

Using law and policy to protect the critical habitat of Victoria's threatened species



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Publication date: 20 August 2021

Cover image: Hooded Plovers by [Muirland Publishing](#)

This project was funded by the Patagonia Environmental Grants Program Fund, a project of Tides Foundation

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Introduction

We are in an extinction crisis. It is well known that in Australia this crisis is particularly acute.¹ If this were a bushfire, it would be ‘code red’. The causes and drivers of the crisis are equally well documented. They include habitat loss and destruction. The consequences of land clearing include habitat degradation with fragmented, invasive species impacts, poorly managed fire regimes, degraded hydrologies, and the overarching shift in climate trajectories. The hand of human impact is all over these dynamics. It is a hand guided by human will, agency and conscious decision-making (or non-decision-making) – including by governments and corporate actors. The degrading impacts are large and small, one-off and cumulative, direct and indirect. They affect the fate of ecosystems large and small.

The thing about extinctions is that they are irreversible. Affected species are gone forever. We may not know quite where the tipping point of extinction is for any particular species. We may not know precisely where the fate of one species can have cascading influences, including serious decline, for others and even for whole ecosystems. Consider ‘keystone’ species whose actions disproportionately keep ecosystems in a certain balance, such as small marsupials digging and turning over soil across an entire landscape that keeps whole forests or woodlands healthy.

Ecosystems are dynamic. They are made up of multiple habitats. All of those habitats, and the ecological attributes and functions associated with them, are important. Native flora and fauna habitats are more than the sum of their parts. Protecting and recovering key habitats within an ecosystem are crucial to enabling wider stabilisation and recovery across landscapes. That requires a solid understanding of ecological systems. It requires an ‘ecosystem’ approach to managing human impacts on natural systems. That is an approach that also underpins biodiversity law.²

Some Victorian habitats are gone. Most have experienced significant impoverishment over the last century. Given long enough reprieve from damage, threats and pressures, they can recover and they do adapt. They can be sites of ecological memory, as well as ecological debt.

If continuing loss and pressures are anything to go by, the law presently does not protect habitats particularly well – we might consider threatened species habitat specifically here, as well perhaps as those that are ‘iconic’ or those with strategically important ecological niches (such as supporting ‘keystone’ species). We ‘manage’ habitat impacts, such as through planning and environmental laws. Arguably, we do not contain, halt or reverse them, at least rarely without shifting direction in development or resource use

dramatically – for example, halting sealing or whaling – or without very expensive attempts to patch up large-scale damage later.

We have at our disposal some powerful legal tools with real potential to protect habitat. These tools include legal protections directed to habitats critical to the survival of threatened species. It is our assertion, in this report, that we can use those tools in order to seriously intervene in the extinction crisis, with a view to arresting it and supporting ecosystems’ recovery.

In this report, we reflect on the legal and policy tools available for the protection of the ‘critical habitat’ of listed threatened species. It is a tool long available and virtually never used in Australia and in Victoria. Our analysis considers legal and policy dimensions to the design and use of critical habitat protections, including reflection of their role in conservation policy, which is presently guided by Victoria’s Biodiversity Strategy.³

Critical habitat protection has been used with success in other jurisdictions, such as in the United States.⁴

Victoria has just ‘modernised’ its key biodiversity law, the *Flora and Fauna Guarantee Act 1988*. We think it is high time we took that opportunity to use critical habitat protections to best ecological effect.

Our deliberations on critical habitat protection in this report focus on the updated *Flora and Fauna Guarantee Act 1988*, in which critical habitat protection provisions in Victoria are mainly situated.

1 See eg Wintle et al ‘Spending to save: what will it cost to halt Australia’s extinction crisis?’ (2019) *Conservation Letters*, DOI: 10.1111/conl.12682; Cresswell and Murphy *Australia State of the Environment Report 2016: Biodiversity* (2017);

2 An ‘ecosystem approach’ to biodiversity management is central to Australia’s obligations under the Convention on Biological Diversity (CBD). In turn, those obligations inform our concepts of ‘sustainability’ or ‘ecologically sustainable development’: see generally CBD Secretariat ‘Ecosystem approach’, <https://www.cbd.int/ecosystem/>. See also *Flora and Fauna Guarantee Act 1988* (Vic), subs 4(c)(iii), (iv), (d) in particular.

3 Victorian Government *Protecting Victoria’s Environment – Biodiversity 2037* (2017), <https://www.environment.vic.gov.au/biodiversity/biodiversity-plan>

4 See eg Taylor et al ‘The effectiveness of the Endangered Species Act: a quantitative analysis’ (2005) 55 *Bioscience* 4 360

Part 1: The reformed Flora and Fauna Guarantee Act 1988 ('FFG Act')

The amended FFG Act

The *Flora and Fauna Guarantee Amendment Bill* was introduced into the Victoria Parliament in 2019 and passed into law in September of that year. The Act commenced operation on 1 June 2020. Regulations under the Act were made and came into force on 1 June 2020. The Regulations principally deal with threatened species and communities' listing, and notice for the making of Habitat Conservation Orders.

The amended Act is intended, according to the Minister's Second Reading Speech, to 'modernise and strengthen' the Act. It seeks to do this in a number of ways:

- update and add objectives to the Act;
- add principles to the Act;
- expand duties on public authorities to give 'proper consideration' to the Act's objectives, the Biodiversity Strategy and instruments such as critical habitat determinations and flora and fauna management plans;
- overhaul threatened species and communities' listing to bring it into alignment with the International Union for the Conservation of Nature (IUCN) categories;
- update and elaborate on measures concerning conservation management, such as critical habitat protection, conservation orders, agreement-making, and enforcement options.

Key changes to the Act include varying and/or expanding on forms of obligations operating under the Act. For the most part, this includes updating and 'strengthening' forms of duties on public authorities generally or on the specific authority of the Secretary of the Department of Environment, Land, Water and Planning (DELWP) to consider doing certain things. These duties reflect, in general, varying degrees of legal obligation:

- there are few examples of binding obligations of an authority or person to undertake certain actions. The most significant obligation of this type remains the obligation on the Secretary to prepare an Action Statement for a listed species or community 'as soon as possible' after listing.
- there is the new form of mandatory obligation to afford 'proper consideration' to various biodiversity matters under section 4B, which is intended to 'elevate biodiversity considerations to form part of the administration of government'⁵
- the making of various conservation devices, including critical habitat determinations, habitat conservation orders, management plans or public authority management agreements, are subject to the Secretary's discretion (the Secretary 'may' undertake these actions).
- the making of critical habitat agreements, once critical

habitat is determined under the Act, is an action the Secretary must take 'all reasonable steps' to implement.

Critical habitat

The concept of 'critical habitat' under the Act is an 'area of Victoria for which a critical habitat determination is made'.⁶ The Secretary may determine any area of Victoria to be critical habitat.⁷ 'Area' is not defined under the Act and it is unclear whether this term is to be confined to land. Given the often wide and liberal interpretation of environmental statutes, it is likely the term 'area' can include waters, sea, airspace, subterranean areas, or features attached to land (such as vegetation).

The rather circuitous definition of 'critical habitat' is elaborated and explained by more expansive guidance under subsection 20(2) that provides critical habitat can only be determined where the Secretary considers that:

- the area significantly contributes to the conservation in Victoria of a listed species or community; or
- the area significantly contributes to the conservation in Victoria of an unlisted species or community on the recommendation of the Committee and on which a decision to list is pending; or
- the area supports ecological processes or ecological integrity that significantly contributes to the conservation of a listed species or community.

The phrasing of this provision suggests that it is the Secretary's opinion on these matters that enables determination.

Further guidance is provided at subsection (3). A determination may be made if:

- the area is critical to the persistence of a species or community; or
- flora or fauna aggregate in the area for reproduction or other important life stages; or
- the area is used by flora or fauna to move between populations, migrate, disperse, or provides refugia during environmental stress; or
- the species or community is occasionally present in the area; or
- the species or community is not present in the area but was present previously and there is potential to reintroduce it; or
- the area is likely to be needed by a species or community in the future.

Each of these considerations are alternatives and do not have to be present in each or all circumstances for determination of critical habitat to be made. Each may inform the Secretary's consideration or opinion.

The 'critical habitat' formula used under the Act varies in certain important ways from the construction of the term elsewhere, such as under the *Environment Protection and*

⁵ Flora and Fauna Guarantee Amendment Bill 2019, Explanatory Memorandum, 6

⁶ *Flora and Fauna Guarantee Act 1988* (Vic), s 3 ('critical habitat')

⁷ *Flora and Fauna Guarantee Act 1988* (Vic), subs 20(1)

Biodiversity Conservation Act 1999 (the EPBC Act) or the United States *Endangered Species Act of 1973*. Under the latter, critical habitat is defined in terms of habitat ‘critical to the survival’ of a listed threatened species or community.⁸ Under the Act, a comparable term is used in guidance but the overarching scope of critical habitat extends to areas making a ‘significant contribution to conservation’ of a listed species or community (or non-listed species or community pending listing). ‘Significant contribution to conservation’ is arguably a more liberal framework, given in particular the areas thus identified are confined neither to those arguably *essential* (‘critical’) to the species or community nor to its mere survival. ‘Significant’ has a long history of judicial interpretation under biodiversity law, equating with ‘notable’ or ‘consequential’. ‘Conservation’ similarly can infer not only ‘persistence’ but also scope for recovery.

The legislative framing of ‘critical habitat’ under the FFG Act provides a relatively liberal and flexible canvas for biodiversity protection.

Determining critical habitat

As noted above, the Secretary is empowered to determine critical habitat.

The Scientific Advisory Committee may recommend the making of a critical habitat determination to the Secretary and the Secretary must consider that recommendation and make a decision on it. The Secretary must prepare and publish reasons on this decision.⁹

These obligations for responsiveness on the part of the Secretary have added some measures of accountability to the process of determining critical habitat. Committee recommendations do provide an avenue of independent, expert input into the process.

There is a form of public consultation and, in effect, objection process on a proposal to make a critical habitat determination.¹⁰

A determination may be made after consideration of submissions from the consultation process and a decision whether or not to determine critical habitat must be made within 12 months of publication of the original proposal.¹¹ A determination may be amended. For other than minor changes, the procedure for making a determination applies to making amendments.¹²

The Secretary can produce Guidelines ‘in relation to’ areas potentially eligible for determination as critical habitat, in consultation with the Scientific Advisory Committee.¹³ No guidelines have yet been made. Scope for this guidance is relatively broad: it concerns any matter touching on potential areas of critical habitat. It is not clear precisely what the effect and intention of these Guidelines are. They appear to be guidance for the management of areas

in anticipation of critical habitat being determined. For example, this could include guidance on identifying critical habitat, setting out conflicting uses or objectives, prioritising outcomes, or establishing interim arrangements for potential critical habitat areas.

The uses and effect of critical habitat determination

Determining critical habitat under the Act is the first in a step-wise process to protect threatened species habitat. Once determined in accordance with Division 2 of Part 4 of the Act, critical habitat acquires either direct and legal status and effect or, through further actions, provides a basis for new protection devices. Taken together, we refer to all of these measures and options as ‘critical habitat protections’ in this report.

Influencing public administration

Once made, a critical habitat determination has direct and immediate effect as a matter to which a public authority must give ‘proper consideration’ under subsection 4B(2)(c) of the Act. In this way, critical habitat of itself is intended to influence public administration, the treatment of threatened species, and biodiversity conservation as set out under a determination. Specifically, the conduct and behaviour of any relevant public authority is to be affected by and responsive to the determination and its contents and subject-matter.

Administrative uses: flora and fauna management plans

Critical habitat determinations can provide a basis for Flora and Fauna Management Plans prepared under Division 3 of Part 4. The Secretary is empowered, but not obliged, to make Management Plans.¹⁴ In a rather convoluted approach to drafting, the Secretary may however prepare guidelines setting out when Management Plans must be prepared.¹⁵

Management Plan contents are much wider than a response to critical habitat alone.¹⁶ The ‘conservation, management or restoration of a critical habitat’ is one matter for which a Management Plan may provide. A Management Plan may be informed by ‘critical habitat’ and, for the purposes of the FFG Act, that will mean an area ‘in respect of which a critical habitat determination has been made’.

Like a critical habitat determination, a Management Plan once made is a matter to which a public authority must give ‘proper consideration’ in the exercise of its functions.¹⁷

Agreement-making: critical habitat agreements and public authority management agreements

It is intended under the Act that a critical habitat determination provide a basis for agreement-making. The Secretary must ‘take all reasonable steps’ to enter into agreements in relation to areas that are the subject of a critical habitat determination.¹⁸ This phrase establishes a positive or proactive duty on the Secretary of DELWP to

8 EPBC Act, subs 207A(1)

9 *Flora and Fauna Guarantee Act 1988* (Vic), s 20A

10 *Flora and Fauna Guarantee Act 1988* (Vic), s 20B

11 *Flora and Fauna Guarantee Act 1988* (Vic), s 20C

12 *Flora and Fauna Guarantee Act 1988* (Vic), s 20D

13 *Flora and Fauna Guarantee Act 1988* (Vic), s 20E

14 *Flora and Fauna Guarantee Act 1988* (Vic), subs 21(1)

15 *Flora and Fauna Guarantee Act 1988* (Vic), subs 21(2)

16 See *Flora and Fauna Guarantee Act 1988* (Vic), s 23

17 *Flora and Fauna Guarantee Act 1988* (Vic), subs 4B(2)(d)

18 *Flora and Fauna Guarantee Act 1988* (Vic), subs 20F(1)

negotiate and conclude such agreements. 'Reasonableness' is not defined nor is there guidance on what actions are required to meet that standard.

The implications of the language in this section is that a voluntaristic approach to critical habitat protection is preferred. Leaving aside the contents of any such agreement, this type of agreement-making has certain analogies to private land conservation. A critical habitat agreement under section 20F must, however, be in the form of a 'public authority management agreement' made under section 25 or an agreement made under section 69 of the Conservation, Forests and Lands Act.¹⁹ In effect, the latter is a form of private land conservation arrangement.

The agreement must specify measures for the long-term conservation and protection of the critical habitat.²⁰

The Secretary need not take the steps to enter into an agreement if they are of the view that an alternative arrangement is in place to provide for long-term conservation and protection of critical habitat. Potentially, this provision raises the issue of whether an 'alternative' arrangement is of a comparable effect, coverage, outcome and/or status to these agreements.

A public authority management agreement is an agreement between the Secretary and a public authority under section 25 for the management of a species, community or threatening process. While it might be inferred that a form of legally binding agreement is envisaged by section 25, this outcome is not stated expressly. It is not clear what the form of agreement is – for example, whether it is a contract at common law or, potentially, a Memorandum of Understanding (with lesser legal effect).

Regulation: habitat conservation orders

The protection, conservation and management of critical habitat may be given regulatory effect through the making of a Habitat Conservation Order (HCO). This type of order updates 'Interim Conservation Orders' available under the pre-amended Act. An HCO is made under section 26.

Section 26 empowers the Minister to make an HCO in respect of critical habitat or an area to which is proposed to be determined as critical habitat.

The critical habitat determination triggers the *requirement* for the Minister to consider whether an HCO is to be made.²¹ A further precondition on the making of an HCO is necessary to halt, prevent or repair damage to critical habitat or proposed critical habitat. This damage can be past, present or anticipated.²²

Part 5 Division 1 of the Act also sets out details on the required contents of an HCO, processes for its preparation, process of amendment and revocation, provisions to enable permitting under an HCO, registration of HCOs, and review. An HCO can

remain in force for up to 10 years.²³ An HCO has the force of law and it is an offence to contravene an HCO.²⁴

The Minister is empowered to suspend licences and other authorities or approvals that operate in contravention of an HCO.²⁵

An HCO prevails over the provisions of a planning scheme.²⁶

A right to compensation follows from a financial loss arising from a 'natural, direct and reasonable consequence' of an HCO on existing use rights under planning law or rights accrued under an authority under any other Act.²⁷

Conclusions

'Critical habitat' and 'critical habitat determinations' under the FFG Act are an important basis for legal protection of threatened species and communities listed under that Act. The two terms effectively coincide under the Act.

'Critical habitat' is both a matter of fact and a matter of law. In particular, critical habitat will be informed by expert scientific opinion, as well as given expression in a determination made by the Secretary.

'Critical habitat' is to be given broad meaning but its operation depends on various 'decision points' available under the Act, mainly but not solely dependent on the discretion and actions of the Secretary of DELWP. The Scientific Committee has a relevant and potentially influential role also.

'Critical habitat' informs other mechanisms under the Act as well as having direct effect once 'determined'.

19 *Flora and Fauna Guarantee Act 1988* (Vic), subs 20F(2)

20 *Flora and Fauna Guarantee Act 1988* (Vic), subs 20F(3)

21 *Flora and Fauna Guarantee Act 1988* (Vic), subs 26(2)

22 *Flora and Fauna Guarantee Act 1988* (Vic), subs 26(3)

23 *Flora and Fauna Guarantee Act 1988* (Vic), subs 27(4)

24 *Flora and Fauna Guarantee Act 1988* (Vic), s 32

25 *Flora and Fauna Guarantee Act 1988* (Vic), s 34

26 *Flora and Fauna Guarantee Act 1988* (Vic), s 41

27 *Flora and Fauna Guarantee Act 1988* (Vic), s 39

Part 2: Biodiversity policy and how we can use critical habitat protections for threatened species conservation

The main formal expression of Victorian government biodiversity policy presently is *Protecting Victoria's Environment – Biodiversity 2037* ('Biodiversity Strategy') completed in 2017. This document functions as the current Biodiversity Strategy for the purposes of Part 4 of the FFG Act. A Biodiversity Strategy must be prepared under the Act.²⁸

Progress on implementation of the Biodiversity Strategy must be reviewed in 2022 by the Commissioner for Environmental Sustainability.²⁹

The Biodiversity Strategy provides no express consideration of threatened species' critical habitat, notwithstanding operation of the concept under the pre-amended FFG Act and its prominence in conservation law and policy generally.

The policy of the Biodiversity Strategy

The Biodiversity Strategy is constructed around certain key issues and themes:

- the headline goals, which are distilled into the themes of wellbeing being founded on the state of the natural environment ('Victorians value nature'); and 'functioning' biodiversity, improved habitats and resilience, 'even under climate change' ('healthy' natural environment).
- people 'valuing' nature is generally directed toward recreational and amenity values of human interactions with the natural world ('connecting with nature'), economic benefits (such as tourism), and voluntaristic conservation efforts.
- the conceptual architecture of the Strategy is based on ecological economics and environmental-accounting methods, which focus on aligning ecosystem science insights with economic models (for example, ecological 'stock' and 'flow' concepts in the analogy of 'natural capital' and ecosystem services concepts). Environmental-accounting assessment models and principles are to inform public sector decision-making. These models have come to proliferate, if not dominate, environmental assessment and policy-making, including via the United Nations.
- the 'healthy' environment objective is framed around a form of 'net gain' outcome ('overall improvement') with focus on threatened species and habitat, or in other words a type of welfare maximisation model aiming to target conservation investment. The investment focus of the policy aims for economies of scale in effect.
- the so-called 'game-changing' influence of climate change is accounted for in assumptions of ecosystem transitions, as well as climate-mitigation effects of nature (for example, in cities).
- forms of regional biodiversity planning are to be established, informed by modelled prioritisation of

conservation effort ('strategic management' actions).

- biodiversity conservation presumes a major role for the public sector ('leadership' across government and public reserves being a central pillar of nature conservation) but aims to leverage non-government efforts, either in terms of financing for or delivery of conservation.

The Biodiversity Strategy and the potential role for critical habitat in Victoria's conservation policy

Closer analysis of the Biodiversity Strategy is appropriate to consideration of use of critical habitat protections as an ecological device, especially in light of the passage of the FFG Act reforms.

The 'overall' improvement and outcomes policy: targeting action strategically via vulnerable species and habitat improvement

The policy focus of the Biodiversity Strategy is the targeting of conservation actions, especially investment (assuming finite funds). The specific priorities may be described as:³⁰

- not exacerbating the conservation status of vulnerable species,
- making *ad hoc* interventions for threatened species in order to avoid their extinction, and
- improving habitat in prioritised areas.

By use of existing conservation datasets and prioritisation protocols, a form of modelled landscape-scale approach to these objectives is constructed.³¹ Spatial representation of priority habitat improvement efforts is targeted. These are contained in 'decision support tools', such as 'Strategic Management Prospects', which are available through the NatureKit platform.³² The purported objective is 'securing the greatest overall benefit'.³³

The 'overall' goal of habitat improvement ('net gain') is linked to the goal of 'stopping the overall decline of threatened species'.³⁴ The general goal may be described as marginal habitat improvement across the State in order to achieve or connect with the ambition of arresting decline in threatened species.³⁵

There are two apparent dimensions of arresting threatened species decline:

- habitat improvement that halts or ameliorates extinction risk of vulnerable or near-threatened species, and
- 'specialised interventions'³⁶ for species or

²⁸ *Flora and Fauna Guarantee Act 1988* (Vic), Part 4 Div 1

²⁹ *Flora and Fauna Guarantee Act 1988* (Vic), s 18D

³⁰ Biodiversity Strategy, 20

³¹ *Biodiversity Strategy*, 19, Appendix 1; DELWP *Biodiversity Knowledge Framework* (2020), <https://www.environment.vic.gov.au/biodiversity/knowledge-framework>

³² See DELWP *Deciding Which Actions Best Help Nature: Decision-support Tools to Help Biodiversity Managers Protect Victoria's Environment* (2017), https://www.environment.vic.gov.au/_data/assets/pdf_file/0023/49046/NaturePrint_Brochure_WEB.pdf

³³ Biodiversity Strategy, 17-18

³⁴ Biodiversity Strategy, 14

³⁵ *Ibid*: 'The intent is to see an overall improvement, where the majority of habitats and threatened species will be improved, and habitat gains will outweigh losses.'

³⁶ Biodiversity Strategy, 18

communities at higher risk of extinction (i.e. endangered or critically endangered species).

One inference that can be drawn from this ‘overall’ approach is withdrawal of government effort from threatened species recovery, in terms of sustained effort of recovery of *all* threatened species and, more specifically, seeming withdrawal of ambition of recovery of all high conservation threatened species.³⁷ The policy represents, in effect, a rationing of threatened species recovery. It is questionable whether this approach is consistent with the 2019 amendments to the FFG Act.³⁸

Beyond the ‘overall’ improvement and outcomes policy: the role for critical habitat protections

Having regard to this qualified withdrawal from threatened species recovery, ‘specialised intervention’ may still be taken to mean *ad hoc*, targeted interventions using policy tools – critical habitat protections can represent such a form of ‘intervention’.

Critical habitat protections³⁹ can be used in a manner broadly consistent with these features of the Strategy and its policy. Critical habitat protections provide the potential for a wider set of actions for threatened species, aligned with ‘specialised interventions’. For example, critical habitat protections can provide regulatory controls and legal obligations across government. They are not necessarily reliant on conservation funding.

Policy gap in giving full and proper regard to biodiversity threats, especially those deriving from statutory decisions and permitted uses

The concept of habitat improvement under the Strategy depends heavily on a modelled scheme for discerning and evaluating incremental, positive changes in habitat. The measure for these changes (‘gain’) is probabilistic outcomes based on management interventions, especially focused on removal of biodiversity threats as well as certain restorative actions (such as revegetation or fencing). Precise forms of management intervention are intended to be identified through ‘elicitation’ of expert opinion – that is, informed by expert views as to appropriate actions. The measurable time horizon is likelihood of improvement over 50 years. The measure developed is termed ‘change in suitable habitat’. Combined with prioritisation methods (‘zonation’) the digital models produce strategic management models (‘strategic management prospects’).⁴⁰

Relevant management ‘interventions’⁴¹ focus seemingly on removal of biological threats, such as invasive species.

37 As represented diagrammatically at *Biodiversity Strategy*, Fig 3.2, 18

38 For example, the goal of halting the decline of threatened species falls short, on its face, of ‘prevent[ing] communities and taxa from becoming threatened and recover[ing] threatened taxa and communities so that their conservation status improves’ (FFG Act, subs 4(b), emphasis added). Additionally, the goal of halting decline

39 The term ‘critical habitat protections’ is used here to encompass the spectrum of ‘critical habitat determination’ and its potential uses under the Act. See above.

40 Biodiversity Strategy, Appendix 1; DELWP *Deciding Which Actions Best Help Nature*; DELWP *Biodiversity Knowledge Framework*

41 DELWP *Deciding which actions best help nature* (2017); DELWP *Biodiversity Knowledge Framework*

Tackling those threats is necessary and appropriate. It is also a partial response.

Direct, human sources of threat appear, at worst, absent from this approach and its methodology, at best ambiguously accounted for. Key human sources of threat include the making of statutory decisions that approve, endorse, enable or regulate actions or conduct constituting threats to listed species or communities,⁴² such as development or resource use. Works or programs undertaken directly or auspiced by the State can also have far-reaching adverse consequences on biodiversity, such as inappropriate burning or clearing regimes, infrastructure development, or water management. These can include cumulative degrading influences on the integrity of ecological systems. Additionally, management of degrading actions or conduct permitted as of right do not appear to be accounted for clearly in the Strategy and its policy, such as uses of coastal Crown lands and waters, uses of other public lands, exempted take of water resources or clearing of native vegetation.

Direct human-sourced biodiversity threats include those posed by inconsistent or conflicting use of land and resources, including parks and reserves, by the public and communities in their ‘interactions with nature’. The policy may potentially *induce* threats to biodiversity in excessive or inappropriate human use in the course of for example recreation, tourism, etc. (the ‘people enjoying nature’ approach).

Concession to the importance of authorised threats is noted elliptically in the Strategy:⁴³

Ecological regimes will be improved and biodiversity supported by preventing the spread and reducing the impact of weeds and pest animals and by ensuring that water flows, fire regimes and nutrient cycles are appropriate and adequate, that resource use is sustainable, and that the roles of important classes of species (e.g. pollinators and native apex predators such as owls, quolls and dingoes) are acknowledged and considered in management planning.

Assuming that actions and conduct permitted under statutory decisions, endorsed programs⁴⁴ or as of right uses represent sources of threat to biodiversity in Victoria (including threatened species), it is an important oversight that there is no systematic consideration of this in the Strategy and biodiversity policy.

It is open to policy-makers updating or implementing the Strategy to incorporate these types of authorised threats to biodiversity through the ‘expert elicitation’ process. This approach appears in part what is occurring through the elaboration of a ‘knowledge framework’. Authorised or enabled conduct is reflected in elicitation processes applied to certain threatened species or conservation issues. This

42 For example, water diversions and take, habitat loss or degradation from permitted clearing, burning programs, forestry operations, licences discharges, authorised resources extractions, and so on.

43 Biodiversity Strategy, 14

44 For example, planned burning or other Crown land management operations.

representation is high-level or abstract. For example, in relation to invasive species control, such as deer,⁴⁵ there is no express reference to the maintenance of a legally protected status for that species.⁴⁶ Similarly, Action Statements or Recovery Plans prepared in relation to threatened species are not explicitly considered. The treatment of Hooded Plover, for example, indicates a role for regulation of beach use, which is known to be a key threat to this species, but this is only abstractly referred to in the 'knowledge framework' supporting the Biodiversity Strategy.⁴⁷ Key threats to threatened species and ecosystems arising from statutory decisions, such as native vegetation clearing or water take, are considered allusively in these materials. Those threats are not treated in any details by the causal modelling employed.⁴⁸

In addition to the above points, caution should be taken to any heavy reliance on modelling of conservation outcomes or practices, in absence of sustained on-ground science and practice.⁴⁹

Critical habitat protection identifies and fills gaps in response to biodiversity threats

Critical habitat protections available under the Act can provide tools responsive to authorised threats to biodiversity and/or threats posed by human conduct or conflicting uses. This approach can be aided by identified human threats stipulated in Action Statements and recovery plans.

Distinct from the focus of the Biodiversity Strategy on *investment* in the management of biodiversity threats (and other 'interventions'), arguably a focus of critical habitat protections is *regulatory* intervention in response to those threats. This could potentially include modification, amendment or impairment of existing legal rights and privileges that produce biodiversity threats.⁵⁰

Critical habitat protections provide a device for systematic, codified and transparent interventions required for threatened species conservation. Critical habitat protections can provide for targeted responses to authorised threats (for example, statutory approval of harm to threatened species habitat), or improved management of permitted threatening conduct (for example, as of right uses).

In other words, critical habitat protections can provide 'packages' of legal 'interventions' aligned with SMART responses (Specific, Measurable, Achievable, Realistic, and Time-bound).

Critical habitat protections can enable these responses in relation to priority habitat as defined under section 20 (in essence habitat that is of 'substantial' importance or essential to a species survival and recovery). This is a more urgent and pressing standard than 'suitable' habitat.⁵¹

As noted above, determination of critical habitat as provided for under the Act informs both administrative and regulatory action across government.

In administration of the Biodiversity Strategy, DELWP has established a focus on a series of 'icon' threatened species. Leaving aside questions as to methods for prioritising or choosing target species, critical habitat protections would appear to be obvious measures in implementation of recovery of those 'icon' species, especially given the targeted character and legal force behind critical habitat protections.⁵²

Similarly, emphasis on ecological connectivity (as an ecological process) under various Biodiversity Response Planning projects⁵³ could be a focus of critical habitat protections in support of listed species or communities.⁵⁴

Biodiversity Strategy does not respond well to ecological science

In the Biodiversity Strategy, a 'net gain' strategy is proposed in the form of 'overall improvement' achieved through 'change in suitable habitat'. This measure is developed based on causal models of biodiversity responses to 'management or intervention'.⁵⁵ The policy adopts a modelling tool based on the assessment and weighting of causal influences on outcomes (effects). This tool is called 'fuzzy cognitive mapping'.⁵⁶ It may be a useful tool. However, in terms of its application to ecosystem management generally, and restoration science in particular, it evidences limitations and these limitations need to be set out.

- Ecological systems are complex and dynamic phenomena. This is well-established in ecological science and theory. This is not necessarily represented in the causal model used. For example, the analytical approach (fuzzy cognitive mapping) is based on a relatively simple and deterministic cause-effect relationship, albeit with weighted variables. Ecological sciences have long focused on a wide range of system relationships and properties in nature, beyond simple causation, such as non-linear

45 DELWP *Biodiversity Knowledge Framework*, 16-20

46 Certain deer species are currently protected and their take regulated under the *Wildlife Act 1975* (Vic). This status is largely a legacy of wildlife law as a regime for managing 'game' species and hunting.

47 DELWP *Biodiversity Knowledge Framework*, 37; see also DELWP 'Hooded Plover', <https://www.environment.vic.gov.au/conserving-threatened-species/threatened-species/hooded-plover>

48 DELWP *Biodiversity Knowledge Framework*, 10-12

49 See for example the critique of the Federal Court of reliance on modelling to achieve real-world outcomes in the forestry context in *Friends of Leadbeaters Possum Inc v VicForests (No 4)* (2020) FCA 704

50 HCOs can have this function for example through sections 34 and 41 (suspending rights etc and prevailing over planning schemes respectively).

51 'Suitable habitat', as expressed under the Biodiversity Strategy, would appear to refer to habitat available to a species (or multiple species) or which it can 'make use of': see eg *Biodiversity Strategy*, 19: 'Change in Suitable Habitat considers the type, extent and configuration of habitat for a species, and the factors that influence how much a species can make use of this habitat.'

52 DELWP 'Icon species'; <https://www.environment.vic.gov.au/biodiversity/biodiversity-on-ground-action/icon-species>

53 DELWP Biodiversity response planning projects'; https://www.environment.vic.gov.au/biodiversity/biodiversity-response-planning#Biodiversity_Response_Planning_project_list

54 *Flora and Fauna Guarantee Act 1988* (Vic), subs 20(2)(c)

55 DELWP *Biodiversity Knowledge Framework*, 6

56 Ibid; see eg Hobbs et al 'Fuzzy cognitive mapping as a tool to define management objectives for complex ecosystems' (2002) 12 *Ecological Applications* 5 1548

dynamics,⁵⁷ trophic cascade effects, stochasticity, and system or species resilience. This broader set of considerations is reflective of the inherent, well-settled dynamism of ecological systems.

- This modelling technique may well sit alongside other useful or important tools informing biodiversity decision-making and policy. Why this technique was chosen and what other assessment tools might be available or appropriate are not questions canvassed or resolved in the Biodiversity Strategy. Choices as to modelling tools should be justified, as well as adapted to strategy and goals. For example, different modelling techniques may be better suited to ecosystem management problems, such as ‘keystone’ species reintroduction and trophic cascade effects arising from this strategy.⁵⁸
- Measurable actions or ‘interventions’ informing a quantum of ‘gain’ appear to reflect primarily responses to *biological* sources of ecosystem degradation (for example, invasive species management, engaging in revegetation, and so on) without systematic inclusion of actions responding to *regulated human drivers* of degradation (such as development actions, resource uses, inappropriate fire regimes, water diversions, or permitted land uses). At best, the measurable interventions identified are partial contributions to ecosystem recovery.
- The ‘change in suitable habitat’ method is, arguably, based on a theory of *change* or *improvement*, but this approach is more limited and confined than a theory of ecological *restoration* or *recovery*. A preferred policy basis for biodiversity management should be *ecosystem restoration*. Such an approach provides a robust theoretical foundation to ‘overall improvement’ and/or ‘net gain’. Measures of improvement may be relevant and adapted to a program of restoration. But the former are enabling, not defining, of restoration. Furthermore, the statutory context of the reformed FFG Act emphasises ecosystem restoration and recovery objectives.⁵⁹
- The focus of the strategy appears to be ‘landscapes’ rather than ecosystems. The two terms may overlap and landscape-scale conservation is crucial to ecological recovery (alongside action at other scales), but positive outcomes for nature depend on an ecosystem approach, for reasons set out in this report. Further, an ‘ecosystem approach’ underpins legal models and obligations concerning biodiversity conservation.

Restoration science has been a developing field of work for several decades. Authoritative national and international standards for ecological restoration practice are in

57 Such as ‘regime shifts’ in ecological systems resulting from boundary, threshold or tipping points being exceeded, which can be manifest in either collapse (negative) or succession (positive) changes. These shifts can be particularly important in the context of extinction (or recovery) dynamics for threatened species including at the localised scale.

58 Cf Hunter et al ‘Reintroduction of Tasmanian Devils to mainland Australia can restore top-down control in ecosystems where dingoes have been extirpated’ (2015) 191 *Biological Conservation* 428; Baker et al ‘Ensemble ecosystem modelling for predicting ecosystem response to predator reintroduction’ (2017) 31 *Conservation Biology* 2 376

59 *Flora and Fauna Guarantee Act 1988* (Vic), subs 4(c)

circulation. The most recent and up-to-date version of this work is the second edition of the *International Principles and Standards for the Practice of Ecological Restoration* of 2019.⁶⁰ There is an extensive body of literature concerned with the application of ecological concepts to restoration models and projects. Ecological restoration is understood as intentional human interventions aimed at recovery of degraded ecosystems. Restoration is framed as a purposive, structured and organised ‘change’, typically in an ecosystem setting.⁶¹ It is, in effect, a project of ordered and principled⁶² experimentation.⁶³

These International Principles and Standards are an important stepping-off point for applying ecological restoration systematically to biodiversity policy. For example, the document includes elemental guiding principles that restoration is intended to support ‘natural processes of recovery’ in order to enable ecosystem resilience,⁶⁴ and it sets out an ordered scheme of ecosystem recovery based on cumulative actions. These start with *preventing further deterioration and managing and mitigating adjacent threats*. They proceed to establishing characteristic ecological communities and enabling key ecological processes, with the aim of achieving self-organising and self-sustaining ecosystems.⁶⁵

A key gap in the Biodiversity Strategy is a well-grounded ‘theory of change’, which restoration ecology can supply consistent with the prevailing statutory framework.

Critical habitat protections can provide a key device (focal point) for restoration science and practice

Critical habitat protections provide statutory devices for setting out measures connected to recovery programs for listed threatened species. They can contribute to orderly models of ecological restoration. For example, critical habitat protections can implement threat mitigation, investment actions, and other measures identified as part of programs aligned to wider ecosystem recovery objectives.

Critical habitat protections are intended to be part of recovery and restoration efforts. This intention is implied in the legislative guidance under section 20 of the Act, which sets out a non-exhaustive list of characteristic areas to which

60 *SER International Principles and Standards for the Practice of Ecological Restoration* (2019), <https://www.ser.org/page/SERStandards/International-Standards-for-the-Practice-of-Ecological-Restoration.htm>; other useful sources include Alison and Murphy (eds) *Routledge Handbook of Ecological and Environmental Restoration* (Taylor and Francis, 2017). See also *SERA National Standards for the Practice of Ecological Restoration in Australia* (2017), <http://seraustoralasia.com/standards/contents.html>

61 Allison et al *Routledge Handbook of Ecological and Environmental Restoration* (Routledge, 2017);

62 *SER International Principles and Standards for the Practice of Ecological Restoration*; Higgs et al ‘On principles and standards in ecological restoration’ (2018) 26 *Restoration Ecology* 3 399

63 See eg Zedler ‘Ecological restoration: guidance from theory’ 3 *San Francisco Estuary and Watershed Science* 2, <https://escholarship.org/content/qt707064no/qt707064no.pdf>; Palmer et al ‘Ecological theory and restoration ecology’ in Falk et al (eds) *Foundations in Restoration Ecology* (Island Press, 2006), https://www.researchgate.net/profile/Donald_Falk/publication/40777417_Foundations_of_Restoration_Ecology/links/00b7d528b8edd4e91600000/Foundations_of_Restoration_Ecology.pdf#page=14

64 *SER International Principles and Standards*, 32

65 The so-called ‘5 star recovery system’: *SER International Principles and Standards*, 40-45

critical habitat may relate. These include areas important for species reproduction, movement or dispersal of species, and potential species reintroduction, and for potential or anticipated future species needs.⁶⁶

The device of critical habitat protection clearly anticipates, and facilitates, key biodiversity objectives under the Act, in particular:

- the prevention of species and communities becoming threatened and enabling the recovery of those that are, in order that their conservation status improves;
- the ‘protection, conservation, restoration and enhancement’ of biodiversity including habitat, genetic diversity, ecological communities and ecological processes;
- ensuring biodiversity use as a natural resource is ecologically sustainable.

Enabling influence of these objectives on public sector conduct and practice is required under the Act.

The drafting of critical habitat protections can give specific and targeted expression to:

- Restoration models and practices (for example, through building critical habitat protections into wider ecosystem restoration⁶⁷);
- Recovery outcomes and pathways (for example, progressive elimination of threats, actions directed to proactive repair, and implementation of existing recovery plans); and
- The formulation of ‘reference models’ and targets of environmental improvement (for example, critical habitat protection can help identify ecosystem features or processes underpinning species recovery).

EXAMPLE: DIGGING MARSUPIALS AS KEYSTONE SPECIES

Many Australian marsupials are ‘digging marsupials’. Some of these species are well-known, such as the wombat and the (monotreme) echidna. There are many smaller digging marsupials, including dunnarts, bettongs, bilbies, bandicoots, potoroos, and native rodents. These digging marsupials occupy crucial ecological niches and perform essential ecological functions, such as aerating and turning over soil and avoiding soil compaction, enabling water infiltration and contributing to dispersal of seeds and fungi, establishing habitat and burrows for other species and effecting nutrient cycling. They perform these functions and roles in forests, arid zones, and grasslands. They have disproportionate ecosystem impacts and benefits to their abundance and hence assume the role of ‘keystone species’ – they are of particular strategic ecological importance. The role of ‘keystone’ ecological features has been recognised in biodiversity policy and practice.⁶⁸

Some digging marsupials are extinct, or regionally extinct in Victoria. Introduced ‘diggers’, such as rabbits and pigs, tend not to produce the same ecosystem functions as native digging marsupials.

Some digging marsupials are relative common, such as echidnas. Others are listed as threatened species, such as the Rufous and Brush-tail Bettong, the Southern Brown Bandicoot, the Long-footed Potoroo, and the Common Dunnart. Design and implementation of critical habitat protections for some or all of these species could be particularly valuable from an ecosystem perspective. Strategic emphasis on critical habitat protections for one or more ‘digging marsupials’ may well be favoured as a device for recovery of discrete ecosystems, notably where those species maintain and potentially extend soil health and its attendant benefits and services.

From a strategic vantage point, the targeting of critical habitat protections for ‘digging marsupial’ species is an example of the application of robust ecological theory in informing conservation choices.

⁶⁶ *Flora and Fauna Guarantee Act 1988* (Vic), subs 20(3)

⁶⁷ See eg ‘South-eastern Red-Tailed Black Cockatoo, *Calyptorhynchus banksii graptogyne*’ below

⁶⁸ See *McDonald v West Wimmera SC (Red Dot)* [2019] VCAT 70, [41]-[44]

Biodiversity Strategy understates connection of biodiversity to climate change

The Biodiversity Strategy contends with the ‘game-changing’ influence of climate change on biodiversity. The Strategy refers to ‘ecosystem shifts’ arising from climate change, and

Climate change will influence the future location and availability of habitats and the intensity and distribution of threats, and this in turn will influence how different types of management are targeted.⁶⁹

The need to accommodate change in land-use and resource conflicts are indicated at a high level of generality.⁷⁰ Climate change is recognised as a biodiversity conservation variable, which is likely to influence responses within the overall strategy, as well as required ‘adaptive management’. The Strategy includes the role of urban ecology as an important part of climate change adaptation (through expansion of so-called ‘green infrastructure’).⁷¹

All of this is helpful, however it is also not entirely candid or fully informative of the relationship of climate change to ecosystem trajectories or to the nature and scale of the ecosystem interventions likely needed.

Since the Biodiversity Strategy was prepared at least one clear climate-attributed event has had major implications for biodiversity conservation: the east coast fires of 2019–2020, including across East Gippsland in early 2020.

The 2020 fires expose the first of two major analytical shortcomings in the Biodiversity Strategy, as it relates to climate change: its failure to engage explicitly with the catastrophic (non-linear) character of climate change. This can be manifest in extreme events. The implicit assumption in the Biodiversity Strategy is that gradualist and incremental responses (‘shifts’) in ecosystems are likely and conservation actions should be targeted to those changes. It has been well-known for some time, with a high degree of confidence, that climate shifts are likely to be ‘abrupt’, catastrophic, and linked to extreme events.⁷² Ignoring this probability at the time of preparing the Biodiversity Strategy was problematic. It tends to reflect the approach that climate change dynamics are in the ‘too hard basket’. It also appears to represent a major gap in the spectrum of ‘threats’ necessary to consider, in some form at least, in calculations of habitat change and improvement.

The Biodiversity Strategy should have engaged more comprehensively and precisely with likely (actual and projected) climate dynamics as these effect ecosystems. It will need to do so in the future. Probabilities of abrupt changes associated with climate change, including to regional or local ecosystems, combined with likelihood of extreme events affecting ecosystems, need to be considered in light of exposure and vulnerability of natural

and human systems.⁷³ Consideration of these dynamics, including biodiversity exposures and vulnerabilities, should be signalled as a program of work under the Biodiversity Strategy, if not in the Strategy itself.

A second important analytical shortcoming in the Strategy is lack of full and express appreciation of ecosystems and biodiversity in climate mitigation – or, in other words, the extent of *overlap of ecological integrity and climate stability*, and, conversely, potential contributions of ecosystem recovery to climate mitigation efforts. This issue concerns the function of natural ‘ecosystem services’ as carbon sinks, as well as ‘buffers’ and contributors to resilience. The potential contribution of ecosystem protection and restoration to climate change mitigation is large and the full scope of this contribution does not appear to be accounted for or acknowledged in the Strategy:

Nature based solutions with safeguards are estimated to provide 37 per cent of climate change mitigation until 2030 needed to meet the goal of keeping global warming below 2 degrees C with likely co-benefits for biodiversity.⁷⁴

Interaction between land use, ecosystems and climate change is complex. However, improving ecosystems contributes to climate change mitigation.⁷⁵ What is not acknowledged in the Biodiversity Strategy is the role in and importance of ecosystem recovery to climate change mitigation. This task may be comparable to the effect of reducing emissions. Furthermore, this climate buffering function of ecosystem recovery is not posed in how priorities are set under the Strategy (for example, in establishing the Strategic Management Prospects framework and outputs).⁷⁶

69 Biodiversity Strategy, 17.

70 Biodiversity Strategy, 17. The use of ‘scenario planning’ to manage conflicts is suggested.

71 Biodiversity Strategy, 32–33

72 See IPCC *Climate Change 2014: Synthesis Report for Policy-Makers* (2014), [1.3], [1.4], [2.3], [2.4],

73 See IPCC *Managing the Risks of Extreme Climate Events and Disasters to Advance Climate Change Adaptation* (2012)

74 Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services *Summary for Policy-Makers of the Global Assessment Report on Biodiversity and Ecosystem Services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services* (2019), 10 [D8]

75 IPCC *Climate Change and Land: An IPCC Special Report on Climate Change, Desertification, Land Degradation, Sustainable Land Management, Food Security, and Greenhouse Gas Fluxes in Terrestrial Ecosystems – Summary for Policy-Makers* (2020). ‘Sustainability-focused’ models require stabilisation of loss of natural ecosystems and a high degree of reforestation (or ecosystem repair): see 20–32

76 There is active debate over the potential extent of ecosystem restoration (in particular reforestation) needed and available as a key part of climate mitigation: see eg Bastin et al ‘The global tree restoration potential’ (2019) 365 *Science* 76, who assert that the sequestration potential of restoration ‘places ecosystem restoration as one of the most effective solutions at our disposal’. Bastin et al’s calculations and assertions have been actively debated in subsequent issues of *Science*, with contentions ranging from outright refutation to qualification of their methods and findings.

Critical habitat protections as a response to climate change

Conservation policy responses to climate change – in terms both of climate adaptation and climate mitigation strategies – are an issue of considerable breadth and complexity. How critical habitat protections contribute meaningfully to this overall response is likely a nuanced and strategic exercise. Critical habitat protection are important, if not crucial, for the following reasons and in the following ways:

- administration of the FFG Act is required to give ‘proper consideration’ to the ‘potential impacts of climate change’⁷⁷ as well as precaution.⁷⁸ The use of critical habitat protections can be a key device in that administration;
- protection of critical habitat for targeted threatened species, as well as in maintenance of ecological processes, will likely be important in ensuring the survival of numerous species in the context of shifting and retreating habitat availability;
- critical habitat protections would be an important, targeted tool responsive to climate change scenarios, such as ‘reinforcing existing populations’; managing ecological balance within certain areas or habitat ranges, and increasing habitat areas and corridors or connectivity;⁷⁹
- critical habitat protections would be important to *anticipatory* habitat needs, including protecting refugia, core habitat in the context of overall decline, linkages and connectivity between ‘suitable habitat’ (for example, corridors as critical habitat), and critical habitat as a basis of co-benefits (for example, critical habitat areas as protection of micro-climates, healthy hydrological systems, or cultural landscapes); and
- critical habitat protections as a precautionary device in order to establish, for example, buffers (‘margins for error’ or for loss) in maintenance of threatened species’ populations or for key ecological processes. Critical habitat protections are likely to be a *mechanism of prudence* in the context of climate change, as indeed they are likely to be in the context of the inter-related extinction crisis.⁸⁰

77 *Flora and Fauna Guarantee Act 1988* (Vic), subs 4A(c)

78 *Flora and Fauna Guarantee Act 1988* (Vic), subs 4A(d). The relevance of precaution to interactions between climate change and biodiversity turns on application of threshold triggers of risk of serious or irreversible harm to biodiversity (or any particular species, ecosystem or ecological process) combined with a degree of uncertainty. This is likely to apply in the context of many, if not most, listed species or communities, or ecological processes, as affected by climate change. Once precaution is triggered proportionate response directed to preventing degradation is required.

79 Biodiversity Strategy, 16-17

80 See eg *Telstra v Hornsby Shire Council* [2006] NSWLEC 133, [162]

EXAMPLE: MOUNTAIN FORESTS

In Victoria, cool temperate forests are endangered. These forests contain diverse and spectacular species, such as Mountain Ash and rainforest species. Endangered fauna, such as Leadbeater’s Possum, are associated with this ecosystem. Cool temperate forests are connected to rainforest, with the former understood to be a ‘successional’ stage of the latter.

These forests are threatened by fire and by logging, to the point where the ecosystem as a whole is threatened with collapse.⁸¹ The fate of these mountain forests is closely linked to climate change, both in terms of exacerbated threat but also the ‘ecosystem services’ provided to mitigate or forestall climate change. Mountain Ash forests for example are enormous stores of carbon, making them major ‘carbon sinks’.⁸² Their loss, through fire or logging, releases large volumes of greenhouse gases. Both rainforest and other forest components are important climate buffers, in their resistance to fire, their water regulation functions, and their regulation of microclimate.

These types of forest ecosystems represent important biodiversity refugia in the context of changing (increasingly intense and frequent) fire regimes and habitat loss.⁸³ The fate of this threatened ecosystem is tied to decisions concerning its function in climate regulation among other complementary as well as conflicting ‘ecosystem services’.⁸⁴ Establishment of critical habitat protections in these forests represents a tool responsive to climate change and biodiversity impacts on these ecosystems. These protections may be linked to protections for specific forest-dependent threatened species, such as Leadbeater’s Possum.

81 Lindenmayer et al ‘Avoiding ecosystem collapse in managed forest ecosystems’ (2016) 14 *Frontiers in Ecology and Environment* 10 561; Bergstrom et al ‘Combating ecosystem collapse from the tropics to the Antarctic’ (2021) *Global Change Biology*, <https://doi.org/10.1111/gcb.15539>

82 Lindenmayer and Mackey ‘Native forests can help hit emissions targets – if we leave them alone’ *The Conversation*, 23 July 2015, <https://theconversation.com/native-forests-can-help-hit-emissions-targets-if-we-leave-them-alone-44849>; Keith et al ‘Re-evaluation of forest biomass carbon stocks and lessons from the world’s most carbon dense forests’ (2009) 106 *PNAS* 28 11635

83 Mackey et al *Wildlife, Fire and Future Climate: A Forest Ecosystem Analysis* (CSIRO Publishing, 2002)

84 See Colloff et al ‘Adaptation services and pathways for the management of temperate montane forests under transformational climate change’ (2016) 38 *Climate Change* 267; Keith et al ‘Ecosystem accounts define explicit and spatial trade-offs for managing natural resources’ (2017) 1 *Nature Ecology and Evolution* 1683

Biodiversity Strategy side-steps threatened species recovery planning

The premise of the Biodiversity Strategy is that marginal improvement in habitat for rare or threatened species, according to a scheme of prioritisation across landscapes, will achieve ‘overall improvement’. Targeting of landscapes and species focuses on vulnerable species and communities, with additional interventions for those effectively in high-risk conservation categories (such as critically endangered). It is analogous to a ‘welfare maximisation’ model.

None of this has apparent regard for the mandate for recovery planning at section 19 of the FFG Act. The FFG Act contains a statutory duty on the Secretary of DELWP to prepare Action Statements for listed species and communities ‘as soon as possible’ after listing.⁸⁵ Action Statements are a form of threatened species recovery plan, setting out what has been done to conserve and manage the species/community and what is intended to be done, and may set out information on what needs to be done. Recovery planning is a cornerstone of threatened species conservation.

There is no mention of Action Statements or recovery planning in the Strategy.

It is not clear what role Action Statements and recovery planning are to play in the Strategy, including for example in informing prioritisation techniques (‘change in suitable habitat’ priorities and cognitive mapping).

For many listed species, no Action Statement has been prepared, despite the obligation under section 19. Many other Action Statements are in need of revision as they have not been reviewed and updated in more than a decade.

In effect, the Strategy appears to ignore the legislative

⁸⁵ *Flora and Fauna Guarantee Act 1988* (Vic), subs 19(1). This duty operated under the Act prior to the recent amendments and continues in substantially the same form.

mandate concerning preparation of Action Statements. The Strategy appears to side-step this provision and embark, at its highest, on summary engagement with experts in respect of certain listed species and threats to discern courses of management action.

This approach appears to ignore the intention, implied in the requirement to produce Action Statements, that recovery planning informs threatened species conservation and biodiversity management more generally. As a matter of practice, recovery planning typically includes species/community descriptions, identification of threats to species or community survival, critical habitat, and responsive management actions.

Ignorance of recovery planning in the Biodiversity Strategy appears to be consistent with systematic failure to meet the established (and continuing) legislative mandate concerning Action Statements. This shortcoming is demonstrated in Figure 1. More than half of listed species do not have prepared Action Statements. Of prepared Action Statements, nearly all are more than 10 years old.

Critical habitat protections are important in informing recovery planning

The factual description of critical habitat should inform recovery planning for threatened species and communities, including in the form of Action Statements made under the FFG Act. In other jurisdictions, description of designation of critical habitat is formally part of the legal machinery of recovery planning and threatened species conservation.⁸⁶

Critical habitat determinations should be prepared on the basis, among others, that they align with preparation and/or revision of Action Statements, providing not only descriptive content to species or community conservation but instruments anticipating management. A guide to priority for

⁸⁶ See eg *Endangered Species Act of 1973* 16 U. S. C ch 35, s 4; *Environment Protection and Biodiversity Conservation Act 1999* (Cth), subs 270(2)(d)

FIGURE 1: LISTED THREATENED SPECIES UNDER FFG ACT AND ACTION STATEMENTS (AS AT NOVEMBER 2019)

CATEGORY	TOTAL LISTED SPECIES	LISTED SPECIES WITH PREPARED ACTION STATEMENT	ACTION STATEMENT >10 YEARS OLD
Amphibians	12	6	4
Birds	81	43	42
Communities	41	18	18
Fish	31	16	11
Invertebrates	73	24	23
Mammals	42	33	29
Plants	Vascular and non-vascular: 359 + 19 = 378	131	126
Reptiles	29	13	11
Total	687	284 (42.3% of all listed species)	264 (92.96% of Action Statements)

Source: https://www.environment.vic.gov.au/_data/assets/pdf_file/0024/115827/20191114-FFG-Threatened-List.pdf; ... <https://www.environment.vic.gov.au/conserving-threatened-species/action-statements>

use of critical habitat protection as a device for progressing or implementing recovery planning on the basis of Action Statements might be:

- whether and/or how critical habitat protections respond to each of the duties and power under subs 19(2) of the FFG Act (Action Statements to set out what has been done, what is intended to be done and information on what needs to be done to conserve and management threatened species/communities); and
- which species/communities are most likely to benefit⁸⁷ from design and implementation of critical habitat protections as part of Action Statements, especially in the context of:
 - ♦ relative risks of extinction, intensity and likelihood of activities conflicting with preservation of critical habitat;
 - ♦ importance of critical habitat to wider ecological processes;
 - ♦ social factors such as extent of community organisation and support for species recovery;
 - ♦ costs and disruptions calculated in financial terms; and
 - ♦ costs calculated in terms of impacts on natural capital base.

Building critical habitat into the ‘business of government’

Critical habitat protections enable biodiversity obligations to be met

The recent FFG Act reforms ‘strengthened’ obligations on all public authorities to give ‘proper consideration’ to objectives of the Act. Those objectives are wide-ranging and ambitious, especially in terms of recovery, conservation and restoration of biodiversity. The standard of ‘proper consideration’ adverts to the requirement that these objectives be *influential* on the conduct, behaviour or practices of public authorities,⁸⁸ within the scope of their ordinary functions and powers. The intention is that the work of biodiversity conservation is applicable ‘across government’ as a whole.⁸⁹

The objectives of the Act include identifying and conserving areas in relation to which critical habitat determinations are made.

Integrating these biodiversity objectives ‘across government’ should properly include the making of critical habitat protections or contributing to their formulation and implementation.

Insofar as administration of the Act requires prudence and precaution, in order to achieve the objectives of the Act,⁹⁰ it is reasonable to assert that the Secretary and DELWP should be actively looking to make and implement critical habitat determinations and the wider set of protection associated

with them. In a great many instances, use of critical habitat protections under the Act will be proportionate to the conservation status of threatened species (for example, critically endangered species), to achievement of wider ecosystem or landscape outcomes (such as protecting various vulnerable species or contributing to enhanced ecological processes), and to important ancillary outcomes (such as mobilising communities around protected species or other biodiversity outcomes).

The making of critical habitat determinations, and design of protective tools based on them, is one important device enabling public administrators to discharge their duties under the Act. This will be particularly important in the context of public authorities with responsibilities for statutory decision-making and works affecting areas that are, as matter of fact and scientific opinion, critical habitat for threatened species or relevant to key ecological processes.

To progress the making and use of critical habitat protections across government we propose the following actions:

- Preparation and delivery of a *Strategic Plan for the Making and Implementation of Critical Habitat Protections for Threatened Species and Communities in Victoria* (‘the Strategic Plan’). This Strategic Plan would set out the means and timetable for delivering critical habitat protections. Those bases should include sound ecological criteria for priority, including threats and conservation status, as well as other relevant (financial, regulatory or social) criteria.⁹¹ They could work within or alongside guidelines under section 20E of the Act. Preparation and implementation of a Strategic Plan is consistent with fulfilment of the functions of the Secretary under section 7 of the Act. The ecosystem approach suggests pathways in strategic planning, such as targeting keystone species habitat or areas critical to ecosystem function.
- To the extent their functions and powers may impact on biodiversity and be relevant to critical habitat for threatened species and communities specifically, each public authority should establish a Biodiversity Program with measures that include but are not limited to:
 - ♦ protecting and enhancing determined critical habitat (active critical habitat protection);
 - ♦ contributing knowledge, resources, and organisational effort to identify and protect areas capable of determination as critical habitat (actions to anticipate critical habitat protection and threatened species conservation);
 - ♦ expanding organisational capacity directed to threatened conservation and critical habitat protection (capacity building); and
 - ♦ reporting against these measures.

87 Compare *Endangered Species Act of 1973* 16 U. S. C ch 35, subs 4(f)(1)(A) concerning method for prioritising the preparation of recovery plans.

88 Compare *Bare v IBAC* [2015] VSCA 197, [299]

89 Parliament of Victoria *Parliamentary Debates*, Legislative Assembly, 19 June 2019, Flora and Fauna Guarantee Amendment Bill 2019, Second Reading (Hon Lily D’Ambrosio, Minister for Energy, Environment and Climate Change), 2273

90 *Flora and Fauna Guarantee Act 1988* (Vic), subs 4A(d)

91 Strategic planning and prioritization methods apply in relation to other aspects of threatened species management, such as recovery planning and nomination, as well as the ‘change in suitable habitat’ method employed under the Biodiversity Strategy presently: see eg Walsh et al ‘Trends and biases in the listing and recovery planning of threatened species: an Australian case study’ (2012) 47 *Oryx* 1 134; *Biodiversity Conservation Act 2016* (NSW), s 4.11; *Endangered Species Act 1973* 16 USC 35 § 1531, s 4(f)(1)(A). Our contentions above in relation to the Biodiversity Strategy concern methods of ecological management rather than methods of prioritization per se.

Part 3: Case Studies for the Making of Critical Habitat Determinations

In this report we set out a series of case studies aimed at illustrating the value of critical habitat protections. In each case we include consideration of the ecology and science known of the species, reasons for using critical habitat protection (based on a CHD), and where and to whom generally critical habitat protections would apply.

The selection of case studies is not guided by priority or other criteria, other than, in each case, community and/or scientific effort has gone into conservation of the species to date. The selection is intended to begin the task of thinking through methods for designing, justifying and giving effect to critical habitat protection as they may be made under the Act.

Case study: Hooded Plover (*Charadrius rubricollis* (Gmelin))

Strategic justification for CHD: why is it needed?

Hooded Plover conservation efforts began at a few highly-localised sites in central Victoria led primarily by community groups and local rangers in the late 1980s. Population-wide counts have continued since 1980. In 2006, evaluation of population counts revealed a major population decline within Victoria. A statewide recovery project was commenced by BirdLife Australia (then Birds Australia). This began by establishing monitoring of 80 breeding sites across the entire coast and implementing on-ground signage and fencing around vulnerable nest and chick sites, to mitigate the impacts of human recreation. It was demonstrated that simple on-ground efforts to protect the breeding sites could result in improved fledging success through mitigation of multiple human-based threats.

From 2009, the project grew and key priorities were to:

- engage, train and support land managers across Victoria to manage threats to the Hooded Plover;
- engage, train and support citizen science volunteers across Victoria to monitor the birds and their threats at selected priority sites and to participate in on-ground actions, community education and advocacy; and to
- facilitate beach user behaviour change through education and improved coastal recreational zoning to alleviate key threats to the birds.

This 'bottom up' approach has successfully halted decline of the Victorian Hooded Plover population to date. Slowly, the population is beginning to increase in number again. Breeding success has improved. Key changes have been made to improve the long-term management of threats at priority sites, for example through prohibition of dogs in the Mornington Peninsula National Park, investment in a management plan for Belfast Coastal Reserve, and introduction of seasonal on-leash areas across the Bellarine Peninsula. Protection of Hooded Plover habitat benefits other shorebird species, including treaty-protected migratory shorebirds.

Recovery has now reached a point where progress is hampered by existing legislative, social and political barriers. Threats are escalating faster than mitigate efforts at most sites across Victoria. Despite volunteer and land manager efforts improving dog leashing and compliance with regulations, the proportion of beach users still breach 'guidelines' to a degree causing breeding failure at sites. Even where local councils have been supportive and have amended dog regulations to achieve improved protection, these changes are susceptible to local, public pressures and/or changes in elected council members. Successful actions to date are tenuous and vulnerable in the absence of long-term solution to threats. The burden of effort is placed on volunteers and burn out is likely, further weakening the recovery structure in place.

Improved protections and consistent implementation are imperative to population resilience and continued recovery. State-wide mechanisms for a set of protections for critical habitat would overcome the current site-based approach.

Science and conservation

An Action Statement was prepared for the Hooded Plover in 2003. The Action Statement notes:

The Hooded Plover, *Charadrius rubricollis* (Gmelin), is a medium-size shorebird (20 cm long) readily identified from other waders by its black head, white nape, black hindneck, and white underparts coupled with a black-tipped red beak and red eye ring... This bird is found predominantly on ocean beaches; at times on adjacent reef platforms, coastal inlets and lakes. It is most frequently seen in pairs although sometimes flocks of 30 or 40 are seen in Victoria... It favours wide beaches with large amounts of beachwashed seaweed, and also creek mouths or inlet entrances with large flat areas of sand... In Victoria the Hooded Plover is an opportunistic feeder, eating a Hooded Plover *Charadrius rubricollis* variety of invertebrates, such as crustaceans, molluscs, insects and polychaete worms ... The Hooded Plover occurs along the southern Australian coastline (WA, SA, Vic., Tas. and southern NSW). In south-western Australia this species inhabits inland saltlakes more than 100km from the sea... but in Victoria it is confined largely to the ocean-shore environment...

Since European settlement the range of the Hooded Plover in eastern Australia has declined (e.g. contracted from northern NSW). Even where it still occurs this species is now less abundant than formerly... Breeding success is very low to extremely low on beaches frequently visited by people and dogs...

Many of the ecological issues of this species are common to other beach-nesting species... In Victoria, the Hooded Plover breeds only on ocean beaches or adjacent sand dunes and low headlands and some islands within the Gippsland Lakes. Its breeding biology is not fully understood, but animals are most vulnerable in the breeding period.... The nest is a depression in the sand, typically next to vegetation and half-buried seaweed and other beachcast wrack on the uppermost sections of beaches or in primary sand dunes, at times on low rocky headlands and secondary dunes

over 100m in inland from the beach. The incubation period (about 30 days) is the longest of any Australian member of the genus *Charadrius*. The young do not fly for at least three weeks, so each clutch is vulnerable for nearly two months. The nesting seasons extends from August to February, which includes the time of peak use by holidaymakers, e.g. sunbathers and surf fishers. The Hooded Plover's habit of leaving a nest site if people approach and usually not returning until people have left the area has an important influence on breeding success...

Key current conservation objectives for the species include:

- Prevent population decline by improving breeding success rates through the reduction of impacts of human disturbance, invasive species and habitat modifications.
 - ♦ *[Conservative target: for at least 40–50% of breeding pairs within each distinct population, achieving breeding success rates of at least 0.4 fledglings/pair per season. Key knowledge gap: Population Viability Analysis to improve accuracy of targets.]*
- Maintain and improve the health and resilience of the adult population (or of key population units).
 - ♦ *[Conservative target: maintain a population of at least 800 adults in South Australia, 680 adults in Victoria, 70 adults in NSW and 1200 adults in Tasmania. Key knowledge gap: definition of population units informed by genetic analysis.]*
- Prevent the further loss and degradation of habitat critical to the survival of the species including breeding and non-breeding sites.
 - ♦ *[Conservative target: protect historically and currently occupied breeding and non-breeding habitat from degradation and loss. Key knowledge gap: mapping priority habitat under climate change scenarios and identifying habitat with potential for inland retreat.]*

Geography and ecology of a CHD

Hooded Plover critical habitat includes breeding and non-breeding (for example, feeding, foraging and flocking) habitat. Critical habitat is mostly on coastal Crown land. Key areas of critical habitat in Victoria are identified in Figure 2.

On average, Hooded Plovers occupy a 1km length of beach and territorial defend this during the breeding season, presumably so they have access to enough resources to breed and raise a family within a given season.⁹²

⁹² Weston, et al 'Manage one beach or two? Movements and space-use of the threatened hooded plover (*Thinornis rubricollis*) in south-eastern Australia' (2009) 36 *Wildlife Research* 289; see also Bock, et al 'The role of beach and wave characteristics in determining suitable habitat for three resident shorebird species in Tasmania' (2016) 75 *Journal of Coastal Research* 358; Cuttris, et al 'Breeding habitat selection in an obligate beach bird: a test of the food resource hypothesis' (2015) 66 *Marine and Freshwater Research* 841; Ehmke et al 'An obligate beach bird selects sub-, inter-and supra-tidal habitat elements' (2016) 181 *Estuarine, Coastal and Shelf Science* 266

Hooded Plovers are highly selective of characteristics that define their use of non-breeding habitat.⁹³ Choices about which habitats to use during the non-breeding season were mainly driven by beach aspect, amount of available swash area and distance to the nearest neighbouring breeding territory.

Prescriptions for a Hooded Plover CHD

- Critical breeding and non-breeding habitat may not be designated as accessible by off-leash dogs.
- If resources cannot support regular compliance patrols, education and enforcement, sites are to be designated as 'no dogs' sites.
- Critical breeding and non-breeding habitat may not be designated as accessible by horses.
- Active breeding sites, delineated through standardised signage and fencing, are designated as 'no stopping' zones where people are only permitted to walk past along the water's edge and not to remain in the area.
- It is an offence to enter a fenced enclosure (unless as an authorised person working on the recovery project).
- It is an offence to have an off-leash dog within this breeding site zone.
- Ongoing monitoring and nest protection response (signage/fencing) is to be established at areas in the vicinity of breeding sites readily accessible by the public.
- Critical habitat is protected from adverse development impacts, negative modifications (for example, coastal infrastructure), harvesting of beach cast wrack, sand carting/harvesting, and unsympathetic erosion control measures (e.g. brush matting).
- Critical habitat is to be protected from commercial or public activities known to cause disturbance and/or impacts to habitat (e.g. pipi harvesting, racehorse training).

Application of CHD for Hooded Plover

The making of a CHD for Hooded Plover would have certain direct consequences under the Act, specifically for public authorities. Other consequences, such as preparation of a Habitat Conservation Order or Public Authority Management Agreement, would require further action by Government. The making of these more specific and, arguably, more targeted instruments would give regulatory form to the CHD. Nevertheless, absent these regulatory devices, a Hooded Plover CHD would still have important regulatory function in influencing and guiding the conduct and practices of key public agencies and local councils, whose functions and powers bear on Hooded Plover critical habitat.

Hooded Plover critical habitat applies primarily to coastal Crown land. As a consequence, the design and effect of arrangements under a CHD for Hooded Plover are relatively more straightforward than where land held in private tenure is at issue. For example, a CHD for Hooded Plover of itself would be a matter to which key agencies, such as

⁹³ Barker *Non-breeding habitat of hooded plovers (*Thinornis rubricollis*) – Filling critical information gaps to aid recovery* (Honours Thesis, School of Life and Environmental Sciences, Deakin University, 2020)



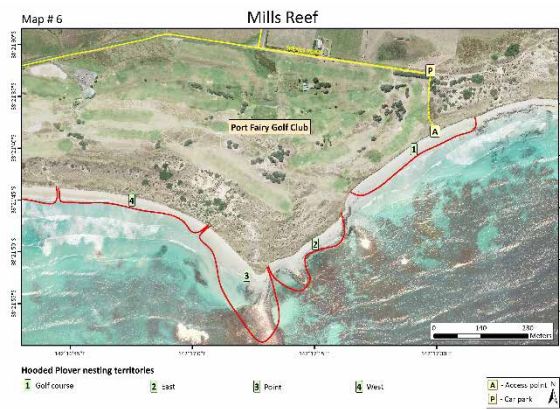
Example of routes surveyed during biennial count for one region (Mornington Peninsula)



Example of species distribution map from biennial count for one region (Mornington Peninsula)



Example of breeding territory boundaries for a stretch of coast in Inverloch



Example of breeding territory boundaries for a stretch of coast in Port Fairy

FIGURE 2: HOODED PLOVER AREAS OF CRITICAL HABITAT IN VICTORIA. SOURCE: BIRDLIFE AUSTRALIA, PUBLISHED AND UNPUBLISHED DATA

Source: Adams et al Report on the 2018 Hooded Plover count (BirdLife Australia, 2019)

Parks Victoria, local councils, or infrastructure authorities, would have to consider properly in their actions. Those considerations could be relevant to their works or funding programs, management arrangements for coastal Crown land, regulation of land use, and/or public education programs. A CHD would enable better coordination of protection and recovery arrangements across all habitat.

Alongside measures aimed at improving Hooded Plover conservation status, with a view to overcoming extinction risk, CHD can establish a legal framework for *enduring and coordinated* protection and conservation of the species. The CHD can provide a common protective and restorative instruments across all Hooded Plover habitat in Victoria, with ongoing effect (subject to necessary revision over time).

Public authority management agreements could be entered into to achieve conservation and restoration outcomes.

Sufficient regulatory arrangements could be established as a result of the making of the CHD or a public authority management agreement, where these arrangements are

implemented by the coastal land manager or a local council (for example, through by-laws or regulations). Alternatively, an HCO could be used to provide that regulatory support. Compensation provisions operating under an HCO would appear to be unlikely to be required for Hooded Plover habitat.

South-eastern Red-Tailed Black Cockatoo ('RTBC') (*Calyptorhynchus banksii graptogyne*)

Strategic justification for CHD: why is it needed?

Within Victorian areas of RTBC critical habitat a CHD for the species can provide an underpinning legal and policy device for landscape-scale conservation and recovery of the species, building on and strengthening existing instruments.

Various legal and policy mechanisms currently exist for protection and conservation of the Red-tailed Black-Cockatoo ('RTBC'), especially relating to species habitat. These include:

- Clause 41.03 Schedule 3 (ESO3) of the Glenelg Planning Scheme – South-eastern Red-Tailed Black Cockatoo Habitat Areas;
- Clause 41.03 Schedule 2 (ESO2) of the West Wimmera Planning Scheme – Red-tailed Black Cockatoo Habitat Areas;
- *Draft National Recovery Plan for the South-eastern Red-tailed Black-Cockatoo, Calyptorhynchus banksii graptogyne* (2016), prepared under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth);
- Action Statement for the *South-eastern Red-tailed Black-Cockatoo, Calyptorhynchus banksii graptogyne* (2006), prepared under the *Flora and Fauna Guarantee Act 1988*; and
- Department of Environment and Primary Industries *Management Standards and Procedures for Timber Harvesting Operations* (2014).⁹⁴

In addition, there is extensive community organisation and support for RTBC conservation within communities in SE South Australia and SW Victoria. This organisation is crucial to sustained conservation efforts over many years.⁹⁵

Conservation efforts concerning the RTBC have grown into a broad landscape-scale conservation project. RTBC habitat occurs across a diverse, 'matrix' landscape.⁹⁶ Each of the above instruments is relevant and/or important to the fate of the species. Nevertheless, habitat conservation critical to the survival and recovery of RTBC is not necessarily organised under a single, coherent, up-to-date framework, with clear legal implications, at this landscape-scale. For example, legal controls under planning schemes are important for regulating ongoing loss of habitat, confined to municipalities, but without direct provision for habitat on public land or implementing anticipated or future habitat needs. Similarly, recovery plans (including Action Statement and EPBC Act recovery plans) are intended to apply and

⁹⁴ Appendix 3, Table 13, p 90: 'No removal of any large hollow-bearing trees or preferred stringybark species (Brown and Desert Stringybark) with DBHOB > 45cm in areas of potential habitat currently not protected by SPZ or SMZ.' This prescription applies in State Forests the subject of a timber utilization plan.

⁹⁵ Russell et al 'Science, community and commitment underpin the road to recovery for the Red-Tailed Black Cockatoo' in Garnett et al *Recovering Australian Threatened Species: A Book of Hope* (CSIRO Publishing, 2018)

⁹⁶ Burnard and Pritchard *Draft National Recovery Plan for the South-eastern Red-tailed Black-Cockatoo, Calyptorhynchus banksii graptogyne*; Maron and Fitzsimon 'Agricultural intensification and loss of matrix habitat over 23 years in the West Wimmera, south-eastern Australia' (2007) 137 *Biological Conservation* 4 587

function at landscape-scale and at the intersections of science, community action and public policy, but without clear or uniform legal status.

Science and conservation

The current Draft Recovery Plan for the South-eastern RTBC⁹⁷ sets out the scientific and conservation basis for the species as follows:

The South-eastern Red-tailed Black-Cockatoo is a large (48–52 cm), nomadic cockatoo restricted to the far south west of Victoria and south east of South Australia. It is the smallest of five sub-species of the Red-tailed Black-Cockatoo (Ford 1980). Like many cockatoos, this sub-species is relatively long-lived, and may live over 30 years in the wild (Higgins 1999).

The sub-species has highly specialised food requirements; it is almost exclusively dependent on the seeds of three tree species: Brown Stringybark (*Eucalyptus baxteri*), Desert Stringybark (*Eucalyptus arenacea*) and Buloke (*Allocasuarina luehmannii*).

The South-eastern Red-tailed Black-Cockatoo is highly mobile moving throughout their range to exploit available food resources. Concentrations of birds are reported in some years in areas of Brown Stringybark and in other years in areas of Desert Stringybark. These movements appear to be in response to the abundance of new seed crops in these two key food species. Both stringybark species typically set a new seed crop every few years (with the two species often seeding in different years), but hold seed in capsules on the tree for several years. Buloke, by contrast, provides a seasonal food resource usually in late summer to early autumn, after which seed is dropped from the tree. Movements into Buloke habitat reflect this availability...

Recruitment of young into the adult population is difficult to measure directly, due to the difficulties noted above and because juveniles and sub-adults resemble females. Flock counts conducted in late autumn when most birds are not breeding, measure the proportion of adult males in flocks as a proxy measure of the proportion of juveniles and sub-adults. The proportion of males in autumn flocks has varied between 35% and 49% since 1999 (weighted means, R. Hill, R. Pritchard & D. Williams unpubl. data). Years with a high proportion of males (and presumably lower proportion of juveniles and sub-adults) are associated with periods of few or no recent seeding events in the two stringybark species, while years with low proportion of males (and presumably higher proportion of juveniles and sub-adults) are associated with recent seeding events (R. Hill, R. Pritchard, D. Williams & P. Koch unpubl. data). It is unknown what level of recruitment is required to achieve a stable population.

The single population is believed to be in a continued decline based on the following evidence:

- There are times when all available feeding habitat is used by birds (Koch 2003), suggesting populations are

⁹⁷ Burnard and Pritchard *Draft National Recovery Plan for the South-eastern Red-tailed Black-Cockatoo, Calyptorhynchus banksii graptogyne* (2016)

limited by the availability of feeding habitat;

- There are higher proportions of males in non-breeding flocks in some years, suggesting low production of juveniles and or low recruitment of sub-adults especially in years of low food availability, which over time will result in a decline in total population.
- There is a continued decline in the extent of habitat (Maron *et al.* 2008).

Critical habitat needs of the species are expressly set out in the draft Recovery plan:⁹⁸

The South-eastern Red-tailed Black-Cockatoo requires all three food tree species (Brown and Desert Stringybark, and Buloke). Because the birds are very mobile, and move throughout the range to exploit the most efficient feeding opportunities, all current feeding habitat is important for the sub-species' survival.

Current stringybark habitat includes trees of a range of sizes and contexts. There is no known minimum size of stringybark feed trees, although it is estimated that a tree may need to be at least 15 years old to reach levels of capsule availability preferred by the sub-species (P. Koch, pers. comm.). Current Buloke habitat appears to be limited to trees over 19 cm DBH (est. age 100 years). The sub-species show a strong preference for Buloke trees over 30 cm DBH (est. age 200 years). There were estimated to be only 87,000 Bulokes of this size remaining in the range in 2004 (approximately 45,000 occurring as scattered paddock trees). All Buloke trees below 19 cm DBH are potential future feeding habitat.

The South-eastern Red-tailed Black-Cockatoo nests and roosts in scattered eucalypts on farmland as well as in eucalypt forests and woodlands, usually in areas close to feeding habitats. Nesting habitat includes all eucalypts bearing hollows of a sufficient size, within 5 km of feeding habitat. This habitat type is important for the sub-species survival. All eucalypts yet to develop hollows are potential future habitat.

Isolated paddock or scattered trees provide very important habitats. For example, the majority of known nests are in scattered eucalypts on private land (Hill and Burnard 2001). Most large Buloke feed trees occur as scattered trees on private land (Maron *et al.* 2008). Large scattered stringybarks on private land tend to have much larger than expected seed crops (Maron *et al.* 2008).

Because this species is nomadic, absence of records of birds using an area does not suggest that the habitat is not important for the sub-species long-term survival. All habitats that meet current habitat preferences within the species range are important, regardless of whether birds have been sighted at any time. Further, because many preferred habitat trees are very old (Buloke trees >200 years, nesting trees > 220 years), potential future habitat areas supporting trees below preferred size are important to ensure habitat continuity into the future.

In summary, RTBC critical habitat comprises three specific tree species, found variously on farmland (private land) and public land, and with specific characteristics such as maturity, bearing nesting hollows of sufficient size, and proximity of nesting and feeding habitat.

Community organisation for RTBC protection and conservation is well-established across the species range.⁹⁹

Geography and ecology of a CHD

These aspects are set out elsewhere in this section.

98 Ibid, 9-10

99 See Birdlife Australia 'Red-tailed black cockatoo: south-eastern subspecies', <http://www.redtail.com.au/>

Prescriptions for a RTBC CHD

A CHD for RTBC must set out the designated critical habitat area for conservation of the species, including the area set out within Victoria in Figure 3.

Within that designated critical habitat area, conservation measures consistent with species' recovery should apply to the following RTBC habitat:

- All Desert and Brown Stringybark trees within the designated critical habitat area
- All Eucalyptus trees with hollows greater than 30cm in diameter within the designated critical habitat area
- All Buloke trees within the designated critical habitat area
- Scattered paddock trees of relevant species (buloke or stringybark) within the designated critical habitat area
- Priority revegetation areas identified in Maron et al 2008,¹⁰⁰ for both Stringybark species and Buloke species, within the designated critical habitat area

Conservation measures applicable to the above areas include those set out in *National Recovery Plan for the South-eastern Red-Tailed Black Cockatoo Calyptorhynchus banksii graptogyne: Final Draft April 2016*, to the extent of the designated critical habitat area.

100 Maron, M., Koch, P., Freeman, J., Schultz, S., Dunn, P. and Apan, A. 2008. *Modelling and planning to increase future habitat of the Red-tailed Black-Cockatoo*. Unpublished report Wimmera Catchment Management Authority.

Application of CHD for Red-Tailed Black Cockatoo habitat

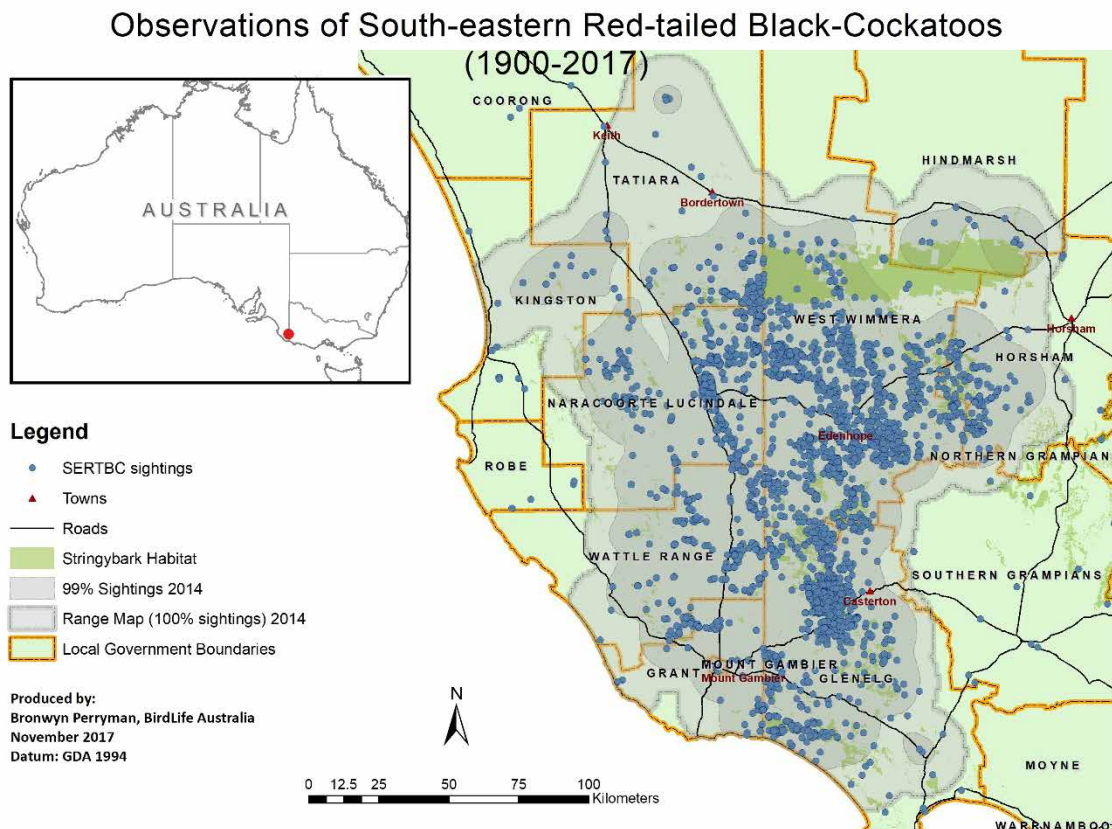
A CHD for Red-tailed Black Cockatoo in Victoria's south-west would apply to an area (or areas) characterised by certain key features:

- remnant, old-growth stringybark and Buloke woodlands, which are principal feeding, nesting and roosting habitat;
- those habitat areas across public and private land tenures;
- scattered trees of appropriate species, especially on agricultural land; and
- established and/or designated areas of anticipated habitat, notably in landscape revegetation corridors.

Extensive mapping has already been undertaken and continues to occur in support of RTBC recovery that can inform precise designation of a CHD.

Without more, a CHD for RTBC would trigger the common requirement across all relevant public authorities for proper consideration of these measures in their work. That would likely include public land managers, resources managers (such as in relation to timber allocation), local government in relation to works and planning, and State departments and/or infrastructure agencies in relation to works or programs. RTBC critical habitat determination would inform any work, programs or actions of these agencies relevant to the recovery program of the RTBC.

FIGURE 3: THE RANGE OF SE RTBC (SIGHTINGS IN BLUE).



Source M. Maron Ecological Evidence on Proposed Planning Scheme Amendment C82 Updating ESO3 in Glenelg Planning Scheme, Nov 2017

A CHD would require steps to be taken to implement agreements supporting the CHD. This would need to occur across public and private land tenures.

Further regulatory implementation of a CHD through a Habitat Conservation Order would provide a comprehensive and common legal foundation to RTBC habitat protection and recovery, either where agreement-making is not sufficient or amenable to that task or where clear legal tools are needed to give effect to the CHD such as through compensation provision or setting out forward-looking measures including re-establishment of habitat corridors.

Mount Donna Buang Wingless Stonefly (Reikoperla darlingtoni)

Strategic justification for CHD: why is it needed?

The species is listed as threatened under the current Victorian threatened species list. In 2002 the Federal Threatened Species Scientific Committee advised the species was not eligible for listing under the EPBC Act. Reassessment of the species under Federal legislation was sought in 2020 but the nominator was advised this species was not in the priority list for threatened species assessment in that year.¹⁰¹

In 2014, the species was included on the IUCN Red List and classified as Critically Endangered. The IUCN listing was based on evidence of threats from altered hydrology, climate change, fire, and development, in addition to 'continuing decline in the number of mature individuals, observed from 2005 to 2012.'¹⁰²

The species' habitat is entirely located on public land. This area is managed for conservation purposes (as national park) but with recreational activities and development permitted nearby and potentially affecting the species. Targeted conservation measures are required to secure known populations and habitat needs of the species in addition to general, or relatively coarse conservation protections provided by current land tenure.

Habitat and lifecycle requirements of the species are highly specific and localised.

Critical habitat protections would have ecological co-benefits for the *Nothofagus* forest in which the species is found as well as other unique, cryptic species of stonefly found recently in the course of surveys for the Mt Donna Buang Wingless Stonefly.

While national legal protections are required,¹⁰³ refined and targeted Victorian measures, using critical habitat protections, are crucial to survival and indeed flourishing of the species. Sufficient protection of the species and its habitat from known threats¹⁰⁴ is unlikely to be met without targeted protections such as critical habitat measures can provide.

Science and conservation

The Mount Donna Buang Wingless Stonefly is a unique, 'cryptic'¹⁰⁵ invertebrate found in a very restricted geographic

¹⁰¹ Correspondence from Department of Agriculture, Water and the Environment to Edward Tsyrlin, 9 October 2020. Copy supplied by the nominator.

¹⁰² Suter Reikoperla darlingtoni: *Mount Donna Buang Wingless Stonefly* (IUCN Red List of Threatened Species, 2014), 1, <http://dx.doi.org/10.2305/IUCN.UK.2014-1.RLTS.T19730A21426325.en>

¹⁰³ *Ibid*, 7

¹⁰⁴ Decline of Federal listing was based, in part, on the basis of 'active management including the closure of adjacent walking trails and revegetation of a former carpark at the summit of Mount Donna Buang designed to mitigate any potential threats to the Stonefly': Threatened Species Scientific Committee 'Advice 2002'. More recent propositions for bike trails and development in the vicinity of the species appear to run counter to this finding. The TSSC 2002 decision appears also to account for direct and not indirect impacts. The importance of indirect impacts is noted in the TSSC findings and in other documents, such as the Action Statement.

¹⁰⁵ DSE Mount Donna Buang Wingless Stonefly Reikoperla darlingtoni (Action Statement 125, 2003), 1

area within the Yarra Ranges National Park, described in the Action Statement prepared for it as of ‘high scientific interest’.¹⁰⁶

The Action Statement for this species sets out key aspects of the science, ecology and conservation of the species, including:¹⁰⁷

- the species is a member of the Order Plecoptera (stone flies) and are distinctive for being flightless. It is the only species of wingless stonefly in Victoria and one of two in Australia;¹⁰⁸
- the species is highly restrictive in dispersal and range and it has to date only been found primarily within 1 km of the summit of Mt Donna Buang and spanning approximately 4 km in area;
- there are potential wider areas of species’ habitat within approximately 5–19 km of the Mt Donna Buang summit;
- the species’ habitat is closely associated with small, ephemeral freshwater streams located in Beech Myrtle forest understorey;
- larvae and nymphs are aquatic herbivores-detritivores and adults live and feed in vegetation adjacent to streams especially bark from overstorey. It is a highly specialised taxon;
- while biological characteristics of the species have been studied, there is considerable uncertainty as to species ecology, aside from its

- association with small freshwater streams;
- principal conservation issues concern the proximity of development associated with the Mt Donna Buang resort. These include direct impacts arising from tracks, trails and human impacts traversing habitat areas. Direct impacts include fire;¹⁰⁹
- conservation issues include indirect impacts, such as to the flow or water quality of the small streams that are critical habitat (for example, flow alteration, turbidity or soil compaction), or degrading influences on Myrtle Beech forest understorey or overstorey (for example, fungal disease or herbicide use);
- recent proposals for a mountain bike trail in the vicinity of the species’ habitat would pose indirect impacts on habitat.¹¹⁰
- certain actions, such as closing trails, have been taken to ameliorate risk to the species habitat;¹¹¹
- the known species’ habitat is located entirely on public land (national park), with areas of alternative and stricter land management within wider potential habitat, such as a water supply protection area and the Watts Creek Reference Area; and
- further research work is emphasised in the Action Statement.

106 Ibid: ‘The combined features of flightlessness, ability to survive cessation of stream-flow, and long life-span render the taxon of high scientific interest.’

107 Statements in this summary reflect the Action Statement unless otherwise noted.

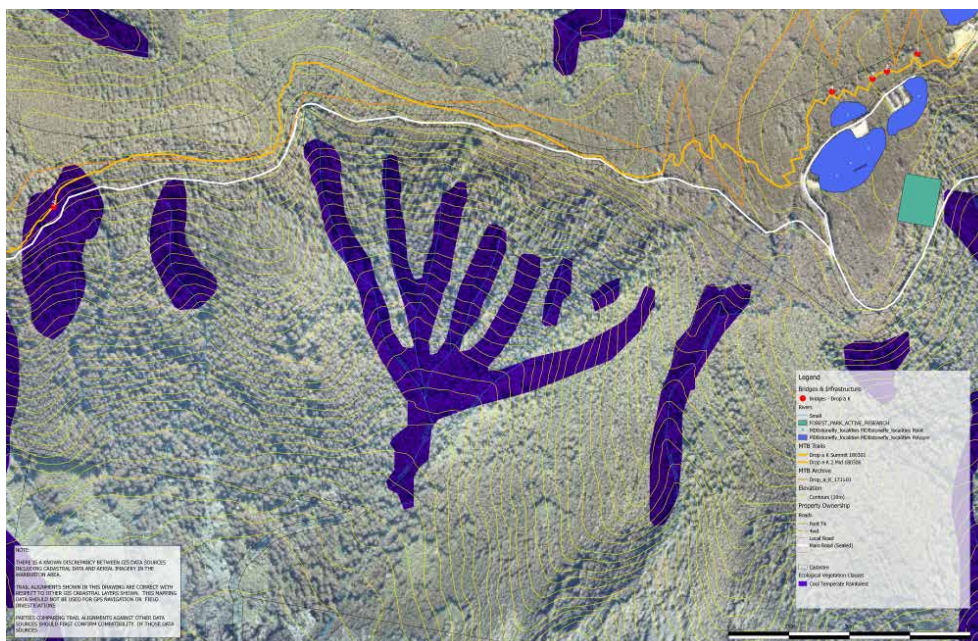
108 Tsyrlin *Survey of the Wingless Donna Buang Stonefly Reikoperla darlingtoni in relation to the Proposed Warburton Mountain Bike Trail* (Shire of Yarra Ranges, 2019)

109 Threatened Species Scientific Committee *Mount Donna Buang Wingless Stonefly Reikoperla darlingtoni: Advice to the Minister for the Environment and Heritage from the Threatened Species Scientific Committee (TSSC) on Amendments to the list of Threatened Species under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) (2002)*, <http://www.environment.gov.au/biodiversity/threatened/nominations/ineligible-species/riekoperla-darlingtoni>

110 Tsyrlin *Survey of the Wingless Donna Buang Stonefly Reikoperla darlingtoni*

111 Threatened Species Scientific Committee ‘Advice 2002’

FIGURE 4: KNOWN DISTRIBUTION OF MT DONNA BUANG STONEFLY [LIGHT BLUE POLYGONS]



Source: Proposed Warburton Mountain Bike Hub Master Plan

Geography and ecology

Ecological characteristics and needs of this species are set out above. The geographic distribution of the species as presently known, further to the above description, was mapped as part of a proposal for mountain bike facilities. This is extracted below. Subsequent surveys have found additional evidence of the species further to the west of locations identified (in the centre of the map image at left).

Prescriptions

Prescriptive measures required for protection and conservation of critical habitat for the Mount Donna Buang Stonefly should include:

- avoidance of direct development or infrastructure impacts on known habitat areas;
- precautionary measures to include comparable protection of potential and likely habitat areas (stream and rivulets) on the basis of sound evidence of suitable habitat;
- avoidance of indirect impacts on populations and known and suitable habitat arising from alteration of stream flow regimes, geomorphology or water composition, such as through runoff from roads, infrastructure, tracks and trails, or other built features;
- in the context of drying climate, establish artificial stream management mimicking natural conditions (for example, of snow melt, localised hydrology and infiltration regimes), such as adapted flow regimes via tanks or stormwater systems;
- establish and enable a program of scientific investigation into areas of known and suitable habitat, with a view to critical habitat for the species functioning as a reference area; and
- to the maximum degree practicable, dismantle constructed barriers or features interfering in natural hydrological and geomorphic processes.

Application of CHD for Mt Donna Buang Wingless Stonefly

A CHD designed for the protection and conservation of this species would primarily apply to public agencies concerned with management of public land in the vicinity of the Mount Donna Buang summit (Parks Victoria). Other public authorities with an interest in such critical habitat protections or to which they may apply include Melbourne Water as catchment manager of water supply catchment for which habitat streams are tributaries.

Geographic application of critical habitat for the species falls generally under three categories presently: known habitat (typically forest streams and rivulets), suitable habitat (comparable features across a wider range), and adjacent land and features likely to give rise of adverse indirect impacts on species' habitat. The latter areas comprise in effect 'buffer' areas substantially important to the survival and conservation of the species.

Leadbeater's Possum, *Gymnobelideus leadbeateri*

Leadbeater's Possum: science and conservation

The Leadbeater's Possum, or the *Gymnobelideus leadbeateri* is a small, arboreal marsupial measuring 150 – 170mm, able to fit easily in the palm of a human hand.¹¹² The Leadbeater's Possum is endemic to eastern Victoria and once occupied areas from Mt Wills in the north-east of Victoria to as far south as the Westernport region. Now, the species is confined to an area of less than 70 x 80 km in the Central Highlands and a small, lowland area east of Melbourne in the Yellingbo Nature Conservation Reserve.¹¹³

The Leadbeater's Possum was listed as Critically Endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) in 2015. This categorisation provided legal and scientific confirmation that the Possums remain at a very high risk of extinction within the next few decades unless strong measures are undertaken to reverse this. An Action Statement was prepared under the *FFG Act* for the Leadbeater's Possum, outlining the importance of this unique creature to the biodiversity of north-eastern Victoria, as well as the many challenges facing the Possum's continued survival.¹¹⁴

In 2009, Black Saturday fires had a devastating impact upon the species. The existing habitat for the Possums was almost halved and many areas of potential habitat were also burned. The sites that are most suited to the Possums are lush, unburnt vegetation in gullies that are located in areas with relatively low summer temperatures and high summer rainfall, with the necessary density of hollowbearing trees or wattle understory.¹¹⁵ The catastrophic impact of the fires upon the Possum's habitat of montane ash and snow gum significantly reduced the presence of these areas and their conservation status was escalated from endangered to critically endangered.¹¹⁶

As the Action Statement highlights, 'the most important components of the Leadbeater's Possum habitat are den tree abundance, vegetation structure and food availability', and this is more likely to occur in areas with higher densities of hollow-bearing trees. Furthermore, a centrally important habitat feature related to vegetation structure is 'connectivity'.¹¹⁷ Unlike some other species of small possums that are able to glide between trees, the Leadbeater's Possum depends upon connecting vegetation to move through their forest home. Consequently, optimum habitat for the Possums includes an ample supply of both large, hollow-

¹¹² Threatened Species Scientific Committee, *Gymnobelideus leadbeateri* (Conservation Advice 273, 2015) 1, ('Conservation Advice').

¹¹³ Menkhurst and Lumsden, 'Leadbeater's Possum' in Peter Menkhurst's *Mammals of Victoria: Distribution, Ecology and Conservation* (Oxford University Press, 1995) 104-107.

¹¹⁴ Department of Environment and Primary Industries *Leadbeater's Possum Gymnobelideus leadbeateri* (Action Statement 62, 2014) ('Action Statement').

¹¹⁵ Lumsden et al *A new Strategic Approach to Biodiversity Management—Research Component* (Arthur Rylah Institute for Environmental Research, 2013)

¹¹⁶ Ibid.

¹¹⁷ Harley 'A review of recent records of Leadbeater's Possum (*Gymnobelideus leadbeateri*)' in Goldingay and Jackson (eds) *The Biology of Australian Possums and Gliding Possums* (Surrey Beatty and Sons, Sydney 2004) 330-338

bearing trees and young understory.¹¹⁸ Due to these specific ecological requirements, Possum habitat is therefore highly sensitive to disturbance from fire and/or logging.

Colonies of groups of Leadbeater's Possum (known as 'denning groups') typically consist of 2-3 individuals, although larger colonies have been recorded (up to 12 individuals). In undisturbed habitat, adjacent breeding colonies tend to form discrete genetic units or 'kin groups' which contain a significant level of the population's genetic diversity. The breeding pair in each territory will then typically reproduce twice per year, producing just 1-2 offspring per litter.

Leadbeater's possum colonies are territorial, defending areas of 1-3 hectares.¹¹⁹ In order to survive, the possums appear to have critical minimum habitat size of around 12 ha.¹²⁰ It is especially important to maintain habitat occupied by this species as the Leadbeater's Possum have long-term site fidelity.¹²¹ This means that conservation and recovery efforts must place habitat protection as a central aspect of the strategy, as relocation of the species may not always prove viable.

Key current conservation objectives for the species include:¹²²

1. Ensuring that the Leadbeater's Possum can survive, flourish and retain its potential for evolutionary development in the wild
2. Securing populations or habitat from potentially incompatible land use or catastrophic loss
3. Maintaining or increasing the extent of habitat
4. Reviewing and evaluating ecological effectiveness of actions for the recovery of the Leadbeater's Possum

Strategic justification for a critical habitat protection: why is it needed?

Habitat pressures on the species arise from timber harvesting operations in Victoria and wildlife, especially leading to loss of hollow-bearing trees in appropriate montane forests.¹²³ All areas of current and potential occupancy are important for conservation of the species.¹²⁴ The existing reserve system, comprising both formal and informal reserves (for example, zoning arrangements under forestry regulation), does not extend to protection of all actual or suitable species habitat:

The current reserve system alone is insufficient and inadequate to maintain Leadbeater's possum, and the

species' recovery will require a substantial increase in the extent of dedicated and informal reserves, plus enhanced management in the remaining areas.¹²⁵

Around one-third of habitat essential to the survival of the species was susceptible directly to timber operations in 2016. These findings pre-date catastrophic 2019-2020 fires. They pre-date judicial findings on unlawful timber operations impacting on the species' habitat.¹²⁶

The 2015 Conservation Advice stated the Leadbeater's Possum met a number of the criteria for being critically endangered including:¹²⁷

- (a) the species' loss of population size is 'very severe';
- (b) it has a restricted area of occupancy and a geographic distribution that is precarious for its survival;
- (c) the number of mature breeding individuals is likely to be at least 'limited' and is very likely to be 'restricted', with numbers likely to continue to decline, together with the precariousness of the species' geographic distribution; and
- (d) it has a probability of extinction of at least 10%, given the estimate that the Mountain Ash Forest ecosystem on which a large population of Leadbeater's Possum depends has a 10% likelihood of becoming extinct within the next 100 years.

Timber harvesting impacts on Leadbeater's Possum are managed under Victorian legislation by way of Commonwealth accreditation of Victoria's forest management framework and the Central Highlands Regional Forest Agreement (the RFA). The EPBC Act offers no direct protection to the species where timber harvesting operations are carried out in accordance with the RFA, by operation of s 38 of the EPBC Act.

In the Possums Case, the Federal Court found in respect of critical habitat for Leadbeater's Possum that:

Given the current Critically Endangered status of Leadbeater's possum, and its predicted severe ongoing decline, including significant risks of extinction, all current and prospective suitable habitat is critical for its survival, and necessary for its recovery¹²⁸; and

the surest guides to determining what forest is habitat critical to the survival of each species are detections and presence; that is, 'on the ground' observations and evaluations about the nature and character of the native forest in question.¹²⁹

The Court went on to find that past and future timber harvesting in numerous coupes containing detections of the species was likely to have had or to have a significant impact on the species, notwithstanding application of existing Victorian prescriptions (200m buffer around

¹¹⁸ Lumsden et al *A New Strategic Approach to Biodiversity Management—Research Component*

¹¹⁹ Lindenmayer, et. al. 'The need for a comprehensive reassessment of the Regional Forest Agreements in Australia'

¹²⁰ Ibid.

¹²¹ Ibid.

¹²² Action Statement, 12; see also Conservation Advice, 31

¹²³ Department of Environment *Draft Recovery Plan for Leadbeater's Possum *Gymnobelideus leadbeateri** (2016), 13, <https://www.environment.gov.au/system/files/resources/6e2618ee-b799-4505-ac96-b3b3e0eb99c4/files/draft-national-recovery-plan-leadbeaters-possum.pdf>

¹²⁴ Ibid, 20

¹²⁵ Ibid, 21-22

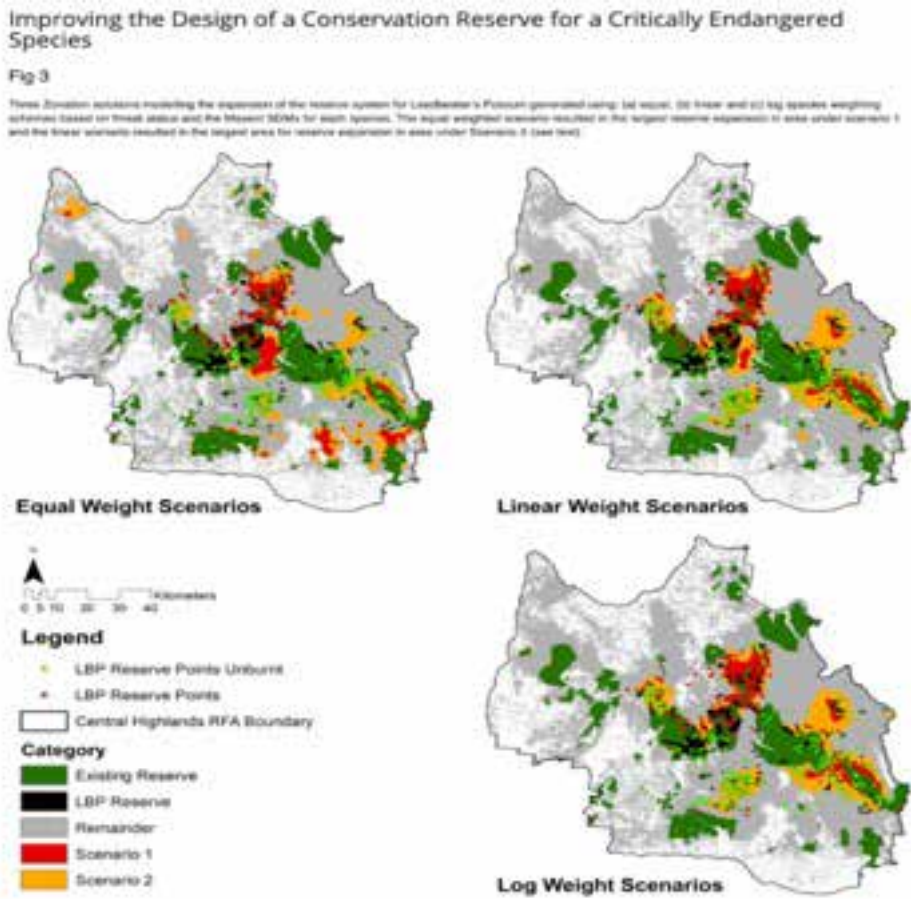
¹²⁶ *Friends of Leadbeater's Possum v Vicforests (No 4)* [2020] FCA 704

¹²⁷ Conservation Advice, 8-23

¹²⁸ *Friends of Leadbeater's Possum Inc v VicForests (No 4)* at [1396]

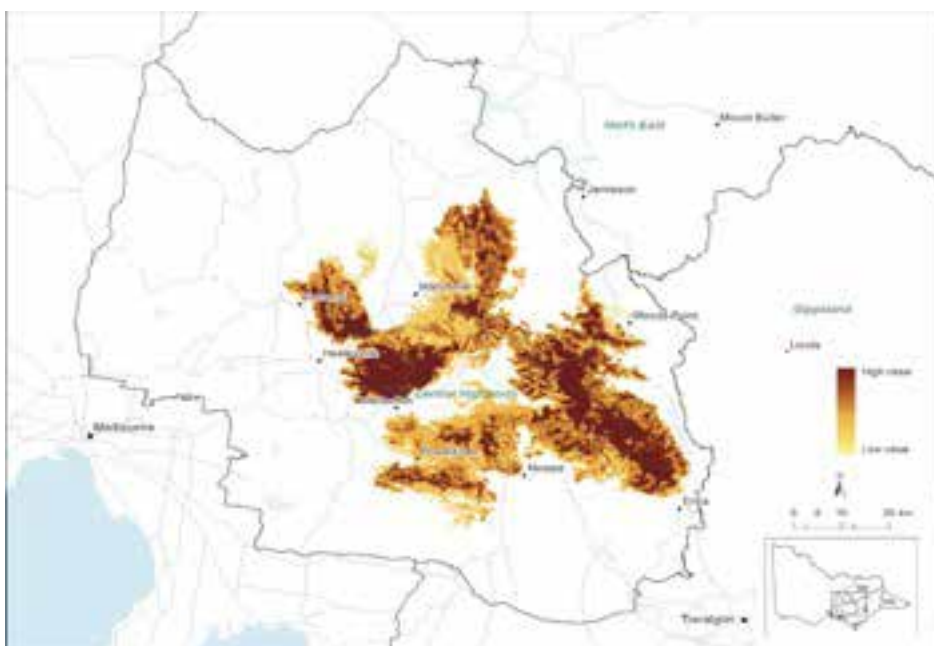
¹²⁹ Ibid [1406]

FIGURE 5: EXAMPLE OF A HABITAT DISTRIBUTION MODEL: LEADBEATER'S POSSUM INCORPORATING MODELLED TREE AGE AND OTHER SPECIES-SPECIFIC MODIFICATIONS



Source: Taylor et al

FIGURE 6: LEADBEATER'S POSSUM HABITAT DISTRIBUTION MODEL



Source: VEAC 2017, 13

sightings), found to be ‘insufficient and ineffective to halt the decline towards extinction of this species’¹³⁰ and reserves which ‘have neither slowed nor arrested the species’ decline’¹³¹. Significant impacts identified by the Court from such forestry operations included destruction of habitat occupied, used or likely to be so,¹³² a material contribution to the ongoing decline of the species¹³³, and interference with its recovery¹³⁴. The Victorian Government’s October 2020 Threatened Species and Communities Risk Assessment, conducted pursuant to the renewed RFAs entered in March 2020, confirmed that forestry operations are a hazard for the species rated as ‘significant or high’¹³⁵. Yet, the subsequent interim protections report and action plan, intended to introduce enforceable protections where necessary to address such identified risks¹³⁶, made no mention of the species whatsoever. That report does identify critical habitat declarations as one pathway for implementation of interim protections, in the abstract.¹³⁷ The force of the factual findings in the Possums Case,¹³⁸ together with the 2016 draft Recovery Plan and the 2019 re-confirmation of the species status as critically endangered again reiterating the continued decline and threat to its habitat, including from timber harvesting,¹³⁹ provide significant weight to the suitability of a critical habitat declaration as the appropriate measure to conserve the species:

The extent, quality and connectivity of suitable habitat is the critical factor for conservation of Leadbeater’s possum, and conservation management actions should focus primarily on factors and actions that serve to increase (or most effectively reduce the rate of decline in) the current and prospective habitat extent, quality and connectivity.¹⁴⁰

Existing measures are not sufficient to prevent continued critical habitat loss. Use of critical habitat protections under the FFG Act is appropriate. The case specifically for such a source of action has previously been made to the Victorian Environment Minister.¹⁴¹ The chief advantage of such an instrument is that, while RFA and forestry arrangements turn on trade-offs between conservation and logging interests, critical habitat protections are solely concerned with habitat protection. They represent a more appropriate and better adapted conservation instrument to the task of habitat protection. Additionally, those protections can be tailored to

130 Ibid [1408]

131 Ibid [1419]

132 Ibid [1430]

133 Ibid [1408]

134 Ibid [1411]-[1420]

135 DELWP, Threatened species and Communities Risk Assessment, Oct 2020, pp11, 42.

136 Cl 25K of the Central Highlands RFA

137 DELWP, Threatened Species and Communities Assessment – Interim Protections and Management Action April 2021

138 All upheld by the Full Federal Court on appeal, see *VicForests v Friend of Leadbeater’s Possum Inc* [2021] FCAFC 66 and *VicForests v Friend of Leadbeater’s Possum Inc (No 2)* [2021] FCAFC 92

139 2019 Conservation Advice for the Leadbeater’s Possum

140 Ibid [1394], quoting the draft 2016 Recovery Plan.

141 Letter from Danya Jacobs, Lawyer, Environmental Justice Australia (on behalf of Friends of Leadbeater’s Possum Inc) to Hon Lily D’Ambrosio, Minister for Energy, the Environment and Climate Change, 24 April 2017

the specific concerns at hand (such as those impacting the sensitive Possum habitat) to provide a more targeted and strategic solutions.

Geography and ecology of a CHD

Known habitat and range of Leadbeater’s Possum is almost entirely on public land, across tenures including national parks, other conservation reserves, and State Forest.¹⁴² ‘Strongholds’ for the species are now confined to the Central Highlands of Victoria.¹⁴³

Hollow-bearing trees (for nest sites and refuge) with large internal dimensions around 30 cm in diameter are a critical habitat feature for Leadbeater’s possums. In addition, a structurally dense interlocking canopy or secondary tree layer of continuous interconnecting structure is required to facilitate movement and a wattle understorey to provide food.¹⁴⁴

The survival of Leadbeater’s Possum is highly dependent on the existence of sufficient areas of montane ash forest that remain unburned and unlogged for a period that allows large old hollow-bearing trees to develop and survive, typically trees aged 150-500 years.¹⁴⁵

The duration, depth and breadth of scientific study of Leadbeater’s Possum, its habitat and its projected decline have now culminated in overwhelming scientific certainty that the areas identified above constitute areas critical to the ongoing survival of the species.

Prescriptions for a Leadbeater’s Possum CHD

Recommendations published in 2013 by a group of experts were designed to address the threats to Leadbeater’s Possum and minimise the likelihood of Leadbeater’s Possum becoming extinct.¹⁴⁶ Results of a 2016 study conducted by the same authors found little improvement. While 98,500ha of Leadbeater’s Possum habitat was still protected, all remaining suitable habitat for Leadbeater’s Possum (177,280ha) would require protection to ensure a less than 2.5% chance that the species will fall below the minimum viable population (500 adult females).¹⁴⁷

On the basis of the existing scientific information, prescriptions and measures for a CHD for Leadbeater’s Possum should be set out in the following terms:¹⁴⁸

All managed or commercial activities that may disturb, damage or destroy Leadbeater’s Possum habitat are prohibited within Leadbeater’s Possum critical habitat.

Leadbeater’s Possum critical habitat comprises:

142 Department of Environment *Draft Recovery Plan for Leadbeater’s Possum *Gymnobelideus leadbeateri** (2016), 21

143 Department of Environment *Draft Recovery Plan for Leadbeater’s Possum *Gymnobelideus leadbeateri** (2016), 19

144 Ibid.

145 Conservation Advice 2015

146 ‘Lindenmayer, et. al. ‘The need for a comprehensive reassessment of the Regional Forest Agreements in Australia’

147 Ibid.

148 Letter from Danya Jacobs, Lawyer, Environmental Justice Australia (on behalf of Friends of Leadbeater’s Possum Inc) to Hon Lily D’Ambrosio, Minister for Energy, the Environment and Climate Change, 24 April 2017

(a) the area shaded yellow on the enclosed map titled Log Weight Scenarios; and

(b) the area mapped as the two highest value categories in the enclosed 2017 VEAC map titled 'Leadbeater's Possum habitat distribution model incorporating modelled tree age and other species-specific modifications'¹⁴⁹;

(c) the following areas within the Leadbeater's Possum Range as that term is defined in the Management Standards and Procedures for Timber Harvesting Operations in Victoria's State Forests 2014:

- i. Any site, plus a 1 kilometre buffer, where Leadbeater's Possum has been recorded since 1 February 2009;
- ii. Any site, plus a 100 meter buffer, where a dead or living hollow-bearing tree is located;
- iii. the oldest 50 per cent of the forest within each Leadbeater's Possum Management Unit (which can include the areas of critical habitat described at subparagraphs (a) and (b) and (c)(i) above).

Application of critical habitat protections for Leadbeater's Possum

Critical habitat protections for Leadbeater's Possum would apply to public land management agencies primarily, given presence of habitat on public land, including land managers for national parks, State Forest and other relevant conservation reserves (for example, water authorities where habitat is found in water supply catchments). Land users, especially agencies responsible for timber harvesting operations (resource use affecting critical habitat), would be subject to critical habitat protections. That application would extend to Victoria's forestry agency, Vicforests, and contractors working under the auspices of forestry regulation.

¹⁴⁹ Victorian Environmental Assessment Council *Conservation values of state forests* (Assessment Report, February 2017) 13

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