic crayfish, at least 23 are unique to Victoria, and many species are threatened with extinction. Because of their limited dispersal capacity, small ranges, low rates of reproduction and slow maturation, crayfish are vulnerable to decline.

Riverside rescue – the success of the Regional Riparian Action Plan

Of the estimated 170,000 kilometres of river frontage in Victoria, about 30,000 kilometres are Crown land (about 100,000 hectares). The remaining riparian land is a mix of privately owned and other types of public land (e.g. in national parks). At present, about 17,000 kilometres are managed by the adjacent landholders, under about 10,000 agricultural licences.

Riparian land plays a vital role in influencing river health, water quality and biodiversity across landscapes. Intact native riparian land and vegetation maintains river bank structure, controls erosion, filters nutrients and sediments from water, buffers adjoining land uses, and provides shade and temperate control to freshwater habitats. Riparian lands also form vital biolinks and habitat refuges. The protection and restoration of

river, stream and creek side vegetation is highly beneficial for improving ecological connectivity and conserving biodiversity.

Major drivers of degradation are land clearing, alterations to hydrology, altered water regimes and salinity, invasive species and stock access. Stock access to riparian zones continues to be the major pressure on riparian vegetation statewide. Domestic stock, particularly cattle, favor riparian frontages and if uncontrolled they will spend much of their time along stream banks and in the water and cause much damage. Cattle cause loss of riparian vegetation, damage of river banks, reduction in biodiversity, and increased nutrient inputs into rivers and downstream storages. There is also a potential risk to human health due to pathogens in cattle faeces potentially being introduced into water sources.

Fortunately, efforts to control stock access and restore vegetation have helped to halt decline and restore some of the ecological functions of riparian zones. A key state government program over the last four years has been the Regional Riparian Action Plan. It has been successful in working with landholders to manage these areas and has been delivering tangible improvement to public and privately-owned riversides.

The current Government allocated $10 million in 2015/16 and a further $30 million from 2016/17 to 2019/20 to implement the plan. This funding is for on-ground riparian works such as stock management fencing, revegetation, weed management and provision of infrastructure to support off-stream stock watering. The program should continue to be implemented and funded long term as a core part of government functions.

The Riparian Intervention Monitoring Program (RIMP) is a statewide, long-term program developed by DELWP that aims to assesses the impact and effectiveness of riparian management. RIMP examines three common management interventions used to improve riparian vegetation condition or to manage bank erosion.
1. weed control
2. replanting of native vegetation
3. fencing to restrict livestock access

ARI is working with Catchment Management Authorities (CMAs), landholders and botanists to establish monitoring sites on riparian land to assess changes in vegetation condition and bank stability attributes in response to these interventions. Sites are being monitored before, and several times after, interventions are undertaken.

The initial results from a fairly small number of sites are promising. They show that where works were undertaken the following significant changes in vegetation condition attributes were found:[48]

[48] https://www.ari.vic.gov.au/research/rivers-and-estuaries/riparian-intervention-monitoring-program

- total native vegetation cover increased ~2-fold;
- native species richness increased ~1.5-fold;
- planted and natural woody recruits increased ~9-fold;
- woody weed abundance decreased to almost zero at most sites;
- bare ground cover did not increase as found in unmanaged sites.

The positive outcomes of riparian restorations could help address a number of threatening processes listed under the *Flora and Fauna Guarantee Act 1988* including:

- Alteration to the natural flow regimes of rivers and streams.
- Alteration to the natural temperature regimes of rivers and streams.
- Degradation of native riparian vegetation along Victorian rivers and streams.
- Habitat fragmentation as a threatening process for fauna in Victoria.
- Increase in sediment input into Victorian rivers and streams due to human activities.
- Removal of wood debris from Victorian streams.
- Soil erosion and vegetation damage and disturbance in the alpine regions of Victoria caused by cattle grazing.
- Wetland loss and degradation as a result of change in water regime, dredging, draining, filling and grazing.

An extension and expansion of the Regional Riparian Action Plan will support jobs and create positive ecological outcomes, both at a time when our nation needs it most. Nine regional Victorian Catchment Management Authorities (CMAs) have already worked with over 1,000 landholders and farmers and about 200 Traditional Owners, Landcare, angling, school and other community groups.

Riparian zones are important ecosystems in their own right. Usually the most nutrient-rich and dynamic part of a landscape, they are often areas of high productivity, and offer unique habitats for riparian specialists. Consequently, while riparian zones may only represent a small proportion of the landscape, they often have disproportionately high biodiversity values and support distinct communities. Several ecological vegetation classes in Victoria occur solely in riparian areas.

If it were not for riparian restoration and revegetation works in the 1980's, Victoria's bird emblem, the beautiful, endemic and critically endangered Helmeted Honeyeater could very well have been extinct in the wild today. The bird is totally dependent on riparian vegetation with a dense shrub layer for nesting.

Well-managed riparian land is the key to strengthening biolinks and increasing biodiversity in many parts of Victoria. It must be a priority of all governments to vigorously seek to improve the condition of these valuable areas of public land.

Recommendations

The VNPA recommends that the Committee recommend to the Victorian Government the following:

- undertake bipartisan action to reduce water consumption and restore more natural flow regimes to rivers – for the health of rivers, riparian and floodplain ecosystems and to protect the water security of Victoria's regional and rural communities
- optimise protection of high value, largely intact freshwater ecosystems by creating freshwater reference areas under the *Reference Areas Act 1978* – they provide a unique opportunity to serve as baseline reference areas and should be strictly protected
- continue the implementation of the successful Regional Riparian Action Plan with long term funding as a core part of government functions – to provide significant biodiversity conservation action, create important biolinks, improve river water quality, and provide significant regional job opportunities
- a Victorian Environmental Assessment Council investigation or similar into the conservation value of riparian vegetation adjacent to public land – to identify opportunities for better management and to help consolidate the reserve system
- conduct an independent comprehensive state wide scientific review of all freshwater dependent ecosystems – including the impacts of fish stocking and the expected impacts of Sustainable Diversion Limit Adjustment Mechanism projects
- DELWP to improve and update the following action statements pertaining to river-and-stream-related threatening processes listed under the *Flora and Fauna Guarantee Act 1988* (these were prepared in 2003 and are now outdated; they need to be updated to reflect new programs and legislation and to set out what is intended to be done going forward to manage the threatening processes degrading Victoria's river, stream and riparian habitats):
    - Alteration to the natural flow regimes of rivers and streams
    - Alteration to natural temperature regimes of rivers and streams
    - Degradation of native riparian vegetation along Victorian rivers and streams
    - Increase in sediment input into Victorian rivers and streams due to human activities
    - Introduction of live fish into waters outside their natural range within a Victorian river catchment after 1770.
    - Prevention of passage of aquatic biota as a result of the presence of instream structures.
    - Removal of wood debris from Victorian streams.

- DELWP to prepare action statements for the following relevant threatening processes (these are yet to be prepared and action statements are a mandatory requirement under the FFG Act):
    - Input of organotins to Victorian marine and estuarine waters.
    - Input of petroleum and related products into Victorian marine and estuarine environments.
    - Input of toxic substances into Victorian rivers and streams.
    - Introduction and spread of Spartina to Victorian estuarine environments.
    - The discharge of human-generated marine debris into Victorian marine or estuarine waters.
    - Wetland loss and degradation as a result of change in water regime, dredging, draining, filling and grazing.

9. Wetland degradation and the need for better protection

A potentially threatening process listed under the *Flora and Fauna Guarantee Act 1988* is 'Wetland loss and degradation as a result of change in water regime, dredging, draining, filling and grazing'. Despite action statements being a mandatory requirement of the FFG Act, an action statement is yet to be made (approaching two decades) to set out what is intended to be done to mange wetland loss and degradation in Victoria.

The Scientific Advisory Committee's final recommendation[49] relating to wetland loss and degradation had listed common threats to Victorian wetlands and included:

- dredging, draining and/or filling for conversion to agricultural, industrial or residential uses
- population growth and urban developments
- river regulation and water extraction for agriculture and industry
- sand and gravel mining and mineral extraction activities
- nutrient enrichment
- water pollution
- chemical treatments used for pest control (eg. mosquitoes)
- over-grazing and unimpeded access for stock
- damming to raise water levels

It was also noted that the above threats result in any number of the following:

- loss of wetland dependant flora and fauna
- loss and degradation of wetland habitat
- a reduction in size or period of inundation of remaining wetland habitat
- increased separation and isolation of remaining wetland habitat by intervening land use
- deterioration in water quality
- increased occurrence of algal blooms
- reduced supply of suitable water
- sedimentation
- reduced abundance and diversity of native plants and animals
- shifts in species dominance
- changed hydrologic regimes – eg. permanent inundation rather than a natural cycle of wet and dry periods
- an increased occurrence of pest animal and plant species
- disrupted waterbird breeding cycles eg. early cessation of breeding as a result of reduced flooding
- reduction in the frequency of breeding and migration cues for in-stream fauna
- increased salinity
- alteration of natural wetland temperature regimes

[49] Flora and Fauna Guarantee – Scientific Advisory Committee final recommendation on a nomination for listing. Wetland loss and degradation as a result of change in water regime, dredging, draining, filling and grazing. Nomination No. 650. 11 November 2003.

- alteration of natural water chemistry of wetlands eg. chemical poisoning

With the majority of Victoria's wetland losses having occurred on private land, and with about 68% of remaining natural wetlands occurring on private lands, the threat that land clearing, cropping and grazing pose to wetland and floodplain ecosystems is a significant ongoing conservation issue in Victoria. Protection for these wetlands under Victoria's planning framework is inconsistent, usually non-specific, and often nonexistent.

Wetlands on private land include part of 10 Ramsar-listed wetlands and 3600 nationally important wetlands. Even the internationally significant Ramsar wetlands are not fully protected – only about half of their area in Victoria is in land tenures designated for conservation, and activities like duck hunting are permitted at many sites.

The bias to set aside terrestrial ecosystems for nature conservation undervalues the linkages between freshwater and terrestrial systems, and the partial protection of wetlands and watercourses means they are highly vulnerable to degrading processes outside park boundaries. This is important because a primary determinant of wetland condition is the condition of the surrounding catchment area.

There is also a strong bias in the types of wetlands protected, mostly due to the historical conversion of prime agriculture areas to freehold title, leaving little of many freshwater types in public ownership. For example in the Wimmera, the once abundant, shallow, less permanent wetlands are poorly represented, probably because their intermittent inundation meant they were more easily converted to agriculture than permanent wetlands.

Without action, wetlands are likely to be further degraded by grazing and cropping. Better protection and management of wetlands in Victoria is needed to halt and reverse degradation.

A first step is comprehensive assessment of wetland health, land management and threats on both public and private land. The last major independent state wide assessment of wetlands was probably carried out almost 30 years ago as part of the Land Conservation Council (1991) Rivers and Streams Special Investigation.

Ramsar wetlands under threat

In 1975 Australia signed and ratified the *Convention on Wetlands of International Importance especially as Waterfowl Habitat* (known as the Ramsar Convention), and was one of the first nations to sign up to the treaty. The Convention encourages the designation of sites containing representative, rare or unique wetlands, or wetlands that are important for conserving biodiversity – particularly for migratory birds. The

Convention provides a framework for national action and international cooperation for the conservation and wise use of wetlands and their resources.

Australia has 66 sites designated as Wetlands of International Importance. 12 of these sites are in Victoria and include places like the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula, the Gippsland Lakes, Western Port, the Kerang Lakes, Gunbower Forest and Barmah National Park.

A recent parliamentary inquiry report into whether there is an effective regime to manage Victoria's Ramsar sites and protect them from decline found that: [50]

- 31% of the 281 management actions listed in the Department of Environment Land Water and Planning's Ramsar management system database, have not commenced despite most Ramsar management plans being developed in 2014; 63% percent of activities have commenced and 6% have been completed.
- Many management plans have not been updated to adhere with the management principles for Ramsar sites.
- There are data gaps and potential for improvement in data coordination.
- At 10 of the 12 Ramsar sites there are outdated Ecological Character Descriptions (important for establishing limits of acceptable change for all critical components, processes and systems).
- There are inadequate funding arrangements to maintain long-term Ramsar management programs for implementation, monitoring, evaluation, reporting and improvement.
- At 10 of the 12 Ramsar sites, there is a lack of compliance with the Convention's requirement to update Ramsar Information Sheets which are important for assessing the status and trends of Wetlands of International Importance regionally and globally.

This poor oversight and management record is compounded by imminent plans to build a new large scale Liquid Natural Gas (LNG) Import Terminal Facility (i.e. an LNG port) in Western Port Bay, one of our most precious Ramsar wetlands. See more in our recent Park Watch article Too sensitive and precious to risk.

Wetland cropping

The 2016 DELWP Technical Report on the Current and Future Risks of Cropping Wetlands in Victoria[51] explains that "…Cropping in Victoria is generally a dryland activity, with broadacre production of grains such as wheat and barley, covering over 3 million

[50] Parliament of Victoria Public Accounts and Estimates Committee (2020). Inquiry into Auditor-General's Report No. 202: Meeting obligations to protect Ramsar wetlands 2016. Victorian Government Printer.
https://www.parliament.vic.gov.au/paec/inquiries/article/4521

[51] DELWP (2016). Current and Future Risks of Cropping Wetlands in Victoria Technical Report.
https://www.water.vic.gov.au/__data/assets/pdf_file/0025/52783/Current-and-Future-Risks-of-Cropping-Wetlands-in-Victoria-Technical-Report-Final.pdf

hectares. These crop species are intolerant of long-term waterlogging and high salinities. Therefore, wetlands that are most likely to be exposed to cropping are frequently dry, generally shallow, and fresh to brackish. In addition, cropping does not occur on very steep or heavily forested land, so wetlands at risk identified in this study usually occur on plains areas with endorheic (internal) drainage patterns". The report also notes that smaller wetlands are more likely to be cropped than larger wetlands.

The report continues.. "There are multiple ecological consequences from cropping of wetlands. Cropping in wetlands has been found to reduce the germination of plants from the seed bank, and reduce the diversity of plants that establish. Invertebrate diversity and abundance can be impacted by the physical changes associated with cropping, as well as changes in hydrology that occur when wetlands are modified to enhance their value as cropland. Chemical and physical disturbances associated with cropping wetlands can modify food availability and reduce the numbers of amphibians, reptiles and mammals that use dry wetlands as a refuge. Cropped wetlands support fewer waterbirds that rely on a mosaic of wetlands for feeding and breeding."

"…wetlands are highly vulnerable to cropping because a large number of their attributes (soil, seed bank, vegetation, invertebrates, vertebrates, water regime, water quality) and processes (germination, establishment, trophic interactions) are sensitive to the physical and chemical disturbances applied in cropping. Therefore, although temporary wetlands are naturally resilient to disturbance, repeated and widespread cropping is likely to have a negative effect on their condition, and therefore the values and services they provide. Cropping has the capacity to remove shallow, temporary wetlands from the landscape altogether."

In South East Grampians and West Wimmera, the report found that "…changes in cropping practices and machinery that have occurred in the past decade (e.g. rock removal, direct-drill sowing, landscape clearance, use of airseeders with 20 m widths, sprayers with 33 m span), have increased the amount of cropping in wetlands in these regions… with nearly 45 % of wetlands sampled in the South East Grampians cluster of wetlands impacted by cropping to some degree, compared to an estimate of 2% in 2010. …In contrast, the percentage of wetlands cropped in the West Wimmera has remained relatively stable since 2010, at approximately 20 %."

Across Victoria, the 2018 State of the Environment Report notes that the last Index of Wetland Condition found that cropping occurred in 7.5% of the 8,489 wetlands assessed. "An examination of key attributes for wetlands where cropping was recorded found that cropping appears most likely to occur in palustrine, fresh, periodically inundated wetlands with an episodic or seasonal water regime. The nationally, critically endangered ecological community of Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains is an example of a wetland community that occurs in Victoria in wetlands with these attributes. This data indicates that cropping in wetlands

is reasonably common and that certain types of wetlands are more vulnerable than others to the impacts of cropping." [52]

Wetland grazing

In the last index of wetland condition assessment[53], grazing was the most prevalent threat for high-value wetlands, occurring at more than half those surveyed (and driving vehicles on the wetland at more than one third). Grazing was the principal threat source contributing to a degraded water quality threat at 15% of wetlands. Grazing was more prevalent at wetlands on private land than on public land.

Grazing severely threatens riparian and floodplain habitats and wetlands, driving vegetation loss, land degradation and poor water quality. Fencing to manage livestock access is one of the most common management actions for wetland protection.

Cattle trampling and grazing destabilise the banks of wetlands and waterways and promote erosion. Cattle spread weeds, and damage and prevent regeneration of native vegetation. Their preference for particular plants changes the composition, structure and function of riparian and wetland vegetation. Cattle dung and urine are a source of nutrients and, in combination with increased turbidity, they degrade water quality and promote the growth of algae and pathogens, which are a problem for human health as well as biodiversity. High turbidity can kill fish, reduce growth rates and increase disease.

DELWP, Catchment Management Authorities and Melbourne Water are investing significant resources in wetland management, including undertaking weed control, revegetation and fencing to manage livestock access.

DELWP is currently delivering a Wetland Intervention Monitoring Program (WIMP) in collaboration with CMAs, landholders and scientists, as a state-wide program for assessing the effectiveness of management activities commonly applied in wetlands[54]. The results from the first phase of the program are intended to help identify ways to improve grazing management guidance and better target future government investment in grazing management for healthy wetland outcomes. With the WIMP program was initially set to run from 2017 to 2020. Perhaps now is a good time for DEWLP to create an action statement under the *Flora and Fauna Guarantee Act 1988* to outline Victoria's intended actions to manage the listed threatening process of wetland loss and degradation in Victoria.

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[52] https://www.ces.vic.gov.au/sites/default/files/SoE2018ScientificAssessment_B.pdf

[53] Papas P. & Moloney P. (2012). Victoria's Wetlands 2009–2011: Statewide Assessments and Condition Modelling, Arthur Rylah Institute for Environmental Research Technical Report Series No. 229. Victorian Department of Sustainability and Environment

[54] https://www.ari.vic.gov.au/research/wetlands-and-floodplains/wetland-intervention-monitoring-program

Recommendations

The local and international significance of Ramsar sites needs far more acknowledgment and we ask that the Government consider the recommendations of the recent Public Accounts and Estimates Committee parliamentary inquiry, (the full inquiry report can be accessed here) particularly:

- Establish long-term funding for Ramsar site management so that monitoring programs and appropriate management can be maintained, to protect migratory birds and other species as well as our international reputation.
- Implement the Yorta Yorta joint management plan for Barmah National Park, especially in relation to management of feral animals and weeds. A commitment to these objectives allows the Environmental Water Holder to implement a timely flooding regime for the Barmah Ramsar wetlands.
- Stopping large scale development in Ramsar sites, such as the proposed AGL LNG port in Western Port Bay.

Further, the VNPA recommends that the Committee recommend to the Victorian Government the following:

- the enforcement of a 'wetlands overlay' for planning schemes that prohibits development that would destroy or degrade high-value wetlands – high-value wetlands to be strictly protected would include all Ramsar sites
- the preparation of an action statement under the *Flora and Fauna Guarantee Act 1988* (which is mandatory and long over-due) to set out what is intended to be done to manage the listed threatening process of wetland loss and degradation – the action statement should incorporate Ramsar wetlands and wetlands on both private and public land and the intended actions should address the management of a range of threats including grazing, cropping, vehicles and duck hunting
- undertake an independent comprehensive assessment of wetland health, land management and threats on both public and private land, by a body such as Victorian Environmental Assessment Council or similar

10. Protecting marine and coastal ecosystems

Australia's southern waters, particularly in the southeast, are among the most species-rich temperate seas in the world and even host many more unique species than the Great Barrier Reef. The level of endemicity in many marine groups is close to 90%, and at least 12,000 marine species call Victoria home.

In regards to our coasts, of the 300 ecological vegetation classes described for Victoria's bioregions, 95 occur within 500 metres of the state's shoreline, with 34 found only on the coast. Almost two-thirds (62%) of ecological vegetation classes within 500 metres of the shoreline are threatened within at least one of the subregions in which they occur.

Our marine and coastal environments are often our protectors for our way of life by the sea, acting as buffers, protecting against erosion and weather events, controlling our climate and sequestering carbon, as well as providing food, and enjoyment for many.

We know that national parks are one of the best ways to protect biodiversity, but we still have a long way to go to achieving adequate protection for our marine and coastal ecosystems in Victoria.

90% of our coastline is in public ownership, of which 70 per cent is protected under the National Parks Act as national, marine or coastal parks. Almost 30 per cent of the coastline is in areas known as coastal reserves.

Threats

A lack of protection is not all that risks these areas – development pressures, pollution, industrialization, habitat loss, overexploitation (fishing), and a changing climate are some of these risks. Marine spatial planning, a tool for proper planning of our marine and coasts needs to be prioritised to holistically plan for and manage threats across the board, as well as stopping inappropriate developments and uses along our coast.

172 species and four communities that occur in Victorian marine waters have been given conservation listing under state or Commonwealth legislation or international agreements, however this is an underestimate due to less investment compared to the terrestrial space.[55]

Marine protected areas (MPAs)

For our marine environment, the level of protection is very poor. It is now 17 years since Victoria established what was the world's first highly protected network of marine

[55] Assessment of the values of Victoria's marine environment 2019. Victorian Environment Assessment Council.

national parks and sanctuaries. But as the years have passed it has become recognised as inadequate and other Australian jurisdictions have surpassed it.

Although we have a network of 13 marine national parks and 11 smaller sanctuaries, a mere 5.3% of our waters in Victoria are covered in no-take areas – the lowest of any Australian state, well below international benchmarks for marine protected areas. For more information see our latest literature review of marine protected areas here VNPA Marine Parks Report 2019.

The further six partially protected MPAs in South Gippsland, established between 1984 and 1991 prior to the ECC investigation and not subsumed into the no-take areas, lack goals, objectives, management plans and systematic monitoring. Although they are assigned IUCN VI, which qualifies them as MPAs under the lowest global benchmark, the Aichi Target 11 of 10%, they allow recreational and commercial fishing and it could be argued that they are parks in name only or 'paper parks'[56]. All six multiple-use marine protected areas are reserved under the *Crown Land (Reserves) Act 1978* and included in Schedule 4 of the *National Parks Act 1975*.

Internationally, the UN's Sustainable Development Goal 14, 'Conserve and sustainably use the oceans, seas, and marine resources' has set the bare minimum for high-level protection at 10% of marine habitats, double the Victorian percentage, while the long term aspiration of the IUCN is for at least 30% in no-take.

Currently the Andrews Government has a formal policy ban on creating new marine national parks and sanctuaries, even though expert bodies like VEAC have shown that there are clear gaps in our network of marine national parks and sanctuaries, and recommend that they be filled.

A 2010 review of Victoria's MPAs found that they did not meet the NRSMPA's key principles of comprehensiveness, adequacy and representativeness, while the Victorian Environment Assessment Council in 2017 concluded that the "existing system of no-take marine protected areas has some gaps in representation, and individual marine protected areas may not meet the adequacy criterion". Both the 2013 and 2018 Victorian State of the Environment reports highlighted the limited protection afforded by the current MPAs.

The *Marine and Coastal Policy 2020* also suggests the need to enhance Victoria's valuable MPAs *(page 32):*

[56] Marine protected area review 2019. https://vnpa.org.au/wp-content/uploads/2020/05/VNPA-Marine-Parks-Report-2019.pdf

'Maintain, enhance and monitor a comprehensive, adequate and representative system of well-managed Marine and Coastal National Parks, sanctuaries, nature conservation reserves and coastal Crown land reserves.'

VNPA has done the work to determine where the new areas of marine protection are most deserving, shown from our *Nature Conservation Review 2014*, which lists the 20 highest priorities identified by Australian Marine Ecology to improve Victoria's marine protected area network *(page 67).*[57]

No-take MPAs are the most effective means of achieving the highest level of conservation benefits – the reason for their establishment – but they should be used within a suite of conservation and marine management measures, including marine spatial planning.

Marine spatial planning

Marine spatial planning is a tool that can have significant benefits including proactively identifying and reducing potential conflicts between uses, and between uses and natural values, and the protection of economic, social and cultural values linked to the marine environment.

Marine spatial planning, needs to be prioritised to holistically plan for and manage threats across the board, as well as stopping inappropriate developments and uses along our coast, and should include marine protected areas as an integral tool within it.

As set out in the *Marine and Coastal Policy 2020,* the Marine Spatial Planning Framework, sets out a process to plan for Victoria's marine environment in an integrated, coordinated, sustainable and equitable way. Planning and management of these uses has been conducted historically on a sector-by-sector basis, which has proven to not have marine biodiversity conservation at heart.

The Marine Spatial Planning Framework needs to translate from a framework into actually undertaking a marine spatial plan. This will require prioritisation from government and incentives for its implementation. Done right, it can be an effective tool to effectively govern our valuable marine commons.

Any type of marine planning and management must include engagement with Traditional Owner groups. The VNPA support co/joint management of national parks, and this should extend to our marine and coastal areas.

[57] Nature Conservation Review 2014. Victorian National Parks Association. http://vnpa.org.au/wp-content/uploads/2014/02/NCR-Chapter2.pdf

Any new policies and strategies under the *Marine and Coastal Act 2018* should be used to establish marine spatial plans as guides for planning regimes which protect high conservation marine areas from developments such as dredging or over fishing. These should be expanded in Victoria.

Coasts

We are losing coastal nature because of climate change and coastal, urban, port and industrial development driven by a rapidly growing population.
VNPA's report, The coast is unclear, reveals that of the 95 habitats within 500 metres of the shoreline, more than 70% are either endangered or vulnerable.
These threatened coastal habitats have become fragmented and vulnerable to pressures such as:

- invasive plants and animals
- livestock grazing
- expansion of coastal settlements
- industrial development
- coastal infrastructure
- altered coastal processes.

Although significant areas of the coastline has been given protection in national, state and coastal parks, coastal nature is in need of coastal protection on both private and public land.

The failure to deal with these issues is largely the result of Victoria's complex, disintegrated and ineffective coastal planning and management framework.

VNPA's The Coast is Unclear Report summarises a number of key finding and recommendations to reverse the decline in coastal nature, which are summarised on pages 6-17 here: http://vnpa.org.au/wp-content/uploads/2017/02/Pr-CN-The-coast-is-unclear-29022014.pdf

Recommendations

For better management and nature conservation in our marine and coastal areas, the VNPA recommends that the Committee recommend to the Victorian Government following:

- the removal of the ban on new marine national parks
- the creation of new marine national parks and sanctuaries
- an independent review, of current Victorian marine national parks and sanctuaries (and other marine protected areas) against the NRSMPA's key principles of comprehensiveness, adequacy and representativeness, as

recommended by the Victorian Environmental Assessment Council's Statewide Assessment of Public Land Assessment, 2017

- the creation of a state-wide ecosystem based marine spatial plan and that Victoria's marine national parks and sanctuaries be considered as a key conservation pillar in the current Victorian process of marine spatial planning
- that the Victorian government invest adequate funding into marine science and into management of our marine national parks and sanctuaries
- stopping large scale development in RAMSAR sites, such as the proposed AGL Liquid Natural Gas (LNG) Import Terminal Facility (i.e. an LNG port) in Western Port Bay
- the prohibition of commercial racehorse training along any of Victoria's beaches, including the Belfast Coastal Reserve
- that the Victorian Government implement either the accepted or proposed recommendations from the Victorian Environment Assessment Council in relation to the planning and management of marine parks (the VEAC Coastal Reserves Assessment 2020, VEAC Public Lands Assessment 2017, and the VEAC Marine Investigation 2014)

11. The role and need for national parks and protected areas

Permanently protected habitats on public land form the backbone of our society's efforts to conserve our natural heritage and its rich biodiversity.

Victoria's national parks and conservation estate, areas protected by legislation, are a key community asset. They provide great benefit to people as well as to nature, but in that there lies a tension.

It is well established that the most effective (though not necessarily the only) measure to protect biodiversity is a well-managed system of national parks and other protected areas.[58] With around 100,000 terrestrial native species in Victoria (and an additional wealth of marine species), the protection of adequate areas of each habitat type is the only way to ensure we pass this remarkable heritage on to future generations.

Australia was among the first nations to endorse the international *Convention on Biological Diversity*, signing it in 1993 and ratifying it in 1994. Nearly 200 countries are now signatories to this important treaty which, among a number of objectives, asks countries to set up a representative conservation reserve system. In Article 8 of the convention, commitments include:[59]

- Establish a system of protected areas or areas where special measures need to be taken to conserve biological diversity.
- Promote the protection of ecosystems, natural habitats and the maintenance of viable populations of species in natural surroundings.
- Promote environmentally sound and sustainable development in areas adjacent to protected areas with a view to furthering protection of these areas.
- Prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species.
- Develop or maintain necessary legislation and/or other regulatory provisions for the protection of threatened species and populations.

This international commitment to the role played by national parks is recognised by the International Union for Conservation of Nature (IUCN), which defines a range of categories for protected areas. Category 2 in that classification is National Parks, which have the unambiguous objective "*To protect natural biodiversity along with its underlying ecological structure and supporting environmental processes, and to promote education and recreation*".[60]

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[58] What works for threatened species recovery? An empirical evaluation for Australia Martin F. J. Taylor. Paul S. Sattler. Megan Evans. Richard A. Fuller. James E. M. Watson. Hugh P. Possingham, Biodivers Conserv (2011) 20:767–777 DOI 10.1007/s10531-010-9977-8

[59] Convention on Biological Diversity, Article 8. In-situ Conservation. https://www.cbd.int/convention/articles/?a=cbd-08

[60] Department of Agriculture Water and Environment. World Conservation Union (IUCN) protected area categories 2008. https://www.environment.gov.au/node/20957

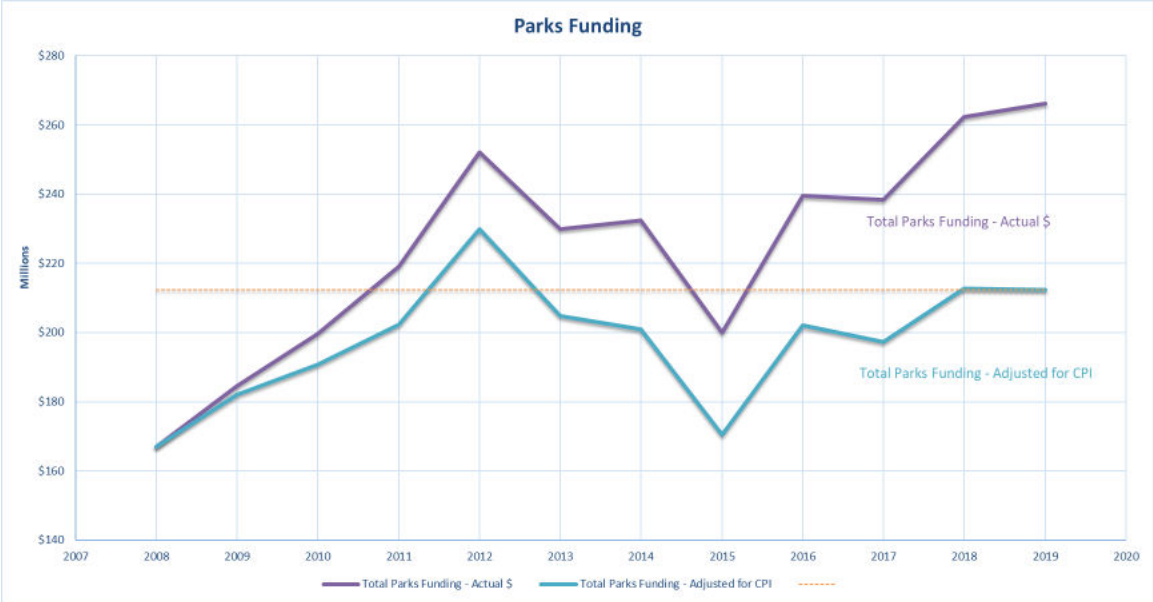
And all of the above objectives are consistent with Victoria's *National Parks Act 1975*, which obliges Parks Victoria (and now, in many cases, in a joint management arrangement with Traditional Owners) to:[61]

i. preserve and protect the park in its natural condition for the use, enjoyment and education of the public;
ii. preserve and protect indigenous flora and fauna in the park;
iii. exterminate or control exotic fauna in the park;
iv. eradicate or control exotic flora in the park; and
v. preserve and protect wilderness areas in the park and features in the park of scenic, archaeological, ecological, geological, historic or other scientific interest

The Act also mandates a plan of management for each park to achieve these objectives. While national parks and other conservation reserves are recognised as critical in avoiding ecosystem and species decline, simply proclaiming a park is, of course, not enough to do the job.

Currently, funding for the management of Victoria's park system sits at less than 0.5% of the state budget. This inadequate funding does not match legislated objectives for park management; it does not match community expectations; and gives little recognition of the considerable economic benefits that parks bring.

Park Victoria Funding 2008 -2019 ('000)

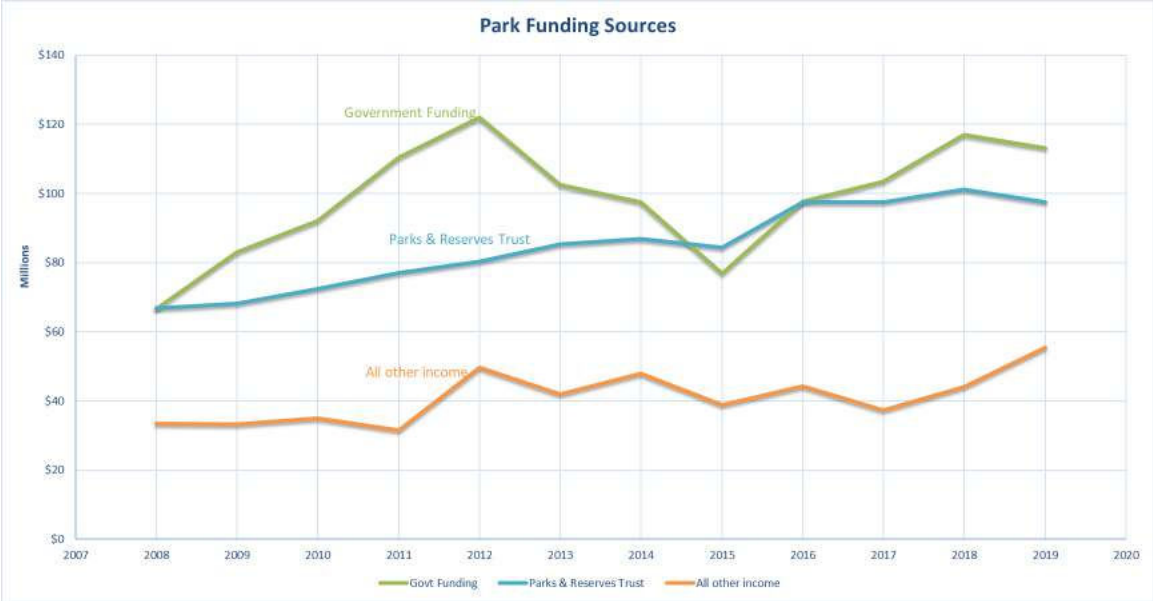


[61] *National Parks Act 1975.* https://www.legislation.vic.gov.au/in-force/acts/national-parks-act-1975/172

While funding for national parks was dramatically cut between 2013 and 2016, it has increased in raw terms to above 2012 levels. However, if cost increases are adjusted for CPI, overall funding would still be $20 to $30 million short of 2012 levels.

It is also worth noting that approximately 37% of parks funding comes from the Parks and Reserve Trust, which is collected on water bills in certain parts of Metropolitan Melbourne. See: https://www.parks.vic.gov.au/about-us/parks-charge. The charge is however restricted to use on development, management and maintenance of metropolitan parks, gardens, trails, waterways, and zoos. In effect this reduces the amount of funding that is available for management of the broader parks estate across the whole of Victoria.

Park Victoria Funding Sources 2008 -2019 ('000)



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Government Funding ($'000)	$66,608	$83,067	$92,089	$110,455	$122,055	$102,567	$97,523	$76,773	$97,672	$103,447	$117,065	$113,115
Parks & Reserves Trust ($'000	$66,920	$68,167	$72,428	$77,132	$80,331	$85,422	$86,965	$84,323	$97,537	$97,512	$101,114	$97,504
All other income ($'000)	$33,436	$33,300	$35,004	$31,413	$49,613	$41,910	$47,850	$38,909	$44,306	$37,379	$44,134	$55,514
Total	$166,964	$184,534	$199,521	$219,000	$251,999	$229,899	$232,338	$200,005	$239,515	$238,338	$262,313	$266,133

Victoria's parks and waterways attract 98.5 million visitors each year. Of these visits, 53.8 million are to parks and 44.6 million are to piers and jetties around the bays.[62] Tourists spend $2.1 billion per year associated with their visits to parks, and add 20,400 jobs to the State's economy, including many regional jobs.[63] Nature-based visitors spent an estimated $11.5 billion in Victoria in 2016-2017.

[62] https://www.parks.vic.gov.au/about-us/what-we-manage
[63] Parks Victoria, Annual Report, 2016-2017

National parks also provide a raft of environmental services (pollination, clean water and fresh air, as well as protection from flood and coastal inundation) worth many hundreds of millions of dollars each year.[64]

Parks are undeniably popular; various polls consistently show that over 70% of people support Victoria having a comprehensive network of national parks and conservation reserves across land and sea. [65]

There are many ways an increase in funding for parks (to at least 1% of the state budget) would benefit regional employment, including Indigenous employment. Most remarkably, few parks have dedicated staff with expertise in biology and ecology, despite a plethora of well qualified botanists, zoologists, mycologists, entomologists and ecologists ready to lend their expertise in park management.

Recommendations

- increase funding for the management of Victoria's national parks be to at least 1% of the state budget
- Parks Victoria to substantially increase its staff expertise in biological and ecological fields, including (but not only) mycology and entomology
- Parks Victoria to increase public education in the role that national parks play, and their benefits to the community

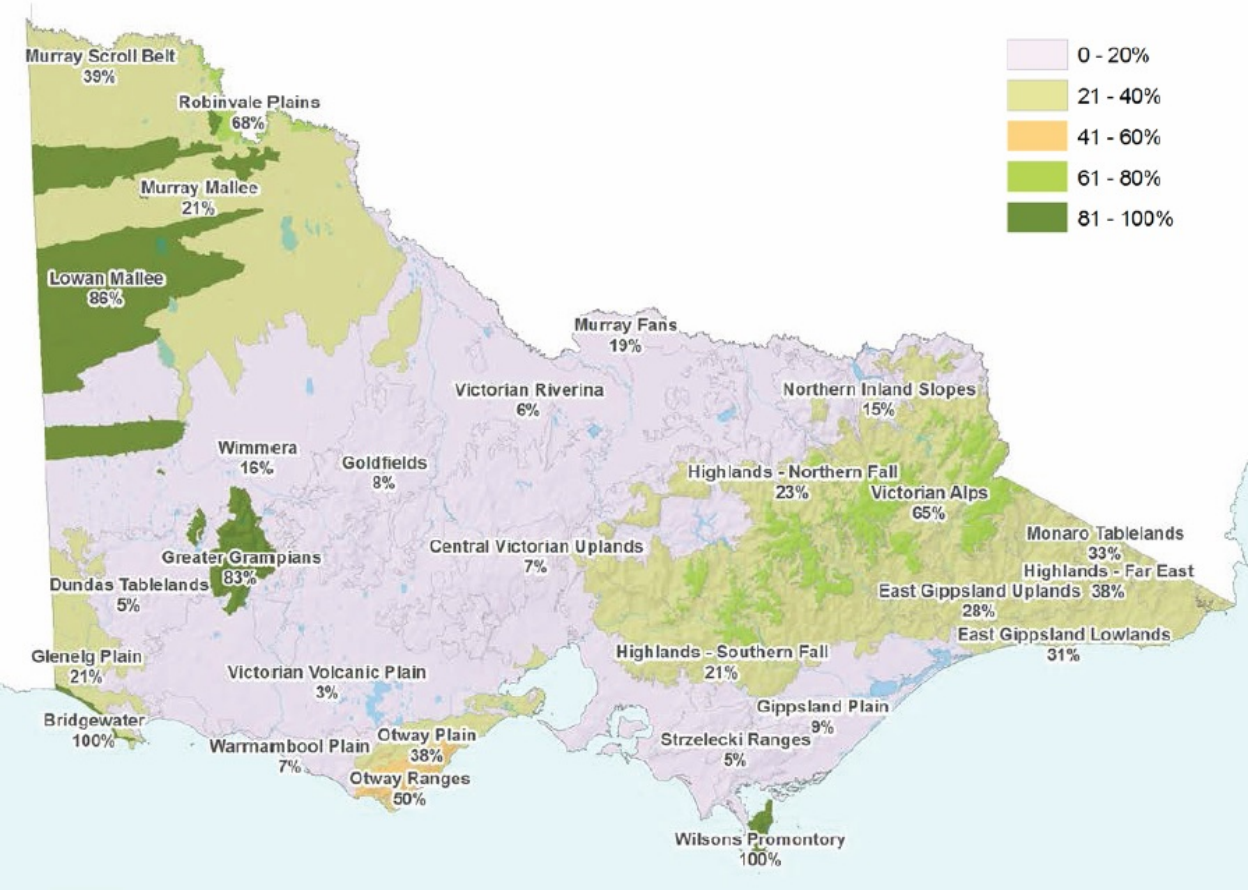
[64] http://parkweb.vic.gov.au/__data/assets/pdf_file/0008/666350/Valuing-Victorias-parks.pdf
[65] https://vnpa.org.au/campaigns/victorian-polling-results/

12. Filling the gaps in the terrestrial reserve system – current opportunities

Although Victoria has a fairly extensive national park and conservation reserve system, our great variety of terrestrial ecosystems are unevenly protected. We are far from meeting the national goal of a comprehensive, adequate and representative reserve system.

Over the last 150 years (particularly the last 60 yrs) Victoria has developed an extensive network of national parks and conservation reserves, covering roughly 18% of the state (about 4.1 million ha) including 70% of Victoria's coastline and 5% of state marine waters, but there are still significant gaps to be filled on both public and private land.

In our 2014 Nature Conservation Review[66], the VNPA analysed the extent of protection of the different ecological vegetation classes across Victoria and found that there are substantial gaps in our national park and conservation reserve system, particularly of the vegetation communities most depleted by clearing and subject to degradation. (See below graph).



The proportion of ecological vegetation classes in Victorian subregions that meet the nature conservation review reserve targets. Map & analysis: VNPA. Data source: Department of Environment and Primary Industries.

[66] https://vnpa.org.au/nature-consevation-review/

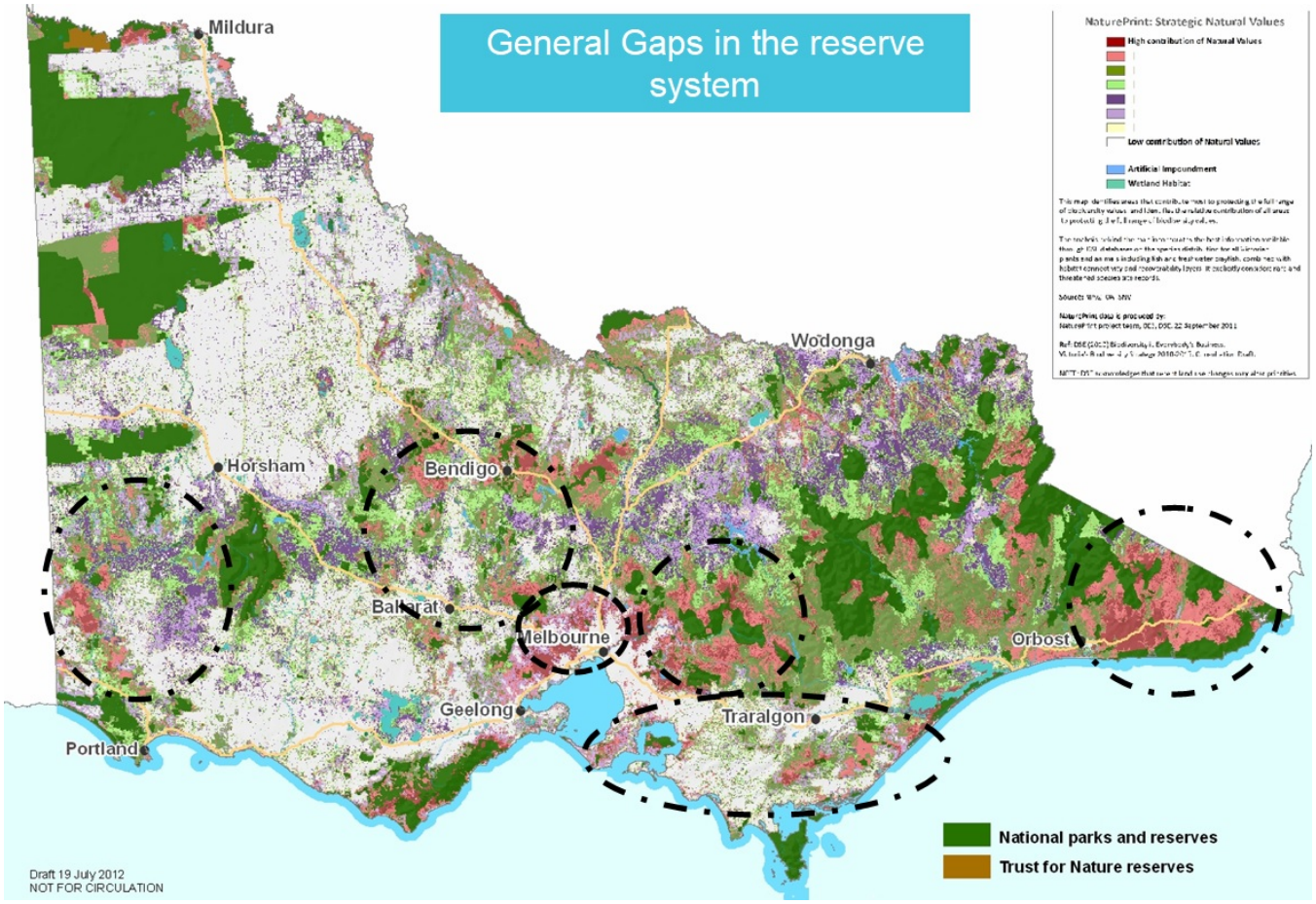
A detailed analysis by the VNPA in 2010 [67] identified the need to secure the permanent protection of around 3.1 million ha on both public land (1.5 million ha) and private land (1.7 million ha) to complete a minimally comprehensive reserve system: one that gives the necessary protection to all habitat types. The state environment department acknowledged, in its state-wide biodiversity strategy, that the additional protected areas required to meet Australia's criteria for a comprehensive, adequate and representative reserve system is 2.1 million hectares.[68] That is without taking into account the needs of specific threatened species, the implications of climate change, or other management factors such as fire impacts. Only around 5% of state waters are protected in marine national parks and sanctuaries, well below international benchmarks for marine protected areas.

The 2016 Victorian Environmental Assessment Council's Statewide Assessment of Public Land Discussion Paper[69] identified three regions of Victoria with distinctly under-represented Ecological Vegetation Classes: South West Victoria, the Strzelecki Ranges-Gippsland Plain and the Central Victorian Uplands.

The below map indicates the parts of Victoria with high natural values where general gaps in the reserve system occur. These are indicative only and incorporate both formal assessments of CAR but also other high conservation values. These are:

- The woodlands and wetlands of far south west Victoria in the Glenelg Plain and Dundas Tablelands bioregions
- The forests and woodlands of central west Victoria in the Central Victorian Uplands and Goldfields bioregions
- The grasslands west of Melbourne in the Victorian Volcanic Plain
- The central highlands including the forests of the Yarra River basin and the surrounding forests of the Goulburn, Bunyip, Latrobe and Thompson basins
- The Strzelecki Ranges and Gippsland Plain bioregions
- East Gippsland

[67] https://vnpa.org.au/publications/nature-conservation-review-2014/
[68] https://www.environment.vic.gov.au/biodiversity/biodiversity-plan
[69] http://www.veac.vic.gov.au/investigation/statewide-assessment-of-public-land



The last decade has been a low point in the creation of parks, with few areas being formally added to the park estate by either side of politics.[70] The progress of creating new national parks on public lands in Victoria is now at its slowest pace in the past 60 years. See: https://vnpa.org.au/national-parks-creation-needs-a-jump-start/

The current Andrews Government has struggled to make a decision about proposals for 60,000 ha of new national parks in Victoria's central west, in the Wombat, Wellsford, Mt Cole and Pyrenees State Forests. After four years of government sponsored investigation and consultation, the government missed its statutory deadline to make a decision in late February 2020. [71]

[70] https://vnpa.org.au/national-parks-by-premier-op-ed/
[71] https://vnpa.org.au/andrews-government-late-for-an-important-date/

There are currently some historic opportunities for nature reservation in Victoria that will help towards filling some of the gaps in the reserve system. These proposals have high public support and are waiting for government to gather the political will to take action. These are:

- new national parks and reserves in the high conservation value forests of the central west including the Wombat, Wellsford, Mount Cole and Pyrenees Range forests
- the Great Forest National Park to protect the magnificent forests of the central highlands and Melbourne's water catchments
- the Western Grassland Reserve and the Grassy Eucalypt Woodland Reserve to protect highly threatened native grasslands on the Victorian Volcanic Plain
- a once in a generation opportunity to purchase 877 hectares of native bushland at the Holden proving ground site in Lang Lang and make a significant addition to Victoria's conservation estate on the eastern side of Westernport Bay in the highly under-represented Gippsland Plain bioregion

New national parks in Victoria's central west

The Victorian Environmental Assessment Council's final recommendations for public land use in the Central West Investigation area, include an increase of 58,115 hectares in protected areas as national park, conservation park, nature reserve, bushland reserve and heritage river – including the Wombat Forest (near Daylesford), Wellsford Forest (near Bendigo), Pyrenees Ranges Forest (near Avoca), and Mount Cole Forest (near Beaufort) as well as many smaller forest areas (see maps in Appendix 1). An additional 19,728 hectares of regional parks are proposed close to townships and to be managed primarily for reaction which will allow for almost all forms of recreation, including dog walking, fossicking and prospecting.

The proposed new national parks and reserves in the central west will protect (from damaging activities such as mining and logging) important habitat types currently under-represented in the reserve system, and will help deliver key elements of Victoria's biodiversity strategy. Victoria's forests of the central west have incredible natural values. Their forests harbour 380 threatened species such as the Powerful Owl, Brush-tailed Phascogale, Greater Glider, Swift Parrot and many rare plants.

Notably, the Wombat Forest near Daylesford is a vital refuge for a regionally significant population of the Greater Glider. A new national park here would secure long-term protection for this iconic species that is in decline across much of the state. (See a new report released by the Victorian National Parks Association and local group Wombat Forestcare Wombat Forest, A greater refuge for Gliders). This is now increasingly important last summer's large-scale wildfires burnt through 32% (21% at high severity) of modelled Greater Glider habitat in Victoria.

The new parks will also protect eleven significant headwaters of important rivers including the Moorabool, Werribee, Lerderderg, Maribyrnong and Wimmera rivers – which provide water supply for large areas of western and northern Victoria.

In the past few months exploration works for gold and other minerals involving large drilling rigs has commenced in the proposed Wombat-Lerderderg National Park, in the headwaters of the Heritage Listed Lerderderg River. Bushwalkers, conservationists and native plant enthusiasts are also concerned that intensified logging plans have been released for key areas around the Beeripmo Walk, a popular overnight hiking trail in the Mount Cole forest within the proposed national park for this area. Active logging happening now on the park boundary is risking the future of the threatened rare endemic Mount Cole Grevillea which has already suffered a 75% decline, largely from logging.

It has been almost a decade since the last major additions to our national parks and reserves system in Victoria. Now is the time to act – new national parks in our state's central west will be a positive outcome for people and nature during a year Victoria needs it most. After four years of government sponsored investigation and consultation by the Victorian Environment Assessment Council, the government missed its statutory deadline to make a decision in late February 2020. See here: Andrews government late for an important date

The central west forests are within the Central Victoria Uplands bioregion which only has approximately 10% of its Ecological Vegetation Classes (units for assessing ecosystem representation) targets met. 43 of the 107 important EVC's identified in the central west investigation area will have significantly improved representation in the Comprehensive Adequate Reserves system (CAR) system if VEAC's proposals are implemented. This will add up to 16,000 hectares of particular EVC's and will either meet or significantly add to ecosystem representation targets.

For more information on the proposed new national parks in Victoria's central west, see our following recent Park Watch articles: A dozen good reasons for new national parks in the central west of Victoria , and Mount Cole still on the chopping block which is still seeing clear fell logging.

The Great Forest National Park

The 2019/20 fire season impacted greatly on the forests of Victoria's east. Many forest animals and plants, some of which were already very threatened, had very large proportions of their habitat extent in Victoria burnt, sometimes at high severity. (See: https://www.wildlife.vic.gov.au/home/biodiversity-bushfire-response-and-recovery)

There is an urgent need to protect our remaining unburnt forests from the further serious threat of commercial logging. Aside from the obvious direct impacts on plants and wildlife, logging also changes the structure and composition of forests and increases fire risk (see further discussion on logging and fire risk in section 6 of this submission). Logging that occurs near or adjacent to existing protected areas also creates the problem of 'edge effects', where the creation of edge along the protected area boundary alters the microclimate of the protected forest, along with promoting the spread of weeds and invasive animals.

A proposal for a Great Forest National Park and network of conservation reserves in Victoria's Yarra Ranges and surrounding Central Highland forests has been developed by VNPA and other conservation groups. See more here: Great Forest National Park summary report. It would see 353,213 hectares of protected forests added to the existing 183,542 hectares of protected areas incorporating over ten smaller parks into a single, contiguous reserve system around towns such as Healesville, Kinglake, Toolangi, Warburton, Marysville and Wood's Point.

Much of the existing reserve system directly adjoins state forest that is being logged. Most of the logging is concentrated in the tall wet Ash forests of the region.

Victoria's Alpine and Mountain Ash forests have been disproportionately targeted by logging, the impacts of which are subsequently compounded by fire. Logging and fire has taken a catastrophic toll on older growth Ash forests, and now less than 1.16% of the 161,200 ha Mountain Ash landscape is pre 1900 old growth. Victoria's Mountain Ash ecosystem has been internationally listed as critically endangered on the IUCN Red List of Ecosystems.

The forests of Victoria's Central Highlands provide important habitat for a range of threatened species that rely on intact forests, large old trees and minimal disturbance. Some of these species include Leadbeater's Possum (Victoria's endemic and critically endangered faunal emblem), Sooty Owl, Powerful Owl, Masked Owl, Mountain Brushtail Possum, Greater Glider, Sugar Glider, Baw Baw Frog and Barred Galaxias.

Many other iconic species also occur in the proposed area such as the endangered Spot-tailed Quoll (the largest carnivorous marsupial on the Australian mainland), the critically endangered Helmeted Honeyeater and the Superb Lyrebird.

BirdLife Australia estimates that over 40% of the Superb Lyrebird's range was impacted by the recent large landscape scale bushfires. The Superb Lyrebird is one of Australia's most treasured animals and the Great Forest National Park will help protect its habitat. We must not wait for Victoria's lyrebirds to become threatened with extinction before acting to protect it from logging, fire, cats and foxes.

A new Great Forest National Park and network of conservation reserves would be created following an investigation by the Victorian Environmental Assessment Council informed by extensive consultation with the broader Victorian community, forest users and Traditional Owners. In addition to nature conservation and helping protect Victoria's iconic Leadbeater's Possum, the park network would host a range of activities such as bike riding, bushwalking, bird watching, four wheel driving, camping and eco-tourism.

The park is expected to be to Melbourne what the Blue Mountains are to Sydney and would support regional tourism in local communities and generate new, sustainable, long-term employment. The Great Forest National Park will also increase the security of Melbourne's domestic water supply catchments.

Globally renowned naturalists like Sir David Attenborough and Dr Jane Goodall along with 30 international, national, local environment, recreation and scientific groups, are supporting the creation of the Great Forest National Park. There is also widespread support among the Victorian community.

> *"The maintenance of an intact ecological system is the only way to ensure the continued existence of biodiversity, safeguard water supplies and provide spiritual nourishment for ourselves and future generations. It is for these reasons, and for the survival of the critically endangered Leadbeater's Possum, that I support the creation of the Great Forest National Park for Victoria."*
> *Sir David Attenborough*

A commitment to create the Great Forest National Park in the Yarra Ranges and surrounds is an investment in the future. It is an opportunity for Victoria's Government to invest in the state's natural heritage and show the world what first class parks management looks like.

The Western Grassland Reserve and the Grassy Eucalypt Woodland Reserve

The 'Natural Temperate Grasslands of the Victorian Volcanic Plain' and the 'Grassy Woodlands of the Victorian Volcanic Plain' are both listed under national environmental laws as 'critically endangered'. Once covering almost a third of Victoria, now less than 2–5% of these rare grasslands remain with less than 1% in high quality condition. What remains is home to 32 threatened flora and 25 threatened fauna listed under national environmental laws including the Growling Grass Frog, Golden Sun Moth, Striped Legless Lizard, Matted Flax-lily and several migratory bird species.

The decade-old Melbourne Strategic Assessment program had intended to streamline urban development approvals and ensure the survival of the remaining critically endangered grasslands and grassy woodlands threatened by urban sprawl in Melbourne's west and north. To offset losses from urban development, in 2010 the

Victorian government committed to purchase and establish by 2020, a 15,000 hectare Western Grassland Reserve (between Werribee and Melton) and a 1,200 hectare Grassy Eucalypt Woodland Reserve (near Donnybrook), along with a range of other measures.

10 years later DELWP has still not met its commitments to establish the reserves and has purchased only 10 % of just one reserve to date, while property developers have continued apace. It is time for the Victorian government to act on this commitment create the highly important reserves as promised. For a more detailed discussion about Victoria's threatened grasslands see section 13 of this submission.

The Holden Bushlands

The Victorian government should take significant steps to secure the all or part of the site for public ownership as a high quality addition to Victoria's conservation estate in the highly under-represented Gippsland Plain bioregion. If direct purchase is not achievable, permeant protection such as Trust for Nature Covenants for high conservation value parcels should be considered, to ensure they remnants are secured.

In the mean time the Bass Coast Shire Council has decided to pursue planning control measures to protect the site from the threat of clearing for sand mining, a significant threat in the region, and will request that the Minister for Planning apply interim additional planning control protection measures over the site.

"Council resolved to push for the HPG site's environmental significance formally recognised under the state government's forthcoming Distinctive Areas and Landscapes Statement of Planning Policy (SPP); and to seek an urgent review of Extractive Industry Interest Area mapping within Bass Coast with a view to having the HPG and surrounding areas excluded."

The forest corridor running from Lang Lang to Grantville is an important biolink and the last remaining significant stand of remanant bushland in the whole of the South Gippsland region.

Fore more information see: https://sgst.com.au/2020/08/last-best-chance-to-save-holden-bushlands/

Recommendations

The VNPA recommends that the Committee recommend to the Victorian Government the following:

- make a decision on the proposals to create 60,000 hectares of new national parks and reserves in Victoria's central west Wombat, Wellsford, Mt Cole and Pyrenees Forests – this decision is now well overdue it's statutory timelines under the *Victorian Environment Assessment Council Act 2001*.

- initiate new Victorian Assessment Council Investigations (across all terrestrial, riparian, freshwater, coastal and marine environments) to identify how to fill gaps in the reserve system, including under represented habitat areas, areas with high numbers of threatened species and areas under threat
- initiate a Victorian Assessment Council Investigation of Victoria's central highlands to investigate the best way to manage public land use in the region to inform the creation of a Great Forest National Park
- immediately deliver on promises to protect endangered temperate grasslands and grassy woodlands and establish the Western Grassland Reserve and the Grassy Eucalypt Woodland Reserve
- formally recognize the Holden Bushlands under the Distinctive Areas and Landscapes Statement of Planning Policy and undertake a review of Extractive Industry Interest Area mapping within Bass Coast with a view to having the Holden Bushlands and surrounding remnant forests protected from sand mining
- the Victorian government should take significant steps to secure the site for public ownership as a high quality addition to Victoria's conservation estate in the highly under-represented Gippsland Plain bioregion – If direct purchase is not achievable, permeant protection such as Trust for Nature Covenants for high conservation value parcels should be considered, to ensure they remnants are secured

13. Protecting the threatened grasslands of the Victorian Volcanic Plain

Victoria and Australia may have ridden on the sheep's back during the early days of British settlement of the continent, but those sheep fed upon the complex, diverse and spectacular grassy plains.

The grassy plains of the Victorian Volcanic Plain have undergone severe changes that have substantially altered their composition and ecological function. This stems from past land uses including cropping, heavy grazing of sheep, introduction of exotic pastures and the use of fertilizers, as well as rocking-crushing and ploughing of the grasslands. These agricultural practices are ongoing and are still a great threat to grasslands.

The Victorian Volcanic Plain bioregion is recognised as one of 15 national biodiversity hotspots and has many threatened plant and animal species. It is rich in endemic orchids. The grasslands and grassy eucalypt woodlands of the bioregion are critically endangered at a national level.

The Victorian Volcanic Plain (VVP) was carved and created by volcanic activity over tens of thousands of years. Dominated by Cainozoic volcanic deposits, these deposits formed an extensive flat to undulating basaltic plain with stony rises, old lava flows, numerous volcanic cones and old eruption points and is dotted with shallow lakes, both salt and freshwater.[72] 26 of the lakes are nationally significant and nine are recognised as internationally significant.

The grassy plains of the VVP provide important ecological functions in the environment by storing carbon, improving water infiltration, reducing soil erosion, and providing habitat to animals, including native insects which support agricultural productivity and ecosystem resilience.

The VVP extends from the western suburbs of Melbourne to the town of Portland in the state's south west. Due to the flat and grassy nature of the grasslands less than 5% of the grassland's original extent now remains, with less than one percent thought to be intact and of high diversity. The Victorian Volcanic Plain vegetation communities and the species that call them home are among the most threatened and at risk species and landscapes in Victoria.

Many archaeological sites are found across the Victorian Volcanic Plain, showing a long and continuous history of connection of First Nations people with these grassy plains across tens of thousands of years. First Nations culture and pursuits of cultural revitalisation rely on country being healthy and accessible to undertake cultural pursuits and uphold First Nations lore.

[72] http://vro.agriculture.vic.gov.au/dpi/vro/vrosite.nsf/pages/veg_managemt_volcanic_plain

The grassy plains of Victoria are known for once being rich in native food resources until large flocks of sheep swarmed across the landscape, compacting soil and degrading ecosystem function and structure, while pushing native food species into decline and towards extinction.

The continued loss of grasslands

Due to their severe decline, the Natural Temperate Grasslands and Grassy Eucalypt Woodlands of the Victorian Volcanic Plain are listed for protection under the *Environment Protection and Biodiversity Conservation Act 1999*. Both vegetation types are also listed as threatened communities under the *Flora and Fauna Guarantee Act 1988* as "Western (Basalt) Plains Grassland" and "Western Basalt Plains (River Red Gum) Grassy Woodland Floristic Community".

Despite their great rarity, remaining grasslands continue to be lost due to agricultural intensification, urban expansion and weed invasion. About 3000 hectares per year were lost in the decade to 2004.[73] The natural temperate grasslands to the west of Melbourne declined by at least 44% between 1985 and 2000, and further clearing has been approved for urban development. Proposed offsets are unlikely to compensate for losses due to the difficulty of restoring degraded grassland communities.[74]

Many remnant patches of VVP grasslands are scattered across the landscape with refuges on disused stock routes, roadsides and small disconnected reserves managed by local councils and Parks Victoria. The remaining vegetation is found on private land due to historic land banking by developers and persistence of the grassland vegetation structures on agricultural lands.

Invasive plants and animals cause great harm. Feral cats and foxes kill and maim the last remaining fauna on the grassy plains such as the Plains-wanderer (*Pedionomus torquatus*) and Fat-tailed Dunnart (*Sminthopsis crassicaudata*). Invasive grasses change nutrient loads and biomass levels, changing the function of grassland ecosystems and reducing species richness.

A real and urgent threat to remnant native grasslands is clearing for urban development to meet Melbourne's high population growth. Since the expansion of the urban growth boundary in 2010, many areas of high conservation value grasslands have gone under the wheels of bulldozers. Agreements to offset clearing with the protection of other grassland areas are inadequate because offsetting still results in a net loss of native grasslands, and offset areas might also be of lesser ecological and floristic value.

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[73] Victorian Environmental Assessment Council (2010) Remnant Native Vegetation Investigation Discussion Paper. Victorian Environmental Assessment Council, Melbourne http://www.veac.vic.gov.au/investigation/remnant-native-vegetation-investigation/reports

[74] Threatened Species Scientific Committee (2008) Commonwealth Listing Advice on Grassy Eucalypt Woodland of the Victorian Volcanic Plain. Australian Government Department of the Environment and Water Resources

Once the most widespread ecosystem in Victoria, the boundless grassy plains of the Victorian Volcanic Plain are now just a series of scattered remnants, barely holding on against the ever-swelling footprint of Melbourne. The iconic plants and animals of the grassy plains are now finding their new homes on threatened species and extinction lists.

Inadequate legal protections for grasslands

The Guidelines for the removal, destruction or lopping of native vegetation is the key legislative guideline for the protection of native vegetation on private land and the Guidelines are incorporated into the Victoria Planning Provisions and all planning schemes in Victoria. Other legislative protection for grasslands exists under the *Flora and Fauna Guarantee Act 1988* and at a commonwealth level with the *Environment Protection and Biodiversity Conservation Act 1999*.

The *Catchment and Land Protection Act 1994* is also of importance as it governs pest plant and animal management on public and private land.

The *Melbourne Strategic Assessment (Environment Mitigation Levy) Act 2020* relates to the roll out of the offset scheme within the Urban Growth Boundary and the clearing and preservation of native grasslands.

When it comes to on the ground enforcement, management and implementation, the legal frameworks to protect native grasslands in Victoria fail and see many areas of high conservation value threatened species habitat being lost and degraded beyond repair.

Within the *Exemptions from requiring a planning permit to remove, destroy or lop native vegetation Guidance (2017)*, an exemption under "Existing buildings and works in the Farming Zone and Rural Activity Zone" allows for the clearing of native vegetation (including grasslands) due to the existing land management of many areas being for farming. This loop hole sees good quality grasslands being able to be ploughed, over stocked and cleared without assessment, permits and offsets. Although this exemption only applies in the Farming Zone or Rural Activity Zone, grasslands are more likely to be present in areas where this overlay is present.

Natural Temperate Grasslands and Grassy Eucalypt Woodlands of the Victorian Volcanic Plain were listed as Critically Endangered under the EPBC Act in June 2008, however there are no Recovery Plans or threat abatement plans for these ecological communities. Both ecosystems remain without recovery plans and recovery teams.

Another weakness in protection is that section 80A of the Regional Forest Agreements (2020) exempt forestry operations (including in relation to plantations) from Part 3 of the EPBC Act. This allows the destruction of grasslands by the planting of plantation

crops without assessment under federal law. An increase of broad acre cropping has led to an expansion of areas under cultivation [75] and these works can be exempt under EPBC Act laws and leads to loss of VVP.

Under Victoria's FFG Act, the Western (Basalt) Plains Grasslands Community has a joint action statement (from 2003 and now outdated) with Central Gippsland Plains Grassland, Forest Red Gum Grassy Woodland, Northern Plains Grassland and South Gippsland Plains Grassland. The Western Basalt Plains (River Red Gum) Grassy Woodland Floristic Community was not included in the action statement. Both listed VVP communities require up-to-date action statements to set out the intended management actions going forward for threatened grasslands and grassy woodlands on the Victorian Volcanic Plain.

The Melbourne Strategic Assessment

A decade-old joint Commonwealth and State government program known as the Melbourne Strategic Assessment, was agreed to following an assessment of "Matters of national environmental significance" under the EPBC Act in Melbourne's urban growth boundary – those matters being the Natural Temperate Grasslands and Grassy Eucalypt Woodlands of the Victorian Volcanic Plain.

The program had intended to streamline urban development approvals and ensure the survival of the remaining grasslands and grassy woodlands threatened by urban sprawl in Melbourne's west and north. To offset losses from urban development, in 2010 the Victorian government committed to establish by 2020, a 15,000 hectare Western Grassland Reserve (between Werribee and Melton) and a 1,200 hectare Grassy Eucalypt Woodland Reserve (near Donnybrook), along with a range of other measures. The program promised to "...increase the extent of protection of Natural Temperate Grassland of the Victorian Volcanic Plain from two per cent to 20 per cent".

10 years later DELWP has still not met its commitments to establish the reserves and has purchased only 10 % of just one reserve to date, while property developers have continued apace. This is not just seriously inadequate, but another example of the environment being pushed aside for development. See our recent media release here.

Acquisition of land has happened too slowly and is seeing grassy ecosystems lose ecological function and structure prior to being acquired for conservation by land managers. Most of the timelines have not been met, with the program failing to protect the matters of national environmental significance it agreed to protect.

[75] Carland, F. & Kennedy, N. (2010). Restoring Critically Endangered Grassland on Roadsides in the Victorian Volcanic Plain. Australasian Plant Conservation: Journal of the Australian Network for Plant Conserveration, 19:2

The only publicly available Progress Report at time of writing, The Melbourne Strategic Assessment Progress Report 2016-17 found that the only areas protected so far under the MSA are:

- 8.5% or 1,243.6 ha of the Western Grassland Reserve
- 88.9 ha of a network of conservation areas within the Urban Growth Boundary (Only 19.5ha is Native Vegetation)
- 0% of a 1,200 hectare Grassy Eucalypt Woodland Reserve
- 13.6% or 1,671 ha of highest priority habitat for Golden Sun Moth protected and managed
- 5% or 72ha of highest priority habitats for Spiny Rice-flower protected and managed
- 1% or 3ha of highest priority habitats for Matted Flax-lily protected and managed

The level of delivery for this program threatens the viability of the reserves and the grassy ecosystems and persistence of threatened fauna and flora that are found in these areas.

The Victorian Auditor-General's Office (VAGO) recently audited the protection of critically endangered grasslands in Melbourne's urban growth boundary and assessed the implementation of the MSA program.

Key findings from the VAGO report (available here) include:

- To date, only 10% of designated land has been acquired for the Western Grassland Reserve, and no land has been acquired for the Grassy Eucalypt Woodland Reserve.
- 22% of the existing western grassland reserve is not considered grassland and large areas are considered low quality or 'nutrient enriched'
- Delays in acquiring land, and continuing threats of degradation, pose significant risks to the ecological values of native vegetation within the reserves.
- Delays in acquiring land have been compounded by cost increases; estimated program costs have increased around 80% between 2013 and 2019, mostly due to rising land values.
- The MSA will need new governance arrangements to ensure they provide sufficient oversight, stakeholder involvement and transparency to support program delivery and that independent monitoring has not occurred in line with the MSA program.

Concerns are held by community members and ecologists over the "like for like" quality of offset vegetation within the Urban Growth Boundary as reflected by the poor quality vegetation within the Western Grassland Reserves. These concerns are justified as DELWP has only been able to undertake 'over the fence' survey work of parts of the proposed WGR.

There are also concerns for areas outside of the UGB. Small areas that already contain threatened species, embedded rock and good cover of native grasses should be retained wherever they are or at the very least until offsets of equal or greater quality are acquired. In areas where species such as the Striped Legless Lizard are present and translocation is not allowed or possible, these areas should be retained as critical habitat for the species survival as other offset areas may not contain these species or required habitat.

Victorian Volcanic Plains grasslands, fire and First Nations peoples

The grassy plains of the Victorian Volcanic Plains hold great importance for First Nations peoples who have lived on the plains for thousands of years. These plains once covered 1/3 of the state of Victoria and extend across many different traditional lands.

The use of fire in Indigenous culture and land management techniques correlates with the need for fire in grassy ecosystems, with a lack of fire being a threatening process for many species on the VVP. Un-burnt grassland sites have higher levels of weed invasion and dominant grass species like Kangaroo grass (*Themeda triandra*) grow too large and crowd out the diversity around them.

Management activities for native grasslands can cost more per hectare than for some other ecosystems such as forests. Native grasslands require annual active management for actions such as weed control and appropriate and monitored burning regimes. Significant extra funding is needed to support the high level of maintenance that native grasslands require.

Restoration of the grassy plains ecosystem with programs re-instating cultural burning practices and traditional farming techniques for species such as Murnong (*Microseris lanceolata*), and re-introduction of lost species will not only restore the health and biodiversity of our native grasslands but will also allow First Nations people to care for country while maintaining cultural lore and connection to the land.

Recommendations

The VNPA recommends that the Committee recommend to the Victorian Government the following:

- Ensure that all of Victoria's diverse vegetation communities, including native grasslands, are adequately represented and properly managed within the reserve system to better secure the future of threatened species
- Immediately deliver on promises to protect endangered temperate grasslands and grassy woodlands and establish the Western Grassland Reserve and the Grassy Eucalypt Woodland Reserve as part of the MSA program.
- Prioritise the acquisition of the highest conservation value grasslands within the urban growth boundary through the MSA program

- Investigate and implement co-management of grasslands with Traditional Owners to revitalise cultural management of grasslands and to give grassland ecosystems the appropriate fire regimes needed for healthy ecosystem function.
- Undertake a state wide audit of all grasslands on the Victorian Volcanic Plains on public land to assess their ecological condition and potential for restoration and protection.
- Create a broad-scale management plan for all grasslands on the Victorian Volcanic Plains as recommended in the EPBC recovery plan decision “A broad-scale bioregional plan would make the greatest contribution to the conservation of the large number of threatened species and ecological communities concerned”
- Make a legislated commitment to no loss of any medium to high quality grasslands outside of the Urban Growth Boundary on public land, and acquire any high conservation value grasslands on private land.

14. Managing ecosystem decline under climate change

Climate change is already upon us, and is affecting ecosystems and species in a number of ways. There may be some winners in this situation, but there will certainly be losers. Importantly, if we can maintain healthy ecosystems, we can maintain a healthy level of carbon absorption across the landscape, helping to reduce carbon emissions.

1/ A warmer climate will tend to push species further south or, in mountainous areas, to a higher altitude. However a number of factors make this difficult for many species:

- The speed of change is faster than in historic climate events, meaning species with slow migration capabilities will be left stranded and stressed in less-than-favourable situations.
- Most habitat types are now fragmented in Victoria, making migration across an agricultural or built-up landscape difficult or impossible for plants and animals.
- Species already at their migration limit, such as alpine species, have nowhere to go. They will be relying on the most genetically suitable strain of a species to survive where they are.

2/ It's not just an issue of temperature. A warming atmosphere is a more energetic one and this results in more turbulence, producing harsher weather events like extreme droughts, more storms and floods, even occasional extreme snowfalls (though reduced snow will be the norm). This will increasingly bring:

- More frequent and more severe fire weather, making traditional fire management practices less effective. Species and ecosystems unable to cope with frequent fire are already suffering. Alpine and Mountain Ash forests are the clearest example of this, and it has been predicted that they will struggle to survive in the long term.
- Coastal erosion will be caused not just by sea rises, but by eroding storm surges. Most of Victoria's coastal habitats are limited to a thin coastal strip, backed by farms or coastal towns. That means, as the coastline erodes, there is nowhere for terrestrial coastal ecosystems to retreat to. And if the erosion problem is to be solved by building extensive sea walls, that hard barrier will bring about another environmental problem: the demise of important tidal zone habitats.

3/ As species and ecosystems come under stress, opportunistic pest plants and animals, including new invasive species suited to the changed conditions, will become more prevalent.

All of these factors can add to the decline of ecosystems, and especially to already threatened species, but there are some very useful things we can do.

Some useful solutions

1/ The most useful thing to do is **more of what we already do** to protect habitats. If we increase our management of invasive plants and animals, increase the extent of protected areas (especially for under-represented habitats), avoid the clearing of native habitats, create biolinks between fragmented native habitats, avoid the exploitation of native species and increase our capacity to stop fire at its source, we can help stressed native species fend for themselves. This will mean increasing our resources, both through funding and the employment of appropriate expertise. See here: Dunlop, M., & Brown, P.R. 2008. Implications of climate change for Australia's National Reserve System: A preliminary assessment. Department of Climate Change, Canberra, Australia.

2/ Establishing a network of Climate Future Plots. Any single native plant species will have a range of genetic variants, and some of those genotypes might be more capable of surviving drought, insect or pathogen attack, or show some other durability. If a species crashes because of drought (this has already happened with Mannna Gums, *Eucalyptus viminalis,* on the Monaro Tableland in southern NSW for example), it will be useful to be able to reseed from a genotype known to be more resilient to drought. A considerable amount of work has been done in Victoria, elsewhere in Australia and around the world in the development of experimental plantations of mixed genotypes for a range of native species: Climate Future Plots.

If we systematically establish a series of these Climate Future Plots across Victoria, future land managers are more likely to have the information and the resources they need to rescue failing species and ecosystems. A guide to this science-based project has been developed by Greening Australia, in liaison with some of the nation's top scientists as well as government agencies and NGOs. The guide and further information can be found at: https://www.greeningaustralia.org.au/climate-future-plots/

We know how to do this, but appropriate funding to scale up this important project has not yet been secured.

Recommendations

- Because climate change will add a range of stresses to species and ecosystems, there is a greater need to increase resources to fight current stressors, such as invasive species.
- Increase funding and support for biolink projects to link fragmented natural habitats and restore natural gene flow between fragmented and isolated populations of flora and fauna.
- Develop a detailed understanding on the implications of climate change on ecosystems, and a detailed assessment at fine scale (e.g at least 5 kilometre blocks) should be undertaken to model the potential changes for key natural areas

- A series of Climate Future Plots should be set up across Victoria, particularly for plant species predicted to be most sensitive to climatic change, giving us the knowledge and capacity to introduce stronger genetic variants of species that might fail under a changed climate.

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