



## 5. Environmental Governance

## A GUIDE TO CHAPTER 5

The focus here is environmental governance issues that underpin problems faced across all environments. Environmental governance is the system of laws, implementation mechanisms, accountability regimes, and institutional arrangements necessary for environmental protection and conservation of biodiversity. Governance is not the same as government – it also encompasses actors such as communities, businesses, and NGOs – but the focus here is primarily the Victorian government, for it is the primary administrator of the laws, policies and programs that influence people’s actions in the Victorian environment.

There is a particular focus on modernising and integrating environmental laws and developing optimal institutional arrangements for environmental regulation and management. Some areas of reform essential to all environments considered in previous chapters, such as adapting to climate change, protecting threatened biodiversity and managing invasive species, are also considered.

Section 5.1 outlines the patterns of governance failings in Victoria and section 5.2 outlines the priority reforms needed for environmental laws, institutional structures and processes, federal involvement in protected areas, planning, climate change adaptation, funding and knowledge. Section 5.3 identifies and describes five priority landscapes for nature conservation and section 5.4 summarises the recommended reforms.

### Topics covered

#### 5.1 Governance flaws

#### 5.2 Governance reform priorities

- Laws
- Institutional structures and processes
- Federal-state relations on protected areas
- Planning and priorities
- Climate change adaptation
- Funding
- Knowledge needs

#### 5.3 Priority landscape clusters

#### 5.4 Future directions

#### 5.5 Sources

## 5.1 GOVERNANCE FLAWS

Victoria has the knowledge, wealth and capacity to arrest most current threats to nature and restore environmental health, and there are compelling social, economic and ethical reasons to do so. Climate change, with its likely catastrophic impacts on economic, social and environmental health, amplifies the imperative.

The current backward trajectories on multiple environmental issues are a result of flawed governance systems as well as wilful anti-environmental choices. From the previous three chapters, and from many other analyses such as audits by the auditor general (table 5.1) and state of the environment reports, there emerges a consistent pattern of failures to effectively establish and implement the processes and measures needed to achieve environmental objectives, such as comprehensive planning, meaningful target-setting, risk assessments, adequate data collection and monitoring, relevant performance reporting, robust enforcement and sufficient funding. Following is a brief outline of aspects and examples of this pattern of governance failings, some of which are analysed in more detail in subsequent sections.

**Lack of integration:** The 2010 draft state biodiversity strategy *Biodiversity is Everybody's Business*, shelved by the current government, acknowledged that the 'biodiversity sector currently lacks [an] integrated approach, leading to fragmented decision-making and conflicting objectives.'<sup>1</sup> The 2009 land and biodiversity white paper, *Securing our Natural Future*, is probably the closest a Victorian government has come to an all-of-government approach to biodiversity but it has never been implemented.<sup>2</sup> *Australia's Biodiversity Conservation Strategy 2010-2030* says that 'by 2015, all jurisdictions will review relevant legislation, policies and programs to maximise alignment with the strategy.'<sup>3</sup> Instead of alignment and integration, there has been an increasing rollback of environmental objectives in favour of commercial and political goals.

Integration of sustainability objectives across government programs is also lacking. A 2008 audit by the commissioner for environmental sustainability found that integration of the principles of environmental sustainability within core policies and programs across government had been 'limited'.<sup>4</sup> Only 7% of agencies audited had any processes in place to integrate sustainability into policy development

processes. 'Many agencies discussed the absence of explicit and/or sophisticated consideration of the environment within common whole-of-government decision-making processes,' the commissioner noted.

**Poor leadership and coordination:** Over the past five years, Victoria's auditor general has reported many instances of poor environmental leadership and lack of coordination. An audit on management of invasive species in national parks found that governance arrangements were complicated and poorly coordinated – there was no single point of focus for oversight or to take responsibility for success or failure.<sup>5</sup> On marine biosecurity, there had been poor coordination between the environment and primary industries agencies, and there was no evidence of a detailed operational plan to coordinate responses to new incursions.<sup>6</sup> On soil health, a lack of coordination had led to a patchwork of unaligned and fragmented projects.<sup>7</sup> On managing recreational fisheries, there had been a failure to engage with natural resource managers and peak conservation groups, with consultation and decision-making biased towards recreational fishing interests.<sup>8</sup> Although the new departmental structure merging the environmental and primary industries agencies into the Department of Environment and Primary Industries provides the potential for better coordination across government, it is likely to result in the greater subsuming of environmental priorities in favour of resource exploitation. A new structure is needed (section 5.2.2).

**Weak laws:** Although many of Victoria's environmental problems could be resolved by effective implementation of existing laws, the system of laws is fragmented and outdated, and there are many gaps (section 5.2.1). They have not been updated to incorporate advances in scientific concepts and community attitudes or to respond to growing threats to the environment. They are deficient in mechanisms to promote accountability, transparency, public participation, and integration of environmental functions across government.<sup>9</sup> Instead of addressing these shortcomings, the current state government has dismissed essential environmental safeguards as inconvenient 'green tape' and further weakened environmental law – to allow commercial development

in national parks, entrench logging of native forests and facilitate clearing of native vegetation.

**Inadequate enforcement:** A 2012 audit by Victoria's auditor general found major systemic failings in compliance monitoring and enforcement of environmental laws by the environmental and primary industries agencies. Neither had a comprehensive, risk-based approach to compliance or clarity about how compliance activities contributed to achieving legislative objectives (section 5.2.1).

**Limited planning:** Turning broad environmental objectives into outcomes needs to be mediated by planning to develop clear targets and performance indicators and specify strategies and measures to achieve them. There is a particular paucity of planning in environmental domains, with the most startling deficiency being the lack of a current biodiversity strategy for the state, despite it being a requirement under the Fauna and Flora Guarantee Act (section 5.2.4). The 2010 draft strategy acknowledged a lack of clarity regarding the state's biodiversity targets and goals.<sup>10</sup> The 2012 Catchment Condition and Management Report found that the lack of 'long-term goals and targets for land and water condition...remains a critical weakness', and the 2013 state of the environment report found 'there is no clear articulation of statewide priorities and objectives for managing the state's natural resources' and an absence of targets.<sup>11</sup>

The auditor general has identified many examples of planning failure: the lack of a strategic plan to identify priorities, policies and guiding principles for managing recreational freshwater fishing;<sup>12</sup> outdated plans for invasive species management in national parks that lacked detail and did not address new and emerging threats;<sup>13</sup> the lack of a policy to direct management of the marine environment and lack of detailed action plans for marine protected areas;<sup>14</sup> and ad hoc planning for management of contaminated sites.<sup>15</sup> In 2012, the management plans for about a third of protected areas managed under the National Parks Act were at least 15 years old.<sup>16</sup>

**Inadequate data:** Knowledge of Victorian biodiversity is deficient in many areas, including the conservation status and trends of many species, and the effectiveness of management techniques.<sup>17</sup> Areas in particular need of improved monitoring, evaluation and reporting are the national vegetation management framework and vegetation offsets, threatened taxa and

ecological communities, invasive species, and management of reserves.<sup>18</sup> In several audits, the auditor general has identified major deficiencies in monitoring, and data collection and management. The information base for recreational fishing was 'neither comprehensive nor robust'; Parks Victoria data for invasive species management was 'inadequate and increasingly out of date'; and there was no marine pest monitoring system to detect marine biosecurity incidents.<sup>19</sup> The 2009 Victorian Bushfires Royal Commission highlighted a need for better knowledge of the ecological impacts of different fire regimes.<sup>20</sup> The Catchment Management Council found that processes for assessing the condition of land and water resources and the effectiveness of protection measures, were 'either absent or insufficient'.<sup>21</sup> The council stressed the need for an independent body to report annually on progress toward achieving robust processes for assessing the condition of land and water resources. The 2013 state of the environment report highlighted the need for a 'systematic, environmental data collection plan'.<sup>22</sup>

**Limited disclosure:** It is not possible to gain a clear understanding of the state government's environmental performance from its public reporting. Although the Flora and Fauna Guarantee Act requires annual reporting on the progress made towards achieving its conservation and management objectives, a lack of data and reporting led the auditor general to conclude it was not possible to determine whether the primary objectives were being achieved (section 5.2.1).<sup>23</sup> In a 2013 audit, the auditor general found that the Department of Environment and Primary Industries reported on only a subset of performance indicators and primarily on outputs and activities rather than outcomes. Reporting processes do not provide confidence in the consistency and reliability of reported performance information.<sup>24</sup> State agency performance measures in the annual budget papers are not linked to longer-term environmentally meaningful measures in state of the environment or catchment condition reporting. For example, budget paper indicators for the performance of land management relate to the area managed, asset condition, visitor numbers, area treated for invasive species, which are too limited or bear too little relationship to environmental outcomes to give a true picture of the effectiveness of conservation programs.<sup>25</sup>

**Low commitment and priority:** The preceding problems with governance are all symptomatic of a low

level of political commitment to the state's environmental objectives, particularly when they are perceived to be in conflict with economic goals. Victoria has a multitude of admirable environmental objectives and has achieved much in the half century or so in which there have been environmental-specific governance structures. But the current governance failings leading to backward environmental trajectories will continue unless the environment is accorded much higher priority within government. The low priority is exemplified by the lack of a current biodiversity strategy (section 5.2.4) and the failure to modernise the 25 year old Flora and Fauna Guarantee Act. A 2002 departmental review found it needed a major overhaul but its recommendations continue to be ignored more than a decade later, and 2009 recommendations by the auditor general have similarly been ignored.<sup>26</sup> In other

examples, the auditor general found that the Department of Primary Industries prioritised the interests of recreational fishers over sustainability objectives of the Fisheries Act and that protecting fossil fuel industries has been prioritised over fostering renewable energy and reducing greenhouse gas emissions.<sup>27</sup> Protecting feral deer for hunters has been prioritised over protecting the environment and agriculture from deer damage; subsidised logging of native forests has been prioritised over protecting forests and preventing the extinction of Leadbeater's possum, and a yearly burn target that does little to improve public safety has been prioritised over ecologically sustainable fire regimes. Inadequate funding for essential environmental functions (section 5.2.6) is another symptom of low commitment.

Table 5.1 Some audits by Victoria's auditor general with an environmental focus in the past five years<sup>28</sup>

Topic (year)	Audit focus	Findings
Performance reporting (2013)	The effectiveness of public performance reporting by Department of Environment and Primary Industries, Environmental Protection Authority and Parks Victoria	<ul style="list-style-type: none"> <li>• Reporting only on a subset of performance indicators</li> <li>• Reporting on mainly outputs and activities rather than outcomes</li> <li>• Inadequate data selection, data management, reporting controls and processes</li> </ul>
Recreational freshwater fishing (2013)	Whether the Department of Primary Industries is managing recreational freshwater fisheries in an ecologically sustainable manner	<ul style="list-style-type: none"> <li>• Failure to deliver balanced and sustainable outcomes for recreational freshwater fisheries</li> <li>• Insufficient focus on conservation of ecological processes, habitats and supporting ecosystems in fisheries</li> </ul>
Compliance (2012)	The effectiveness and efficiency of compliance activities within the environment, primary industries and natural resources sectors	<ul style="list-style-type: none"> <li>• Lacking a comprehensive risk-based approach to compliance responsibilities</li> <li>• Failure to identify how compliance activities contribute to achieving legislative objectives and corporate outcomes, how to measure success, and how to monitor and report compliance performance</li> </ul>
Contaminated sites (2011)	How contaminated and potentially contaminated sites are managed	<ul style="list-style-type: none"> <li>• Ineffective management of contaminated sites</li> </ul>
Marine protected areas (2011)	The environmental management of marine protected areas	<ul style="list-style-type: none"> <li>• No evidence to show that marine biodiversity is being protected</li> <li>• Little environmental management activity is evident, pointing to systemic weaknesses with planning, program management and resource allocation</li> </ul>
Renewable energy (2011)	Whether the development of renewable energy has been facilitated effectively	<ul style="list-style-type: none"> <li>• Efforts to increase the proportion of electricity generated from renewable sources have been ineffective</li> <li>• Growth in the state's capacity to generate renewable energy is not on track to meet future targets</li> </ul>
Invasive species in national and state parks (2010)	The effectiveness of invasive plant and animal pest programs in Victoria's national and state parks	<ul style="list-style-type: none"> <li>• Good progress in managing some invasive species in some parks, but generally unclear how well invasive species threats are being managed in national and state parks</li> </ul>
Soil health (2010)	How effectively and efficiently soil health programs have been implemented across private land	<ul style="list-style-type: none"> <li>• Focus has been on delivery of outputs rather than achievement of outcomes</li> <li>• Soil health outcomes are not measured in any meaningful way, it is unknown whether soil health programs have improved the health of Victoria's soil</li> </ul>
Groundwater (2010)	Whether the use of groundwater resources is sustainable	<ul style="list-style-type: none"> <li>• Inadequate groundwater monitoring, and delayed development and implementation of management tools</li> <li>• Insufficient data to know whether groundwater use is sustainable</li> </ul>
Hazardous waste (2009)	Whether the EPA's control and regulation of hazardous waste has reduced inappropriate disposal	<ul style="list-style-type: none"> <li>• Ineffective regulation of industry's management of hazardous waste</li> <li>• Monitoring and inspection activities lack coherence, purpose and coordination; data management, analysis and reporting are poor</li> </ul>
Flora and Fauna Guarantee Act (2009)	How effective administration of the Flora and Fauna Guarantee Act has been in preserving the state's native flora and fauna	<ul style="list-style-type: none"> <li>• Patchy data indicates that act has not achieved its primary objectives</li> <li>• Tools available under the act are not being used.</li> <li>• Lack of data to determine if the conservation status of threatened species has improved because of their listing under the act.</li> </ul>

**Note:** These audits are not all relevant to nature conservation but are useful to indicate systemic governance weaknesses.

## 5.2 GOVERNANCE REFORM PRIORITIES

### 5.2.1 Environmental laws

*'The principles underpinning biodiversity law have not been updated in over twenty years, in which time our understanding of environmental systems has continued to move on, especially in light of climate change pressures.'*

Environment Defenders Office (Victoria), 2014<sup>29</sup>

#### Modernising and integrating environmental laws

Outdated, complex, fragmented and failing, Victoria's various laws for nature conservation need updating, strengthening and integrating. They result from an 'incremental accumulation of different legislative regimes rather than any attempt to consider how it should all fit together and work effectively' (Figure 5.1).<sup>30</sup> The entire system is fragmented, says the Victorian Competition and Efficiency Commission.<sup>31</sup> Other deficiencies include a lack of clear objectives and modern conservation principles, a failure to address cumulative impacts, and too much discretion for decision-making that is inconsistent with conservation objectives.<sup>32</sup> Clearly, Victoria's conservation laws need an overhaul to provide a robust basis for protecting nature and optimising resilience in the face of climate change and other growing threats.

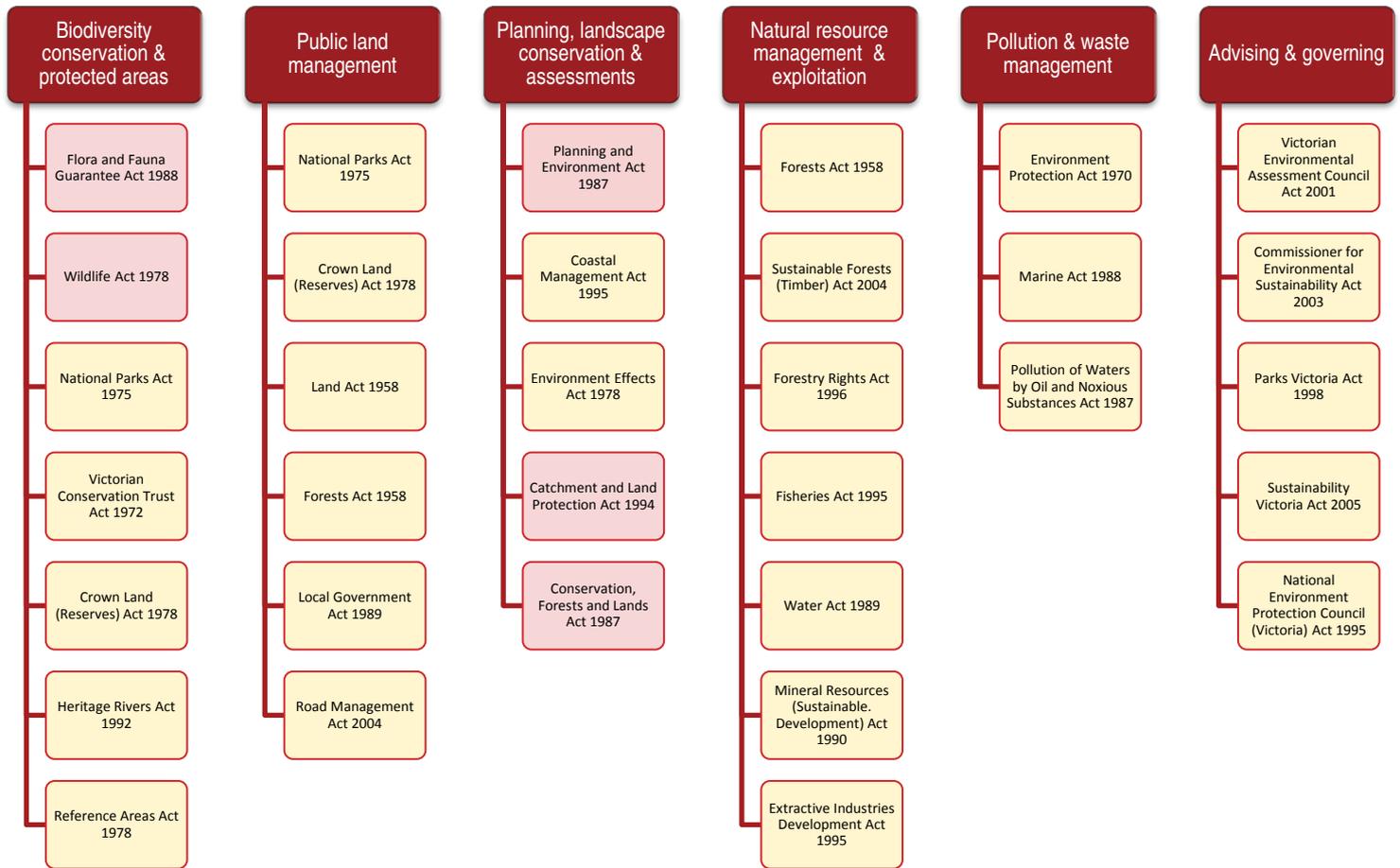
To modernise Victoria's environmental law system, this review recommends reviewing, strengthening and integrating some existing laws, particularly those relevant to protection of native vegetation and biodiversity. It would incorporate the Flora and Fauna Guarantee Act, the Wildlife Act, provisions of the Planning and Environment Act relevant to native vegetation management, the Conservation, Forests and

Lands Act, and part of the Catchment and Land Protection Act (with biosecurity elements of the latter being incorporated into a proposed strengthened new Biosecurity Act).

The new legislation should:<sup>33</sup>

- function as a clear public statement about the importance of biodiversity conservation and ecological sustainability
- define clear overarching principles that build upon ecologically sustainable development (ESD) to include principles and duties around ecological integrity, adaptive management, evidence-based decision-making, collaborative decision-making, integrated planning and action, accountability and proportionality
- provide a framework for developing, implementing and evaluating strategies and plans at appropriate temporal and spatial scales, and effective instruments for implementing them
- provide clarity about the roles and responsibilities of different agencies and organisations
- guarantee monitoring, evaluation, accountability and public participation
- require public reporting on performance, including on outcomes for relevant regulations, policies and plans, and compliance and enforcement.

Figure 5.1 The complexity of Victoria’s system of environmental and sustainability laws, including the laws proposed for review and partial or full integration into a Victorian Environment and Conservation Act



**Note:** This is not a comprehensive list of all relevant laws, and some are placed in more than one category. The laws proposed for review and integration into the proposed Environment and Conservation Act are marked in pink. It is proposed to include only the vegetation provisions of the Planning and Environment Act and the non-biosecurity elements of the Catchment and Land Protection Act.

Table 5.2 Proposed changes to environmental laws

	Biodiversity conservation	Vegetation protection	Catchment planning	Landscape management	Biosecurity	Marine & coastal
Existing laws	Flora & Fauna Guarantee Act Wildlife Act	Planning & Environment Act (part)	Catchment & Land Protection Act (part)	Conservation, Forests & Lands Act (part)	Catchment & Land Protection Act (part)	Coastal Management Act
Proposed strengthened new laws	Environment and Conservation Act				Biosecurity Act	Marine & Coastal Planning & Management Act

## Conserving threatened biodiversity

*[The] legal powers to protect threatened species set out in the [Flora and Fauna Guarantee] Act are almost never used, and ... both the FFG Act and the Wildlife Act are administered without transparency or accountability.*

Environment Defenders Office (Victoria), 2012<sup>34</sup>

The Flora and Fauna Guarantee Act offers some powerful tools but suffers from extremely poor implementation, as documented in a 2009 audit by the

auditor general and a 2012 analysis by the Environment Defenders Office (Victoria).<sup>35</sup>

The FFG Act provides a framework for the protection of threatened biodiversity and mitigation of threats. The first object is the 'guarantee' for Victoria's flora and fauna (Box 5.1), worthy of striving for, according to the law's designers, because 'the employment of any lesser concept is to give advance warning of our intention to fail'.<sup>36</sup> The FFG Act operates in conjunction with the Wildlife Act, whose objects include promoting the conservation of wildlife, prevention of extinction and sustainable use of and access to wildlife.

### Box 5.1 Objectives of the Flora and Fauna Guarantee Act

- a) to guarantee that all taxa of Victoria's flora and fauna ..... can survive, flourish and retain their potential for evolutionary development in the wild
- b) to conserve Victoria's communities of flora and fauna
- c) to manage potentially threatening processes
- d) to ensure that any use of flora or fauna by humans is sustainable
- e) to ensure that the genetic diversity of flora and fauna is maintained
- f) to provide programs:
  - of community education in the conservation of flora and fauna
  - to encourage co-operative management of flora and fauna through, amongst other things, the entering into of land management co-operative agreements under the *Conservation, Forests and Lands Act 1987*
  - of assisting and giving incentives to people, including landholders, to enable flora and fauna to be conserved
- (g) to encourage the conserving of flora and fauna through co-operative community endeavours.

Victoria's auditor general found that the environment department was not using most of the processes and measures available under the FFG Act and that it no longer provided 'an effective framework' for conservation of native flora and fauna'.<sup>37</sup> The 'patchy' data available indicated to the auditor general that its primary objectives were not being achieved.

Listing threatened species and ecological communities under the FFG Act is a first step for their protection and recovery. As of June 2013, 667 taxa and communities were listed as threatened (Table 5.3). Although this is a grim figure, it does not represent a genuine measure of threatened biodiversity. Listings are not systematic or independent and rely on nominations – these days mostly from members of the public (government officers were responsible for most nominations in earlier years).<sup>38</sup> The environment department also maintains advisory lists of species considered threatened, on which there are almost twice as many taxa (1087, see Table 5.3). The department has

been unable to determine the conservation status for 350 species on the advisory lists because there is too little information about them.

Contrary to the promise implicit in the name of the FFG Act and in the objects, listings seem to guarantee very little. The FFG Act requires that an action statement be developed 'as soon as possible' for each listed species, ecological community and potentially threatening process. Action statements are brief management plans 'designed to apply for three to five years, after which time they will be reviewed and updated'.<sup>39</sup> More than half (57%) of listed species and communities lack any action statement and more than two-thirds (69%) of threatening processes lack one. Most action statements have not been reviewed within the specified timeframe. In 2009 the auditor general found that at the then-rate of progress, with existing resources, it would take 22 years to complete action statements for listed entities. An average of just 15 were approved each year from 1991 to 2008, and the rate has

dropped since then to an average of less than five a year, at which rate (with no extra listings) it will take more than 80 years to complete action statement. However, a court case brought by Environment East Gippsland in 2013 seeking to compel the government to prepare action statements for four threatened species (glossy black cockatoo, long-nosed potoroo, large brown tree frog and eastern she oak skink) that had been without action statements for more than a decade resulted in the government developing a three-

year plan to finalise many more action statements.<sup>40</sup> However, once an action statement has been prepared, there is no guarantee it will be implemented. Recommended measures are generally not legally binding. However, the code of practice for timber production does require timber harvesting to comply with measures specified in action statements.<sup>41</sup> The auditor general found that there were no appropriate performance measures to indicate whether the actions in action statements had been effective.

**Table 5.3 Threatened biodiversity and threatening processes: advisory and formally listed under the Flora and Fauna Guarantee Act<sup>42</sup>**

	Extinct (advisory lists) <sup>(1)</sup>	Threatened (advisory lists) <sup>(2)</sup>	Data deficient (advisory lists)	Listed under the FFG Act June 2013	Number of action statements	Listed entities with no action statement June 2013 (%)
Mammals	19	38	5	40	27	33
Birds	2	128	0	78	40	49
Reptiles	1	42	4	29	11	62
Frogs	0	15	3	11	4	64
Fish	3	32	1	25	12	52
Invertebrates	6	134	38	72	28	61
Vascular plants	49	745	228	350	148	58
Non-vascular plants	2	28	77	20	0	100
Fungi & lichens	0	5	0	3	0	100
Ecological communities	-	-	-	39	17	56
Total	82	1087	356	667	287	57
Threatening processes	-	-	-	42	13	69

Source: Department of Sustainability and Environment, Department of Environment and Primary Industries. Notes: <sup>(1)</sup> The most recent government advisory lists were published for plants in 2005, for invertebrates in 2009 and for vertebrates in 2013. Extinct includes extinct over the entire range, extinct just in Victoria and extinct in the wild (where a species survives in captivity). <sup>(2)</sup> This excludes rare and data deficient but includes near threatened.

The listing process is compromised by a lack of up-to-date scientific data. Much of the information on threatened species is over 20 years old, and information on marine invertebrates is particularly scant. There is limited information on the condition of most of Victoria's flora and fauna. The auditor general also commented on the limited stakeholder participation and a lack of expertise in biodiversity due to reductions in research staff.

Several essential tools for conservation provided by the FFG Act are not used. Although the FFG Act requires a Flora and Fauna Guarantee Strategy the one and only strategy is 17 years old and obsolete. The declaration of 'critical habitat' provides a legal basis for protecting the habitat of a threatened species but has been used just once in the 25 year history of the FFG Act and was revoked soon after. This failure leaves the FFG Act

'substantially weakened, particularly as it relates to private land'.<sup>43</sup> The government has never used its capacity to issue 'interim conservation orders' to protect critical habitat. Although they are powerful tools that should be used, they are also limited by a requirement for compensation for financial loss suffered due to the making of the order. Much more reasonable would be to require compensation only if the order requires actions beyond what could be expected under a duty of care, or to remove the compensation clause, as is the case for stop work orders and interim protection orders under NSW's national parks and threatened species laws.<sup>44</sup>

However, the government has used its powers to undermine protection for biodiversity by creating orders (legally binding instruments under the FFG Act setting out exemptions or additional requirements),

including the Flora and Fauna Guarantee (taking, trading in, keeping, moving and processing protected flora) Order 2004, which removes protection for most threatened plants on private land, and the Flora and Fauna Guarantee (Forest Produce Harvesting) Order No. 2/2004, which authorises the taking of protected flora in state forests and on crown land where it results from or is incidental to harvesting operations or associated road works.<sup>45</sup>

The FFG Act requires the department's annual report to report on progress in implementing the flora and fauna conservation and management objectives but this is ignored.

Permits and licences to take species under the Wildlife Act are 'rarely refused', there is no publicly available data on the degree of compliance with conditions, and 'it does not appear that [the environment department] conducts any compliance monitoring of permits'.<sup>46</sup> Undermining the conservation goals of the Wildlife Act, some damaging invasive species – feral deer in particular – are protected for the benefit of hunters, resulting in a massive increase in deer populations and environmental and agricultural damage (section 3.4.2). Feral deer receive more protection than some native species exempted from protection under the Wildlife Act in some regions (wombats, long-billed corellas, sulphur-crested cockatoos, galahs and brushtail possums).<sup>47</sup>

Compliance monitoring and enforcement under both laws have been 'very limited'.<sup>48</sup> There is no policy or strategy, and no reporting of such activity specific for each act.

A 2002 review by the department found that the Flora and Fauna Guarantee Act was in need of an overhaul. More than a decade later, nothing has been done and the act is in even greater need of reform. The auditor general and the Environment Defenders Office have each made several recommendations, which VNPA endorses. These changes can be made through the incorporation of the FFG Act into the proposed Environmental and Conservation Act. Essential reforms include addressing the deficiencies identified here: improving the listing and recovery planning processes for threatened species and ecological communities to ensure they are systematic and reflect biological reality and ensuring that tools such as critical habitat determinations and interim conservation orders are used as intended.

However, the focus of biodiversity legislation also needs to expand, with new objectives, principles and tools to more effectively protect biodiversity and ecological processes to foster resilience and adaptation to climate change (addressed below).

### Managing invasive species

Invasive species laws in Victoria are under review as a result of national reforms to biosecurity. An Invasive Species Management Bill is proposed for introduction into parliament in 2014. Comments were sought on a discussion paper in 2012 but the government has rejected most of the feedback received and no further opportunities for input will be offered prior to the legislation being introduced into parliament.

Australian biosecurity was long focused primarily on protecting agriculture, and although the focus now encompasses the natural environment, the approach and institutional arrangements are still dominated by agricultural priorities and approaches. Biosecurity regulation and policy have been primarily administered by the agricultural agency while the environmental agency attempts to manage some of the environmental consequences of an increasing flow of invasive species into Victoria. Because biosecurity is of extremely high priority to both the agricultural and environmental sectors, the most rational institutional arrangement is a joint agricultural-environmental biosecurity unit. The environment minister and environmental staff should have primary responsibility for decisions, policy and programs for environmental biosecurity.

Although Victoria's environment is already heavily burdened with invasive species, the Victorian government guarantees a growing problem by an inadequate focus on prevention. Only a small subset of the 30,000 or so exotic plant species in Australia have been assessed for their invasive risk in Victoria, and only about 120 are declared noxious weeds (requiring control and/or restricting sale and movement). Rather than banning just a few high priority species, Victoria needs to move to a permitted list approach, which prohibits the introduction of plants into Victoria unless they have been assessed as 'safe' (at low risk of becoming invasive). This includes plants native to Australia but not indigenous to Victoria. The declaration of pest species should be systematic and efficient, based on criteria consistent with principles of ecological

sustainability and advice by a scientific committee that includes ecologists and other environmental experts.

As one of Victoria's most important environmental laws, the biosecurity legislation should include best practice environmental tools. A broad duty of care requirement is important because there is no way of explicitly regulating all actions potentially leading to invasive species impacts and one person's irresponsible action with an invasive plant or animal can ultimately have adverse impacts across vast areas for centuries to come. A legal obligation needs to be complemented by public education to motivate a more serious approach to biosecurity akin to that of hygiene and public health. The precautionary principle is of fundamental importance for environmental biosecurity because of the prevalent high levels of uncertainty about invasive species impacts in the natural environment, the long timeframes over which

invasions occur and the often-limited management options. Because of the importance of community involvement for effective biosecurity, there needs to be meaningful engagement of the community (including the environmental sector) in biosecurity processes, transparency in decision-making and open legal standing to enforce biosecurity laws.

### Adapting laws for climate change

Adapting environmental laws for climate change requires both doing much better what is already needed to conserve nature under existing pressures and adopting new approaches. Here are some principles for optimising environmental laws for climate change, adapted from five principles advocated by Robin Craig (Box 5.2), and given more context in section 5.2.5 on climate change.

#### Box 5.2 Five principles for climate change adaptation law<sup>49</sup>

*'Altering the basic paradigms of environmental and natural resources law ...to a paradigm of increasing resilience and adaptive capacity, based on assumptions of continuing, unpredictable, and nonlinear change, will necessarily require different kinds of legal amendments, and perhaps even new laws, for different regulatory contexts.'*

Robin Craig, 2010<sup>50</sup>

- Monitor and study everything all the time.
- Eliminate or reduce non-climate change stresses and otherwise promote resilience.
- Plan for the long term with much increased coordination across media, sectors, interests, and governments.
- Promote principled flexibility in regulatory goals and natural resource management.
- Accept – really accept – that climate change adaptation will often be painful.

*Promote resilience and adaptation options:* A fundamental principle of resilience is to eliminate or reduce other stresses on nature and optimise environmental health (section 5.2.5). All environmental laws should have resilience objectives. It requires going beyond saving species and ecological communities from extinction to optimising conditions for their long-term viability. Fostering natural adaptation will require protecting refugia and ecological processes, such as pollination, seed dispersal and species movement, that assist in adaptation. As discussed in chapter 2, it requires amending planning laws to protect sites for inland retreat of coastal habitats as sea levels rise. It requires stronger protection for habitats across marine,

terrestrial and freshwater habitats, and private and public tenures.

*Promote principled flexibility in regulatory goals and natural resource management:* Principled flexibility means that laws and regulators 'implement consistent principles for an overall climate change adaptation strategy, even though the application of those principles in particular locations in response to specific climate change impacts will necessarily encompass a broad and creative range of adaptation decisions and actions'.<sup>51</sup>

*Require a long-term focus to account for climate change over ecologically relevant timeframes:* Examples of where a long-term focus is essential include decisions relevant to coastal developments

likely to be inundated by sea level rises or that compromise inland retreat, introduced species likely to become invasive under future climates, and resources such as water likely to become scarcer under climate change. The precautionary principle is essential because too little is known to predict many future changes. A range of possible long-term futures should be considered.

*Require research and monitoring to inform adaptation measures:* Because information is essential to effective and adaptive management, research and monitoring should be a legal requirement.

## Compliance monitoring and enforcement

*The overall extent of enforcement and compliance with the native vegetation regulations is unknown because data on compliance is not collected and reported. However... there was a widespread view that illegal clearing is occurring, and that many individuals and businesses are failing to comply with offset agreements.*

Victorian Competition and Efficiency Commission, 2009

Laws are generally effective only if enforced. A 2011 audit by the auditor general found systemic failings in compliance monitoring and enforcement of environmental laws by the then departments for primary industries and environment.<sup>52</sup> Neither department had a comprehensive, risk-based approach to compliance: they had not clearly identified how compliance activities contributed to achieving legislative objectives, how to measure success, or how to report compliance performance. In other audits, the auditor general found deficient compliance monitoring and enforcement for management of contaminated sites and groundwater.<sup>53</sup> Vegetation regulations have also been poorly enforced. In 2009 the Victorian Competition and Efficiency Commission found that the extent of non-compliance was not monitored or reported although illegal clearing was widely assumed to occur. The Municipal Association of Victoria said that 'significant resource constraints' and 'features of the regulatory framework' made it difficult for councils to undertake enforcement.<sup>54</sup>

VNPA endorses the auditor general's recommendations on compliance and enforcement. Environmental agencies should develop and publish a compliance monitoring and enforcement policy for all environmentally relevant legislation, and comprehensively and publicly report on enforcement activity and outcomes for each law and regulation.

A 2011 independent review of Victoria's Environmental Protection Authority (EPA) highlighted the importance of organisational culture, leadership, systems, procedures and training for effective compliance and enforcement.<sup>55</sup> Two major investigations (in 2009 by the ombudsman and 2010 by the auditor general) found that the EPA was failing to meet its statutory duties – it had a weak regulatory system and a culture which did not facilitate enforcement. The 2011 review highlighted the concern that 'EPA had been too close to industry'. A concerted attempt is now being made to turn the EPA into a 'modern regulator', which will require 'rigour and discipline in decision making and the policies and procedures that underpin this'.<sup>56</sup> The reviewer proposed eight principles for effective enforcement and compliance measures:

- targeted (to prevent the most serious harm)
- proportionate (proportionate to the problem they seek to address)
- transparent (to promote the sharing of information and build credibility)
- consistent (so that similar circumstances and breaches lead to similar enforcement outcomes)
- accountable (decisions will be explained and open to public scrutiny)
- inclusive (engage with community, business and government to promote environmental laws, set standards and provide opportunities to participate in compliance and enforcement)
- authoritative (set clear standards and be an authoritative source of information)
- effective (seek to prevent environmental harm and impacts to public health and improve the environment).

Independence of enforcement functions from potentially conflicting roles in government such as policy formulation and industry support is essential for effectiveness and credibility. This is best achieved by establishing an independent Environmental Regulator (as recommended in section 5.2.2).

## 5.2.2 Institutional structures and processes

Given the complexity and breadth of environmental issues and the potential for conflicts of interest over environmental functions, it is important to optimise government structures to deliver high priority environmental outcomes. The recent merging of the environmental and primary industries agencies to form the super-agency Department of Environment and Primary Industries could improve coordination but is likely to facilitate greater domination of the environment by production and economic interests. Even as a standalone department, the previous environment department was often unable to fulfil its statutory obligations because of a lack of political support, poor internal processes and inadequate resources. This will be exacerbated by its inclusion in the department that also manages and promotes exploitation of natural resources, and merges resource management and regulatory roles. The Victorian Competition and Efficiency Commission noted the inherent conflict in combining policy and regulatory functions for vegetation management and forestry within the one agency.<sup>57</sup> Another structural flaw is that Parks Victoria, a separate authority with responsibility for management of protected areas, is unable to set its own policies and priorities, despite having the greatest knowledge of protected area management. Its priorities and targets are set by the Department of Environment and Primary Industries in a performance agreement.

A new structure is needed for Victoria's environmental and sustainability agencies to limit conflicts of interest and to better focus their work on meeting their obligations and community expectations. The following principles should apply:

- Define lines of responsibility so that each agency has clear objectives, functions and targets.
- Separate regulatory roles from policy setting and management to avoid conflicts of interest and foster impartial and consistent decision-making.
- Maximise the independence of environmental regulators to minimise interference.
- Embed ecological sustainability and biodiversity conservation as core principles for all government departments through their enabling legislation, mission statements and strategic plans.

- Establish accountability measures including transparency, regular reporting and independent audits of performance.

Recent changes to Victoria's Environmental Protection Authority, made as a result of critical reports by the ombudsman and auditor general, provide one potential model for limiting conflicts of interest.<sup>58</sup> The roles of chief executive officer and chairman of an independent board are separate (occupied by different people), with the chairman's role to set the standards and strategic direction for the authority, liaise with stakeholders and monitor the organisation's performance, including governance and risk management, and the CEO's role to manage the EPA and be responsible for statutory delegated decisions, risk management, financial and resourcing decisions and advising the chairman on issues of management.<sup>59</sup> An EPA advisory board reports to the environment minister. Other government agencies are responsible for policy, legislative reforms and supportive environmental programs.

Independent bodies play a very important role in Victoria's environmental governance, and mostly function very well. They may require only minor structural changes and more resources to function optimally. For example, as proposed in chapter 2, at least one third of board members of catchment management authorities encompassing coastal regions should have coastal or marine expertise and, as proposed in chapter 3, the role of the Victorian Environmental Assessment Council should expand to include investigations of private land conservation. Chapter 3 highlights the increasingly essential role of private land conservation in Victoria. This is often most effectively facilitated not by government but by independent community-focused bodies such as Trust for Nature, catchment management authorities and Landcare (they engender greater trust by landholders, who tend to view government with suspicion). Trust for Nature is well connected to the community and if properly resourced, could play a greater role in facilitating private land conservation, guided by its statewide conservation plan.

The role of the sustainability commissioner has had limited influence on the culture and performance of government agencies, and should be expanded to include a 'watchdog' focus: auditing and reporting on

whether environmental law and policy objectives are being met, identifying priorities and policy goals, forecasting the impact of current activities and emerging trends, and investigating community concerns about significant environmental issues.<sup>60</sup>

## Environmental and sustainability agencies

Figure 5.2 outlines a proposed new structure consisting of three state government agencies for delivery of conservation and sustainability functions, two independent regulators for native vegetation management and enforcement of environmental laws, an independent environmental audit office, and independent bodies for private land conservation, coastal and marine management, environmental investigations and catchment management (these include existing bodies). Their structure, role and main functions are outlined in more detail below.

### Nature Victoria

*Role:* Conservation management and delivery.

*Structure:* A statutory government agency reporting directly to the environment minister (rather than through another department via a performance contract as is the arrangement for Parks Victoria).

*Functions:*

- Manage national parks, marine national parks and marine sanctuaries and other reserves under the National Parks Act.
- Deliver conservation programs.
- Develop and implement a state nature conservation strategy.
- Develop wildlife and threatened species policy and recovery and threat abatement plans.
- Manage Melbourne's parks, public foreshores and jetties.
- Undertake environmental data collection, monitoring and scientific research.
- Provide service support for the proposed Marine and Coastal Authority and the Environmental Regulator, including scientific advice, enforcement and logistical support.

### Communities & Landscapes Victoria

*Role:* Landscape and risk management within an environmental framework.

*Structure:* A statutory government agency with its own minister.

*Functions:*

- Apply a broad environmental framework (eg the biodiversity strategy) to government activities.
- Coordinate effort across all tenures to tackle threats to the environment, productivity and human health and safety, including invasive species, bushfires, climate change, droughts and floods.
- Implement management programs, with a strong focus on prevention and early action (fires, invasive species, climate and floods).
- Prepare for emerging and future threats identified by the Environmental Audit Office.

### Production Victoria

*Role:* Support for primary production within an ecological sustainability framework.

*Structure:* A statutory government agency with its own minister.

*Functions:*

- Set policy for natural resource activities (forestry, mining and fishing) on public land, within an ecological sustainability framework.
- Provide support, advice and guidelines for sustainable production (agriculture, fishing, forestry and mining) on private land.
- Support primary industries and their contribution to a thriving economy.

### Environmental Regulator

*Role:* Compliance monitoring and enforcement of environmental regulations.

*Structure:* A statutory government authority, which incorporates and retains the structure of the Environmental Protection Authority, with a chair reporting to the environment minister, a chief executive officer, and an independent advisory board that also reports to the minister.

*Functions* (in addition to existing functions of the Environmental Protection Authority):

- Conduct compliance monitoring and enforcement of regulations for native vegetation, fishing, forestry, river and groundwater use, environmental aspects of mining, pollution and waste management.

- Regulate licencing under the Wildlife Act and Flora and Fauna Guarantee Act (or the equivalents under the proposed Environment and Conservation Act)
- Publicly report on compliance activities and outcomes.

### Native Vegetation Regulator

*Role:* Operational functions of native vegetation management

*Structure:* An independent authority reporting to the environment minister.

*Functions:*

- Assess clearing applications.
- Oversee monitoring programs for native vegetation.
- Administer offset schemes.
- Provide expert advice for vegetation assessments and policy-making.

### Environmental Audit Office

*Role:* Independent reviews of environmental performance (expanding the role of the sustainability commissioner by adding functions similar to those of Victoria's auditor general and increasing its independence).

*Structure:* Independent office of the parliament with the auditor appointed by a parliamentary committee and reporting directly to parliament.

*Functions:*

- Report to parliament on the condition of Victoria's natural environment via five-yearly state of the environment reports and other more frequent and specialist reports.
- Produce five-yearly state of the bays reports.
- Promote ecological sustainability and the adoption of sound policies by the state and local governments.
- Review the implementation of environmental legislation and policies.
- Hold inquiries based on complaints and self-initiated assessments.
- Undertake foresighting, including on future trends and emerging threats.

- Collate, manage and publicly disseminate environmentally relevant information.

### Victorian Environmental Assessment Council

*Role:* Independent investigations on the protection and sustainable use of public and private land (expanding on the current scope of public land).

*Structure:* Council of five members appointed by the environment minister, with a community reference group to advise each investigation, reporting to the environment minister and parliament.

*Functions (including current functions):*

- Conduct assessments at the request of the environment minister.
- Conduct systematic bioregional assessments of landscape values on a rolling 10-year cycle.
- Investigate ecologically sustainable management of public and private land.
- Advance proposals for improving conservation of biodiversity.

### Marine and Coastal Authority

*Role:* Integrated planning and management of marine and coastal areas.

*Structure:* A statutory independent body with a board with expertise including marine and coastal planning, protection and management. It would replace the Victorian Coastal Council and the three coastal boards, and structure its administration around five regions: South-west, Otway, Central (Port Phillip Bay and Western Port), West Gippsland and East Gippsland, the boundaries aligned with those of the coastal catchment management authorities.

*Functions:*

- Produce a marine and coastal strategy (a statutory planning instrument) that provides ecologically based parameters for all recreational and extractive activities including fishing, mining and aquaculture.
- Conduct statutory planning for public lands and marine areas.
- Manage marine areas outside marine national parks and marine sanctuaries.
- Coordinate responses to marine disasters.

### Trust for Nature

*Role:* Facilitator of conservation on private land.

*Structure:* Statutory body with expertise-based independent board reporting to the environment minister.

*Functions* (including current functions):

- Provide covenant and stewardship services on private land.
- Manage Trust for Nature conservation reserves.
- Manage a revolving fund for purchase, covenanting and on-sale of properties.
- Manage the Land for Wildlife extension program
- Facilitate landscape conservation by supporting conservation management networks.
- Provide environmental market services such as offsets

### Catchment management authorities

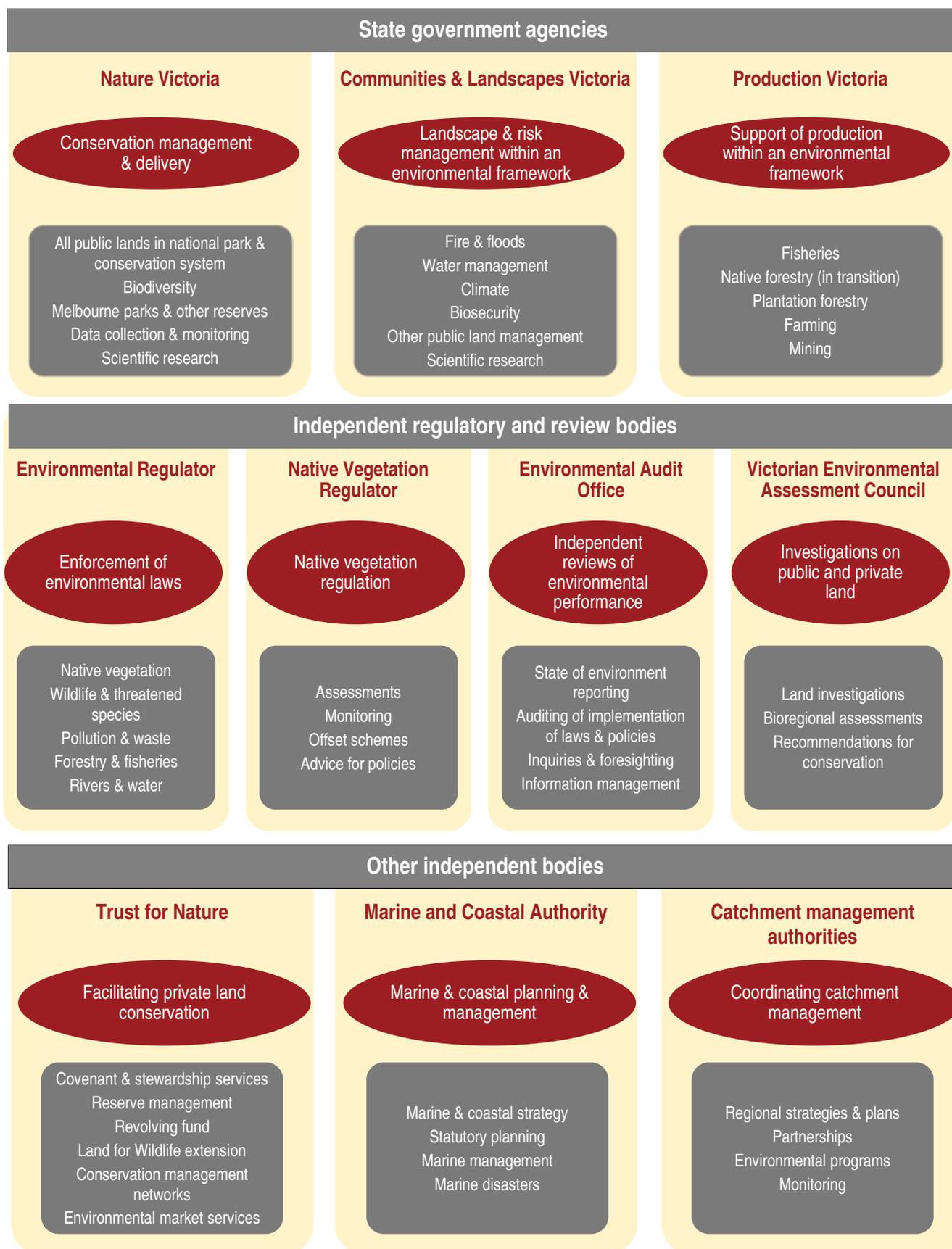
*Role:* Facilitation and coordination of the integrated and sustainable management of catchments.

*Structure:* Each with a board with up to nine members appointed by the environment minister.

*Functions* (including current functions):

- Set a strategic direction for regional land, water and biodiversity management.
- Develop partnerships with land managers, regional institutions, organisations, communities and local governments.
- Deliver programs that improve environmental condition and bring long-term environmental benefits.
- Monitor the outcomes and evaluate the effectiveness of programs.

Figure 5.2 Proposed structure for conservation and sustainability agencies and organisations



## Local governments

Local governments have a pivotal role in regulating land use and environmental management, through the following functions:

- Planning: they determine land use and assess applications for development, subdivisions and vegetation clearing under the Planning and Environment Act.
- Land management: they own and manage substantial areas of high conservation value lands.
- Natural resource management and conservation programs: they administer or support bush regeneration and invasive species management programs, conduct community education and offer incentives for private land conservation.

Local governments' interest in and capacity for environmental management vary considerably – Hindmarsh Shire Council has a budget of \$20 million for an area of 7530 km<sup>2</sup> with a population of 6000 while Melbourne City Council has a budget 20 times higher (\$357 million) for an area 200 times smaller (38 km<sup>2</sup>) with 105,000 residents and 430,000 visiting workers.<sup>61</sup>

Although local governments have major environmental responsibilities under state planning laws, they often lack access to sufficient expertise or resources to effectively fulfil their obligations. This is the case in many local government areas for native vegetation management (one reason for transferring decision-making about clearing applications to the proposed native vegetation regulator).<sup>62</sup>

Local governments also have insufficient conservation tools under the planning system. In particular, there is no conservation zone available for

land located outside the public national park and conservation system. The rural conservation zone is the best available to restrict development but is inadequate for protection of high conservation value vegetation on private and council-owned properties. Local governments need a statutory mechanism under the planning system or local government laws to achieve permanent protection of council-owned lands with high conservation values as 'local conservation reserves'. There also needs to be greater alignment with catchment management planning, with local government plans incorporating and implementing catchment management planning priorities.

As the tier of government closest to the community, local governments have the potential to foster community involvement in environmental programs but conservation is often a low priority amongst many other responsibilities and demands on budgets. A national study in 1997 found that just 3% of local government expenditure was for conservation initiatives.<sup>63</sup> There are many ways the state government could encourage and support councils to play a greater role in environmental protection.<sup>64</sup> One useful model is the global Cities for Climate Protection program, which assists local governments to take 'local action for global sustainability and supports cities to become sustainable, resilient, resource-efficient, biodiverse, low-carbon; to build a smart infrastructure; and to develop an inclusive, green urban economy'.<sup>65</sup> Victorian councils could work with the community to develop and implement local biodiversity action plans. The state government should encourage this by offering matching funds for implementation of such plans.

### 5.2.3 Federal-state relations on protected areas

Although the major focus of this report is state level reforms, the federal government also has considerable influence through its environmental laws, policies and funding programs. It lacks a specific constitutional head of power for 'the environment', but has a substantial role through its constitutional responsibility for implementing international conventions such as the 1992 United Nations Convention on Biological Diversity and the 1971 Convention on Wetlands of International Importance. The Environment Protection and Biodiversity Conservation Act (EPBC Act) specifies

matters for which it has assumed some regulatory responsibility, including world heritage sites, national heritage places, Ramsar wetlands, nationally threatened species and ecological communities, migratory species and Commonwealth marine areas. Despite a 10 year review in 2009 finding that the EPBC Act needed strengthening, the federal government has been weakening the law under an agenda to reduce so-called green tape.<sup>66</sup> The brief focus here is the federal government's role in national park management.

Despite the pivotal role of national parks in conservation (and despite the 'national' in their name), they are not a matter for which the federal government takes responsibility. The 1993 Intergovernmental Agreement on the Environment states that their management is largely the responsibility of the states. There is, however, a clear legal rationale for the federal government to have a greater role, as national parks help fulfil international obligations under the Convention on Biological Diversity. There is also the

need for a Commonwealth role, particularly when state governments disregard their obligations to protect and effectively manage national parks. Currently, the federal government has no legal means to intervene unless some other matter relevant under the EPBC Act, such as a nationally threatened species, is affected by activities in a national park. Environment groups, including VNPA, have recommended that national parks become a 'matter of national environmental significance' under the EPBC Act.

### Box 5.3 Australia's protected area obligations

As a party to the Convention on Biological Diversity, Australia agreed to establish a system of protected areas to conserve biodiversity; develop guidelines for the selection, establishment and management of protected areas to conserve biodiversity; promote the protection of all ecosystems, natural habitats; and manage land to maintain viable populations of species.

The national targets in Australia's Strategy for the National Reserve System 2009–2030 are to protect:

- examples of at least 80% of all regional ecosystems in each bioregion by 2015
- examples of at least 80% of all regional ecosystems in each sub region by 2025
- core areas for the long-term survival of threatened ecosystems and threatened species
- habitats in each of Australia's bioregions by 2030
- critical areas for climate change resilience, such as refugia.

There is also a rationale for the federal government to fund special management programs in the national park estate. Despite the extremely high conservation values of the national park estate, the federal government provides almost no funding to assist with their management, in part out of understandable concern that the states will engage in cost shifting if other funding is available for

functions traditionally undertaken by state agencies. This could be avoided if funding was made available for 'above duty of care' initiatives or cross-border programs or for works to foster climate change adaptation under a Natural Icons Resilience Program proposed by VNPA. Protecting water flows in the Australian Alps would be a prime candidate for such funding (Box 5.4).

### Box 5.4 Australian Alps catchments<sup>67</sup>

The high quality water flowing from the Australian Alps is of national importance. The average 3980 gigalitres of water delivered annually from the Victorian Alps to the Murray-Darling Basin were estimated in 2005 to be worth at least \$4 billion, which means that the water flowing from all Australian Alps catchments (about 9600 gigalitres annually) would be worth, in 2005 terms, as much as \$9.6 billion a year. These waters sustain the high mountain ecosystems, provide environmental flows for downstream rivers and help dilute salt- and silt-laden waters from Murray-Darling Basin catchments. Degradation of the alpine national parks could thus seriously undermine water quality, water yield and natural flow regimes.

The Alps have outstanding biodiversity and geodiversity. Many of the wildlife species are unique, and many are threatened. Landscape and scenic qualities are also diverse and outstanding – summer wildflower displays in alpine herbfields, gnarled snow-gums at the snowline, tall wet eucalypt forests and rainforests, limestone caves, deep gorges, broad river valleys and rugged winter-snow-covered mountains, the highest in Australia.

Climate change is predicted to compromise these natural values and reduce the flows of high quality water. A 2011 report on the condition 235 sub-catchments in the Australian Alps identified climate change risks and priority actions.<sup>68</sup> These priorities, costing about \$100 million over 15 years, include protecting and enhancing water yields by removing weeds, restoring snow gums, protecting water quality and minimising soil erosion; and protecting water flow regimes by conserving natural vegetation cover.

## 5.2.4 Planning and priorities

Planning is essential for setting the direction of conservation in Victoria at state, regional and local levels. But there is no current state biodiversity strategy, no action statements for about half the listed threatened species and out-of-date or non-existent management plans for many protected areas. Many

existing plans are also poorly integrated – particularly across marine, coastal and terrestrial environments, and across public and private tenures. Figure 5.3 shows some of the major strategies and plans needed to direct and integrate environmental management across land and seascapes.

**Figure 5.3 Relationships between land, coastal and marine planning**



**Note:** This is not a comprehensive compilation of environmental strategies and plans needed.

Very high on the priority list is a Victorian nature conservation strategy. The Flora and Fauna Guarantee Act requires the development of a 'flora and fauna guarantee strategy' but the one and only such strategy ever developed is now 17 years old. It was one of the earliest Australian biodiversity conservation policies, and was influential in promoting a bioregional approach to conservation, tools for assessing native vegetation (eg ecological vegetation class mapping) and the native vegetation framework.<sup>69</sup> However, the auditor general (and others) have critiqued the strategy for lacking measurable objectives and guidance on how to achieve those goals.<sup>70</sup> A draft updated strategy 2010-2015 (*Biodiversity is Everybody's Business*) was released for public comment in June 2010 but has been shelved since the change of government later that year.

The Flora and Fauna Guarantee Act requires that the strategy includes proposals for 'guaranteeing the 'survival, abundance and evolutionary development in the wild of all taxa and communities of flora and fauna'. This 'guarantee' objective needs to be matched with long-term measurable targets and outcome-focused performance indicators. It needs to include policies and measures to drive conservation at landscape and seascape scales across public and private tenures, harnessing the resources and skills of government, business and community to create solutions, and to promote resilience and adaption to climate change. Best practice public accountability measures are required, such as independent auditing of outcomes and regular reviews and reports on progress. Departmental performance targets need to be closely aligned to targets in the biodiversity strategy.

## 5.2.5 Climate change adaptation

As outlined in the preceding chapters, climate change will have profound and multiple impacts on marine, coastal, terrestrial and freshwater habitats. Many impacts will be due to the exacerbation of existing threats – such as harmful fire regimes and invasive species – and other climatic impacts will cause greater harm because native species and ecological communities are already under severe pressure from

other threats. Climate change will profoundly challenge governance in economic, social and environmental domains. Victoria should be responding to the threat of climate change by:

- reducing the state's greenhouse gas emissions to a globally fair share (eg per capita) of safe levels (*mitigation*)

- ensuring that responses to climate change are *ecologically sustainable*
- eliminating and reducing current threats to nature to promote *resilience* to climate change
- fostering *adaptation* to climate change.<sup>71</sup>

This will require climate change adaptation and resilience to be an extremely high priority consideration across all government agencies and programs. It heightens the urgency to address existing threats by more effective implementation of current commitments but will require institutional and other governance reforms to provide more capacity for managing and responding to a dynamic system.

**Mitigation:** Measures to reduce greenhouse gas emissions by curbing the use of fossil fuels are not addressed in this review. Victoria also has many mitigation options by conserving natural carbon sinks, such as forests (including the world's most carbon-rich forests, mountain ash), seagrass meadows and streams – and preventing harmful, carbon-emitting activities such as logging, land clearing, and severe fire regimes. Protecting and restoring habitats are valuable both for conservation and climate change mitigation.

**Sustainability:** Climate change is driving changes in human activity and will drive many more – new crops (biofuels and drought-resistant pastures), new products and services (wind energy, carbon sequestration plantings), movement of people and agriculture, and increasing demands for scarce resources such as water. Unless ecological sustainability and a long-term perspective is embedded in laws, policies and government programs, many responses to climate change will exacerbate pressures on nature, undermining the potential for adaptation.

**Resilience:** Ecosystems with intact ecological processes and low threats are likely to have greater capacity to 'resist and recover from the effects of climate variability' – in other words to be more resilient.<sup>72</sup> It requires reducing other pressures on

biodiversity in the multitude of ways identified in previous chapters (eg limiting exploitation, controlling invasive species, implementing beneficial fire regimes). Enhancing the resilience of birds in box and ironbark forests, for example, requires improving habitat quality in remnant forest, particularly in fertile areas (as noted in section 3.4.1). Under climate change, protected areas – on both public and private lands – are more important than ever for they offer the greatest opportunity to mitigate many threats and restore ecological processes.

**Adaptation:** Many climatic changes are inevitable, but their consequences will depend on whether human actions increase or decrease the potential for species to adapt – by retreating to refugia, evolving new tolerances, migrating to more suitable habitats or exploiting new resources, for example. At particular risk in the near term are alpine, coastal and moist habitats, and species with low ecological tolerances, specialised requirements, low genetic variability, long generation times or narrow geographic ranges.<sup>73</sup> Protecting habitat, on public and private tenures, to provide adaptation options is essential – 'the greater the total area of habitat available, and the more diverse that habitat, the greater the number of ecosystems and species that will be able to survive'.<sup>74</sup> The national park and conservation system is essential for safeguarding climate refuges, including sites providing temporary refuge (during climatic extremes and ecological disturbance) and long-term refuge for species with contracting ranges.<sup>75</sup> One high priority is to identify and protect freshwater refugia (section 4.5.3). Conservation beyond protected areas is, of course, also essential, to maintain or restore large-scale ecological processes essential to adaptation, such as pollination, seed dispersal, species movement and natural water flow regimes. All measures to promote resilience and adaptation need to be based on much better information about natural systems, the impacts of climate change and the effectiveness of management.

## 5.2.6 Funding

*Environmental standards should not be compromised for the sake of an agency saving money.*

Ombudsman Victoria, 2009<sup>76</sup>

As the popular saying goes, 'the economy is a wholly owned subsidiary of the environment, not the other way around.'<sup>77</sup> The natural environment directly and indirectly sustains the Victorian economy – as the basis for industries such as tourism, fishing and primary production and by providing a multitude of ecosystem services. Failures to maintain Victoria's 'natural capital' have exacted an enormous financial cost, exemplified by the billions of dollars spent trying to rescue the Murray-Darling system, mitigate salinity, restore vegetation and reduce greenhouse gas emissions. Yet, there is far from sufficient investment of public funds to arrest environmental decline, condemning future Victorians to spiralling costs for restoration and threat mitigation.

A 2002-03 valuation found that the gross value to the Victoria economy from the use of public lands (excluding intangible values and environmental services) was about \$3.5 billion and the net value about \$2.5 billion (Table 5.4). The economic benefits came primarily from the more than 110 million visits each year to Victoria's national parks, beaches and piers (worth \$1.5 billion), and from resource harvesting and extraction (worth \$1.8 billion), mainly from the use of water for irrigation and urban purposes. The state was spending about \$900 million on management of public lands.

**Table 5.4 Annual economic value of the public land estate (2002-03)<sup>78</sup>**

Benefits	\$ million
Natural resource extraction & commercial use	1,836
Visitation benefits	1,525
Recreational fishing	102
Visual amenity value	18
Local ports	6
Gross benefits	3,487
(less) Management costs	(893)
(less) Opportunity cost of land	(106)
Net benefit to Victoria	2,488
Minimum benefit cost ratio	3.5

Source: Marsden Jacobs and Associates.

Note: ecosystem services and intangible values are additional uncoded benefits.

Because of insufficient funding, government agencies are not able to meet many fundamental environmental obligations.<sup>79</sup> The auditor general has highlighted a few cases. A 2010 audit found that invasive species threats in national parks would escalate if resource constraints were not addressed, and that the reliance on short-term funding to address a long-term problem was detrimental to management effectiveness.<sup>80</sup> A 2011 audit found that the environment department had not allocated sufficient resources to plan for or respond to marine biosecurity incidents, and that dedicated funding for managing marine parks had been used for other activities.<sup>81</sup> A 2009 audit found that with existing resources, it would take 22 years for the environment department to complete basic action statements for the then-listed threatened species.<sup>82</sup> Since then, the funding situation has worsened, and there is a backlog of about 370 listed species lacking action statements (Table 5.3).

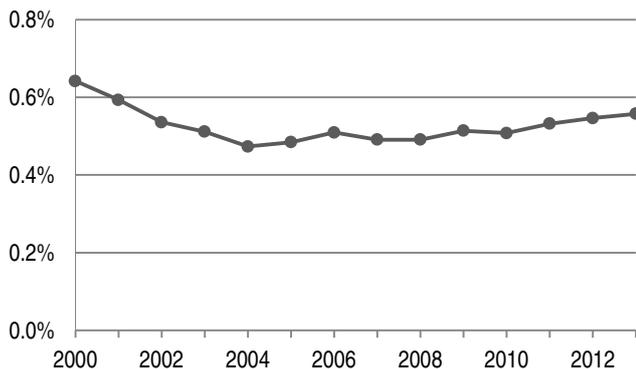
Only a small proportion of the Victorian budget goes to support nature conservation, at a level that is far from proportionate to the value of ecosystem services and the resources needed to arrest decline in and restore biodiversity.

Funding in 2012-13 for Parks Victoria – including from the state government budget, the Parks and Reserves Trust and other sources – was about \$260 million.<sup>83</sup> Equivalent to just 0.6% of the state budget – and about the size of the budget for a medium-sized local government area – it is for managing about 18% of the state's land area and 5% of marine waters: about 4 million hectares of land, 50,000 hectares of marine waters, and 35 million visits to national and state parks (Figure 5.4). It equates to just \$45 per Victorian, or about the cost of a cup of coffee per Victorian per month. It also equates to about \$5 per visit to Victoria's parks. Visiting a national park is not only one of the most popular recreational choices, it is one of the cheapest.

The funding available to manage the national park estate for conservation outcomes is substantially less than the total \$260 million revenue of Parks Victoria. About one third (\$88 million) is spent on just 5000 hectares of metropolitan parks (from the levy

Melbourne residents pay for managing these parks) and considerable sums are spent on managing visitors and facilities, including 44 visitor centres, 703 shelters, 845 toilets, 515 viewing lookouts, 55 playgrounds, 14,000 kilometres of roads, 1213 pedestrian and vehicular bridges, 3700 kilometres of walking tracks, 110 sporting facilities, 217 piers and jetties, 98 water access points and 937 navigation aids.<sup>84</sup> Parks Victoria provided education and interpretation services to more than 180,000 visitors and students in 2012-13. Fewer than 1000 staff (full-time equivalent) are employed by Parks Victoria, which averages out to more than 4000 hectares of land managed per employee (many of whom are not field staff). The government cut 120 jobs from Parks Victoria in 2013.<sup>85</sup>

**Figure 5.4 Funding for Parks Victoria (from state government sources) as a percentage of the state budget, 2000-2013**



**Notes:** The funding includes state government budget allocations to Parks Victoria and funding from the Parks & Reserves Trust.

## Principles for investment

Essential to environmental planning is the realistic costing of actions needed to fulfil Victoria's environmental obligations as well as the costing of current unsustainable practices. Long-term investments are needed for long-term problems. The following principles should be applied to funding decisions.

- Establish clear links between policy and funding, so that policy is translated into actions and outcomes. Much environmental policy is mere rhetoric because too little funding is provided to implement it. Funding must be increased to match the increase effort required to meet the desired outcomes.

- Commit resources for ecologically realistic timeframes. Most biodiversity programs require long-term commitment of resources. Several years' investment may be wasted if ongoing and follow-up works and regular maintenance is not undertaken.<sup>86</sup>
- Allocate 'core funding', with long-term security, to central elements of public land management rather than short-cycle 'initiative' funding.
- Identify the core environmental functions of government – those required under treaties, legislation, regulation and policy – that should be funded by government, to ensure that funding obtained from external, non-public sources is used to enhance these functions and not replace them.
- Make funding decisions transparent with details available for public review. There is currently almost no publicly accessible information about how funds are spent. For example, annual Parks Victoria action plans, which allocate the budgets to implement management plans, are not publicly available.
- Avoid funding or subsidising activities that undermine environmental objectives, such as subsidies for fossil fuel industries.
- Include realistic in-kind and volunteer contributions in programs and ensure there is sufficient budget to support, train and encourage volunteers.

## Options for increasing funding

*Funding and resourcing available for biodiversity fall far short of what is required to achieve effective long-term biodiversity conservation outcomes.*

Ecology Australia, 2011<sup>87</sup>

Most recommendations in this nature conservation review encompass a stated or unstated requirement for increased and longer-term funding. This may appear unreasonable in the context of budget cutting but state government expenditure on conservation and environmental programs is only a small proportion of the state budget and warrants a much higher priority. Nonetheless, the gap between public resources available and the resources required is substantial, and will need to be addressed by multiple sources. An optimal strategy will employ a mix of complementary measures tailored to achieve specific policy goals.<sup>88</sup>

Here, the broad merits of various funding options are briefly addressed.<sup>89</sup>

*Increased public funding:* Given the importance of a healthy environment to Victoria's future and government failures under existing levels of funding to discharge their legislated environmental obligations, there is a strong rationale for substantially increasing public funding, from both the state and federal government.

*More effective prioritisation:* Many programs have not adequately targeted conservation priorities, although there has recently been a greater policy focus on directing available resources to the most important biodiversity conservation tasks. Further development of NaturePrint (or similar modelling systems) is needed to assist with prioritisation.

*More effective use of resources:* As well as focusing effort on the highest priorities, efficiency can be gained by increasing staff skills, purchasing skills on an as-needs basis (although this can undermine institutional capacity), developing protocols, guidelines and procedures for delivering high-quality outcomes, and adopting a 'continuous improvement' approach. 'Cuts in resources and programs are often ... dressed up as "efficiency" measures,' but instead undermine efficiency.<sup>90</sup>

*Commercialisation of biodiversity:* There has been increasing focus on commercial uses of the reserve system and public estate, epitomised by opening parks to cattle grazing and commercial tourism developments. Such activities can undermine the value of natural assets and ultimately cost the state more in threat management and restoration.

*Privatisation of conservation:* Measures promoting private conservation, such as the creation of markets for environmental services and biodiversity credits, and a focus on 'multi-outcome' programs are effective in some circumstances. A Trust for Nature covenant, for example, may in some instances be more cost-effective in securing a small private land remnant than purchase and addition to the public reserve system. But under some programs such as offsets under the native vegetation management framework, the security and longevity of biodiversity outcomes are doubtful.

*Market schemes:* Examples are auction-based schemes such as Bush Tender and EcoTender, and offset schemes for vegetation clearing and greenhouse gas emissions. The scale so far is too small to be a

major driver of environmental management and restoration. The Victorian Competition and Efficiency Commission concluded that 'significant additional funding for incentives' is required if the government wishes to 'achieve the broader net gain policy objective for native vegetation, without imposing the additional costs on landholders'.<sup>91</sup>

*Certification schemes:* Environmental labelling and certification schemes can generate resources for conservation but they require independent auditing and verification, and the benefits may not justify the set up and maintenance costs.

*Multi-objective projects:* Promoting private-sector funding of biodiversity by piggybacking on commercial activities, or undertaking commercial landscape-scale 'biolink' plantings of biodiverse species for carbon-sequestration has been proposed. This could increase resources directed to biodiversity without extra funding.

*Use of community groups:* Community groups have long contributed to conservation works on the public estate. But they will never replace the need for public investment or contribute more than a fraction of the resources required. Community involvement has many indirect benefits – promoting connections to reserves, education and awareness – but also has costs such as for supervision and capacity building. There will always be committed people, but an over-reliance on volunteerism can place unfair pressure on community members and lead to burn out.

*Voluntary stewardship:* Increasing private-sector conservation has been the focus of government programs such as Land for Wildlife and Landcare, and is vital to achieving biodiversity outcomes. Unfortunately, many schemes and projects by individual landholders have not targeted priority biodiversity assets, and little is known about the biodiversity outcomes. Issues include skills, monitoring, maintenance, and security of gains in biodiversity value.

*Incentives to leverage further expenditure:* Some grants and incentives for private land require an equal contribution of resources from the landholder, and some catchment management authorities believe that incentives encourage recipients to also contribute resources (the 'two times' assumption). This appears to be an effective way of increasing spending on conservation.

*Philanthropic funding:* There are several good examples of philanthropic involvement, including the

Wettenhall Foundation's contribution to the 'connecting country' program, and charitable land purchase programs that add to the reserve system, such as the Trust for Nature, Bush Heritage and Australian Wildlife Conservancy, often supported by supplementary grants from other foundations or individuals. A recent study found that the 'current level of philanthropic funding for the environment is not enough to achieve fundamental and long-term change'.<sup>92</sup> Issues include a lack of coordination between funding sources, limitations in types of projects that can be funded under restrictive trust deeds, philanthropists' lack of knowledge about conservation, and failure to identify priority areas and fund activities with a reasonable probability of delivering successful outcomes. Philanthropic involvement should never replace core government responsibilities for funding conservation.

*Environment reparation fund:* The 2009 review of the federal Environment Protection & Biodiversity Conservation Act proposed a reparation fund, to receive fines for breaches of the act and to disburse for repair or compensation.<sup>93</sup> Funds would need to be directed to biodiversity outcomes, rather than simply ending up in consolidated revenue. The Victorian Heritage Act has provision for a heritage fund to receive payment of fines for breaches; the same principle could be applied in the biodiversity sector.

*Parks levy:* Management of urban parks is supported by a 'parks charge' on residential and commercial properties in greater Melbourne. Opportunities for distributing this funding more widely, in line with biodiversity priorities, and widening the collection of the levy, should be investigated.

*Park fees:* Most fees for park use in Victoria have been abolished. The costs of collecting fees are often too high to make it financially worthwhile. Fee for service or fee for visitor funding models can also pervert park management away from conservation priorities towards visitor management.

*Funding from tourism:* It is arguable that the nature-based tourism industry should contribute to managing the landscape from which it benefits. One option is a bed levy. A second is to direct a proportion of the GST raised from tourism towards environmental management. The annual expenditure on acquiring and managing national parks in Australia is less than 40% of the GST revenue earned from nature-based international tourists.<sup>94</sup>

*Biodiversity foundation:* A foundation could be established to raise money from a wide variety of sources for conservation programs beyond core government functions. One potential source of funding is an environmental lottery.

*Biodiversity lottery:* Examples of environmental lotteries include:

- Britain's Heritage Lottery Fund, which has disbursed more than £5.5 billion to 35,000 projects since 1994<sup>95</sup>
- Western Australia's Lotterywest, established in 1932, which disbursed \$270 million to over 1300 community organisations in 2011-12 to support health, arts, sporting and environmental projects<sup>96</sup>
- Netherlands Postcode Lottery, established in 1991, which disbursed about 300 million Euros in 2013 for environmental and charitable projects.<sup>97</sup>

*Tax deductions and rate relief:* Primary producers receive special tax concessions, which require commercial use of the property. Managing farms for conservation or to generate eco-services does not qualify. There are some capital gains tax concessions for when an individual enters into a perpetual conservation covenant, but there must be a reduction in the market value of the property for it to apply. Tax incentives for conservation farming as a form of primary production (supporting ecosystem services) would help stimulate conservation investments.<sup>98</sup> Rates relief for conservation land is available in some municipalities, and could also stimulate conservation covenanting if it applied across all municipalities.

Conservation in Victoria requires substantially more funding – from both traditional and new sources. In recognition that environmental health is essential to Victoria's future and underpins economic and social wellbeing, a certain proportion of the state budget should be guaranteed for environmental and conservation functions. Core funding needs should be identified from an audit of essential environmental functions that arise from national and international commitments, including recovery of threatened biodiversity and mitigation of threatening processes. Long-term funding commitments should be made to permit conservation management over ecologically meaningful timeframes.

Establishment of a Victorian Biodiversity Fund is proposed here to support programs necessary to build the resilience of Victoria's ecosystems. New or

expanded sources of funding should be investigated, including lotteries and levies such as a 'bed tax' from tourism.

### 5.2.7 Knowledge needs

*The limited amount of specific data, particularly on which areas are being impacted by degrading processes and where these issues are being actively addressed, is a clear limitation on how well we currently understand progress towards policy objectives.*

Department of Sustainability and Environment, 2008<sup>99</sup>

Conservation requires knowledge – of what biodiversity exists, its status and threats, how ecological processes function and what management methods are effective. Monitoring, evaluation and reporting are essential for accountability, performance assessment, identification of effective practices, and adaptive management. A consistent theme from the previous three chapters is inadequate or non-existent baseline information and insufficient monitoring to evaluate whether policies and programs are achieving their goals and whether laws are being complied with.

Knowledge of Victorian biodiversity is particularly poor for: (1) conservation status and trajectories of biodiversity, particularly for neglected taxonomic groups such as fungi, non-vascular plants and invertebrates, (2) ecological requirements of taxa and the threats to them, (3) interactions between taxa, communities and abiotic elements (soil, groundwater, atmosphere) and ecological processes, (4) the effectiveness of different management techniques for different situations and (5) conservation assets on private lands.<sup>100</sup> Areas in particular need of improved monitoring, evaluation and reporting are the national vegetation management framework and vegetation offsets, threatened taxa and ecological communities, invasive species, and management of reserves.<sup>101</sup> Large sums have been spent on environmental works and revegetation on private land under Landcare and other programs, but there has been a lack of monitoring to evaluate biodiversity outcomes.

The auditor general has also identified major deficiencies in monitoring, and data collection and management. For recreational freshwater fisheries, there was a lack of 'systematic and quality assured or

ecologically focused' data collection, with significant gaps in assessing the impacts of fishing on freshwater ecosystems, and the ecological impacts of the fish stocking program.<sup>102</sup> For invasive species management, Parks Victoria data in 2010 was 'inadequate and increasingly out of date', with about 75% of plant data and 57% of animal data over 10 years old, and about 30% of plant and animal data over 20 years old.<sup>103</sup> For marine biosecurity in 2011, there was no marine pest monitoring system to detect and respond to marine biosecurity incidents, and no systematic or routine monitoring in any Victorian port. The environment department had not comprehensively monitored the Port of Melbourne or Portland for over a decade.<sup>104</sup> For groundwater in 2010, there was insufficient data about reserves and sustainable extraction rates, and inadequate monitoring.<sup>105</sup> For soil health in 2010, there was no monitoring and soil health data was fragmented, inconsistent and varied in quality.<sup>106</sup> For threatened species in 2009, there was a lack of baseline data, and existing information was often more than 20 years old.<sup>107</sup>

Another area of knowledge deficiency is in understanding the value and methods of traditional land management by Indigenous Victorians and how best to capture and incorporate that knowledge into decision-making and management. Joint management arrangements established recently for some protected areas provide opportunities to acknowledge and apply the knowledge of Traditional Owners. As discussed in chapter 3, Victoria needs more effective approaches for collaborative governance, planning and joint management with Traditional Owners.

## Expertise and skills

*The sustainability of scientific capacity, particularly within government, is ... a serious concern.*

Victorian Coastal Council Science Panel, 2011<sup>108</sup>

Managing the natural environment and the multiple threats and pressures on it requires high level expertise and diverse skills. Several reviews have identified a lack of skills and expertise in state and local governments that limit their capacity to fulfil their obligations.<sup>109</sup> Long-term funding deficiencies have been exacerbated by recent budget and staff cuts, and organisational knowledge has declined due to outsourcing and rapid staff turnover. The auditor general, for example, found there was a lack of staff and expertise to protect the marine environment and achieve the objectives of management plans. Of 18 dedicated marine positions established in 2003, only six park rangers with marine-specific skills remained in 2011, and only two had roles focused wholly on marine park management.<sup>110</sup>

There are major expertise gaps in Victoria, particularly for neglected groups such as invertebrates and fungi, for neglected habitats such as groundwater and in particular disciplines such as taxonomy and oceanography. Emerging issues, particularly climate change, will require additional skills.<sup>111</sup> Failing to address these serious skills gaps will have long-term consequences, for it takes many years to build scientific capacity. Some gaps can be addressed by more resources; others such as the dearth of taxonomists (a nation-wide problem) will need long-term programs to attract and support the next generation of scientists. The gaps are not only biological and environmental; building capacity in social sciences is essential too – for example, to improve the effectiveness of educational programs and build support for climate change adaptation. Environmental management also needs to be bolstered by greater use of expert advisory bodies for functions that require diverse knowledge such as national park management.

Skills and expertise in conservation can be bolstered through:<sup>112</sup>

- developing training modules and certification consistent with national competency standards
- requiring key competencies and specifying certifications required in job descriptions and contracts

- developing a consistent, integrated set of standards, guidelines and protocols for crucial biodiversity management functions that are transportable within the sector
- auditing skills of organisations and service providers and providing training where gaps are identified
- developing codes of practice and certification for biodiversity consultants, and requiring they have specified skills and professional expertise, as a condition of engagement
- providing extension and support for private landholders who manage high value and priority biodiversity assets.

## Monitoring

*We need a considerable increase in effort to establish baselines and commence periodic monitoring of trends in native species populations and habitat quality. Ideally we require across the landscape assessment of changes in native vegetation and other habitat condition which can be linked to land management practice*

Victorian Catchment Management Council, 2002<sup>113</sup>

The need for more comprehensive and meaningful monitoring has become a constant refrain in environmental reports for the obvious reason that tracking the status of biodiversity and evaluating outcomes of management are essential for guiding planning and future action. In recent years, the Victorian Catchment Management Council, the Victorian Coastal Council, the Commissioner for Environment Sustainability and the Auditor-General's Office have each stressed that improved monitoring is essential for effective environmental management.<sup>114</sup> 'It is critical that baseline monitoring is improved and a stable, long-term source of funding to support this monitoring is ensured,' said the *State of the Environment Victoria 2013*. It recommended that the state government 'audit the scope, quality and accessibility of environmental monitoring' and establish a 'systematic environmental data collection plan'.<sup>115</sup> The *Catchment Condition and Management Report 2012* called for the establishment of an independent body and robust processes to determine the condition of Victoria's land and water resources and the effectiveness of land-protection measures.<sup>116</sup> The Victorian Coastal Council identified the

following problems in coastal monitoring, which also apply to other environments:<sup>117</sup>

- disparate monitoring programs by different agencies
- no central data storage
- no coordination of what is to be monitored
- no systematic assessment of whether, even if the variables are right, sufficient data are being collected to detect change.

The council recommended a technical review of monitoring efforts to assess whether data generated was meeting current and future needs. A gap analysis is recommended here to identify priority monitoring needs, including surveys of poorly known and threatened biodiversity; monitoring to better understand interactions between taxa, and between taxa and the biotic and abiotic environment, ecological processes, and the effectiveness of conservation techniques; and systematic surveys for invasive species.

Recommendations to address specific gaps in monitoring and to promote knowledge dissemination have been made in previous chapters in this report, including a monitoring program for marine and coastal environments and the establishment of a Marine and Coastal Research and Information Service.

*'There is a critical role for citizen science in monitoring, information dissemination and gathering, and knowledge creation.'*

State of the Environment Victoria 2013

Community groups and citizens have been increasingly contributing to monitoring, through programs such as VNPA's Reef Watch and Nature Watch, Parks Victoria's Sea Search, the national Reef Life Survey developed by the University of Tasmania, and BirdLife Australia's bird atlas project. Apart from collection of valuable data, citizen science programs offer benefits that derive from meaningful involvement of people in positive environmental activities. It is important to be clear about the ways in which community science programs can help address priority

knowledge needs, to ensure good quality control over data and to provide resources and training for them.

## Reporting

Much of the environmental information accumulated by and for the state government is either difficult or impossible to access. A centralised reporting system and reporting protocols are needed to optimise the value and use of environmental information.

The preparation of 'a standardised, consistent set of environmental indicators, used across jurisdictions' is needed 'so that all data collected at all levels can be aggregated or disaggregated to make data usable at local, catchment, regional, bioregional, state and national levels'.<sup>118</sup> This would make environmental reporting at all government levels consistent and comparable.

Data collected by departments, contracted consultants and scientists, and acquired through publicly funded programs on private land should conform to this framework. There is need for standards, guidelines and protocols to measure performance and compliance and much more comprehensive and meaningful reporting. The condition, status and conservation trajectories of the state's biodiversity should be tracked and publicly reported. Budgetary allocations are needed to ensure that agencies perform monitoring, evaluation and reporting functions.

A body such as the proposed Environmental Audit Office should oversee the collation, management, and dissemination of information. The 2013 state of the environment report recommended the development and maintenance of a public access environmental data portal to serve as a single point access for information such as all state-funded research, common technical standards, publications from agencies that report to the government, all government publications and submissions to policy reviews and reports on prosecutions. The Atlas of Living Australia is one good model for its use of open source methods for collecting, managing and presenting data from a wide range of sources, including community groups and individuals.

## 5.3 PRIORITY LANDSCAPE CLUSTERS

This nature conservation review has made a large number of recommendations, and some prioritisation of focus is needed. A handful of areas in Victoria stand out as having very high conservation values and facing high threats. By grouping them into regional clusters, the case for action is made clearer and more compelling.

VNPA has identified priority 'at risk habitats' by applying the framework outlined in Box 5.5. These priorities are areas with high-value intact vegetation and high biodiversity values and with poor representation in the national park and conservation system. The biodiversity values are as identified by NaturePrint (see Figure 5.6 for an explanation). Adjacent marine areas subject to major threats have also been added to the priority clusters. Five 'priority clusters' for action have been identified; their values and status are summarised in Table 5.5 and their location is shown in Figure 5.6. They are proposed as primary 'focus areas'

for the next two decades. Their boundaries are indicative only. Over the next 10 to 20 years the following outcomes are sought for each cluster:

- *Completion of the reserve system on public lands:* Secure conservation management by addition to the national park and conservation system (to prevent logging, mining, agriculture, fishing in marine areas and other intensive uses) and improve management of intact areas on public land to reduce threats.
- *Conservation management for private lands:* Prevent further clearing or degrading uses, promote conservation management (secured by a perpetual conservation covenant or similar means), enhance connectivity and restore habitats.
- *A focus for community action:* Support the community to be involved in advocacy, on-ground works and citizen science; and foster public awareness, access to information and engagement.

### Box 5.5 A framework for prioritising terrestrial conservation

Conservation priorities for different regions depend largely on the extent and condition of remnant vegetation and the extent to which it is protected. Victorian habitats range from the extremes of highly intact and highly protected to almost all cleared or degraded with little protection. VNPA uses a broad three-tier classification of habitats to inform conservation priorities: (1) critical core habitats, (2) at-risk habitats, (3) restoration habitats (see Figure 5.5).

The temptation is often to direct most resources at the most threatened habitats. But this neglects the importance of also protecting the least-damaged habitats and maintaining their ecological processes. Each habitat category encompasses places with irreplaceable values that are important for achieving state conservation objectives. Public funds and focus should be directed, using appropriate policy tools, to the priority habitats within each of the three categories.

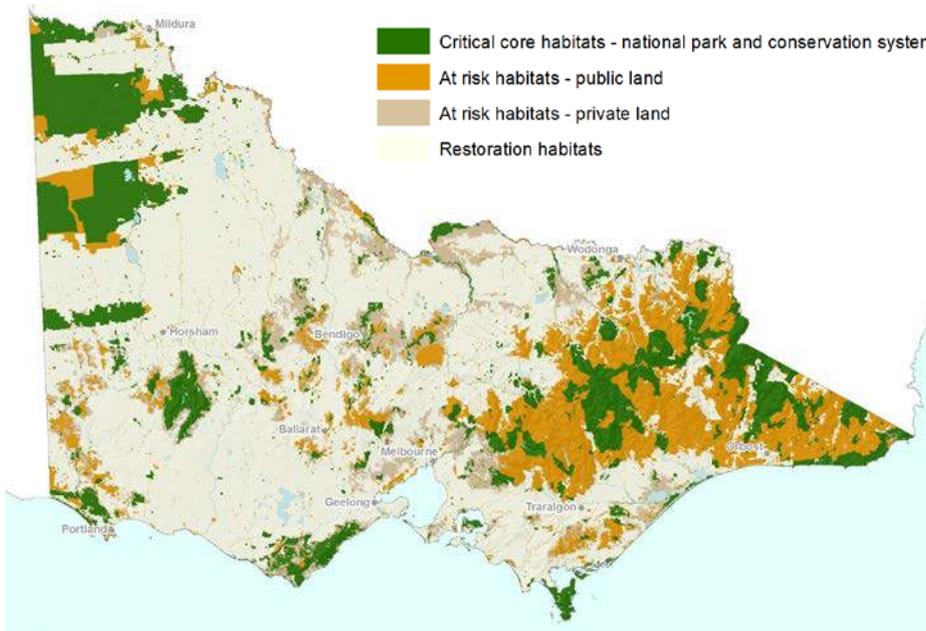
Habitat type	Description	Conservation goal	Priority focus
Critical core habitats	Largely intact vegetation, ecological processes still functioning, permanently protected.	Maintain biodiversity values and ecological processes.	Prevent damage from high-impact recreation, invasive species, inappropriate fire regimes and climate change.
At risk habitats	Habitats with still extensive native vegetation but values at risk or declining due to unsustainable exploitation.	Permanently protect from intensive and exploitative land-use and manage for conservation.	For public lands: upgrade tenure to prevent logging, mining and other damaging uses. For private lands: implement schemes for permanent conservation management.
Restoration habitats	Habitats used primarily for economic activities; highly cleared and often degraded but with important values.	A net improvement in native habitat within a productive landscape.	Maintain extent and quality of vegetation and restore priority sites (including by facilitating natural regeneration) to protect important values.

Table 5.5 VNPA's five priority cluster areas

Subregions included in cluster	EVCs meeting NCR target <sup>(1)</sup>	Subregion adequacy target <sup>(2)</sup>	Cluster area (hectares)	Biodiversity values <sup>(3)</sup>	Features	Threats
<b>South West cluster</b>						
Glenelg Plains	✗ (21%)	✗ (13%)	1,458,190	High in southern central spine	Links large remnants via rainfall gradient. Red-tailed black cockatoo.	Firewood collection, fire management, mining, weeds & feral animals
Dundas Tablelands	✗ (5%)	✗ (2%)				
Wimmera (part)	✗ (16%)	✗ (3%)				
<b>Central Victoria cluster</b>						
Goldfields	✗ (8%)	✗ (9%)	1,827,300	High on public lands in north	See VNPA <i>Special Places</i> . <sup>(4)</sup> Grey box grassy woodlands, white box-yellow box-Blakleys red gum grassy woodlands	Rural residential blocks, firewood collection, prospecting & mining, intensive recreation, weeds & feral animals
Central Victorian Uplands (part)	✗ (7%)	✗ (6%)				
<b>Melbourne Metro, Central Highlands and Catchments cluster</b>						
Gippsland Plains (part)	✗ (9%)	✗ (8%)	1,900,420	High on northern and western grasslands, Yarra Ranges	Grassy woodlands & grasslands. Growling grass frog, striped legless lizard, golden sunmoth, spiny riceflower, Leadbeaters possum. Forest giants. Melbourne's water catchment	Logging, urban development, fire management, intensive recreation, weeds & feral animals, fishing, coastal development & infrastructure, dredging & oil spills
Victorian Volcanic Plains (part)	✗ (3%)	✗ (2%)				
Highlands Southern Fall (part)	✗ (21%)	✓ (20%)				
Central Victoria (marine)	NA	NA				
<b>South Gippsland Plains and Strzelecki cluster</b>						
Gippsland Plains (part)	✗ (9%)	✗ (8%)	820,396	High on Strzelecki Ranges	Spot-tailed quoll, long-footed potoroo, Strzelecki gums, orange-bellied parrot.	Coastal development, coal mines & port, agriculture, weeds & feral animals
Strzelecki Ranges (part)	✗ (5%)	✗ (2%)				
<b>East Gippsland cluster</b>						
East Gippsland Lowlands (part)	✗ (31%)	✓ (23%)	741,725	High on all public lands	Smoky mouse, growling grass frog, long-footed potoroo, ground parrot, spot-tailed quoll	Logging, firewood collection, biomass energy, fire management, weeds & feral animals
East Gippsland Uplands (part)	✗ (28%)	✓ (34%)				
Monaro Tablelands (part)	✗ (33%)	✓ (18%)				

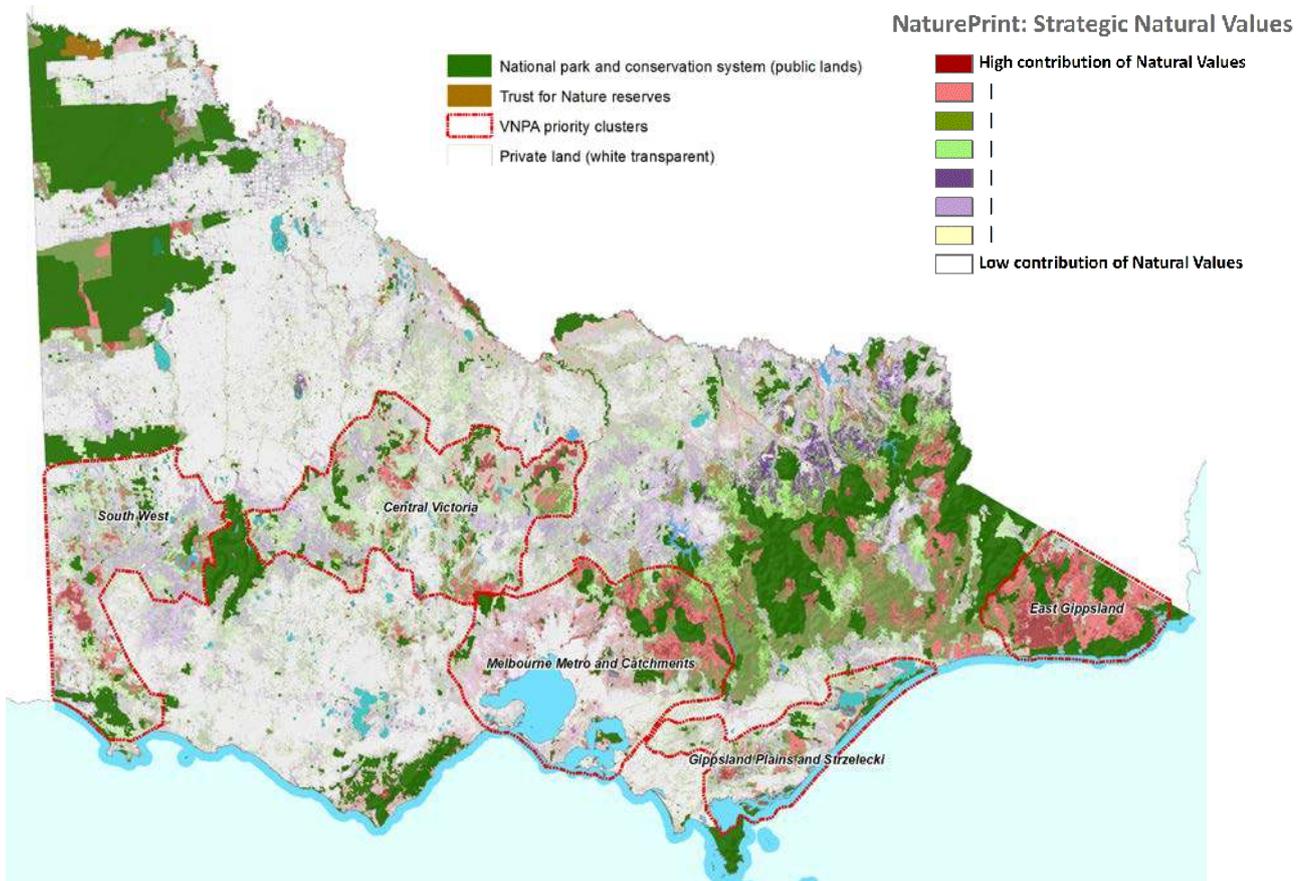
**Notes:** <sup>(1)</sup> The goal is that 100% of ecological vegetation classes meet the nature conservation review (NCR) targets for protection in the national park and conservation system (see Tables 3.21 and 3.22). <sup>(2)</sup> The subregional adequacy target is based on the Aichi target (see Box 3.4 and Table 3.15) and requires protection of at least 17% of each subregion in the national park and conservation system. <sup>(3)</sup> Biodiversity values are based on NaturePrint.<sup>119</sup> <sup>(4)</sup> VNPA's 2010 report *Protection for Special Places* describes the values of this region.<sup>120</sup>

Figure 5.5 VNPA habitat classification: critical core, at risk and restoration habitats



Map & analysis: VNPA. Data sources: Department of Environment and Primary Industries; Trust for Nature.

Figure 5.6 Location of VNPA five priority clusters



Map: VNPA. Data source: VNPA for priority clusters analysis. Department of Environment and Primary Industries for NaturePrint and protected areas data. NaturePrint identifies areas that contribute most to protecting the full range of biodiversity values and the relative contribution of all areas to protecting the full range of biodiversity values. The analysis incorporates information from the government's databases on species distributions for all Victorian plants and animals, combined with habitat connectivity and recoverability layers. It considers rare and threatened species.

## 5.4 FUTURE DIRECTIONS

Underpinning the continued decline of nature in Victoria is a consistent pattern of failed governance. Reforming the system of laws, implementation mechanisms, accountability regimes, and institutional arrangements is an essential foundation for delivering the planning, policies, decisions and programs necessary to achieve nature conservation and a healthy environment.

Victoria's environmental laws are complex, fragmented and outdated, and fail to mandate sufficient priority for biodiversity conservation. A new consolidated law – an Environment and Conservation Act – is proposed to provide a comprehensive framework for conservation, to integrate existing laws on vegetation, biodiversity and wildlife, and to apply best practice elements of environmental law.

Substantial reforms are needed in particular areas of environmental law. The Flora and Fauna Guarantee Act needs more effective processes and tools to guarantee action to reverse biodiversity declines – to protect critical habitats and ecological processes, prevent threats and foster resilience and adaptation to climate change. A new biosecurity law is needed to give appropriate priority to preventing new invasive species and provide the structures and tools to manage existing invasive threats more effectively.

With environmental governance being so complex and politically and socially challenging, it is vital to have optimal institutional structures to develop and implement policies and deliver effective programs. A new structure – four government agencies and several independent bodies – is proposed to improve accountability, reduce conflicts of interest and increase the independence of regulators for conservation and natural resource management. They need to be guided by targets that define a measurable pathway to improving the natural condition of Victoria. A new nature conservation strategy is an urgent priority to match aspirations for nature conservation with well-defined targets and effective measures.

With catastrophic heat waves, fires and floods forewarning of the momentous changes that climate change will bring to Victoria's environment and economy, now is the time to do our utmost to foster resilience and adaptation in nature and human societies. This should be a high priority across all

government agencies and programs. The national park and conservation system has a central role to play in helping nature adapt to climate change.

The failure to invest sufficient public funds to arrest environmental decline in Victoria is exacting enormous economic as well as environmental and social costs. There needs to be much greater recognition that the natural environment provides essential services, and directly and indirectly sustains the Victorian economy. Most recommendations in this nature conservation review encompass a requirement for increased and longer-term funding. A certain proportion of the state budget should be guaranteed for core environmental functions identified from an audit of obligations that arise from national and international commitments, and potential new sources of funding should be investigated.

Following is a summary of reforms recommended as high priorities over the next decade to improve environmental governance in Victoria.

### Environmental laws

#### Integration and modernisation

- G1 Develop new consolidated legislation – a Victorian Environment and Conservation Act – to provide a comprehensive framework for the conservation of biodiversity and native vegetation, and management of public lands. The new consolidated law should:
- function as a clear public statement about the importance of biodiversity conservation and ecologically sustainable management
  - provide clear overarching principles and a framework for developing, implementing and evaluating strategies and plans at appropriate temporal and spatial scales
  - establish effective instruments for implementing strategies and plans
  - provide clarity about the roles and responsibilities of different agencies and organisations
  - guarantee monitoring, evaluation, accountability and public participation
  - require public reporting on performance, including on outcomes for relevant regulations,

policies and plans, and compliance and enforcement.

## Biodiversity

- G2 Strengthen the Flora and Fauna Guarantee Act, including in ways recommended by the auditor general and the Environment Defenders Office (Victoria), and incorporate it into the new Environment and Conservation Act.<sup>121</sup> Essential reforms include:
- an improved and accelerated process to identify and list threatened biodiversity and threatening processes, and to develop, implement and review action plans for recovery
  - a focus on protection of biodiversity at all levels – ecosystems and ecological processes as well as species and population
  - a procedure (including public consultation) and statutory timeline for developing and reviewing a state biodiversity strategy
  - improvements to processes for critical habitat determinations, interim conservation orders and other conservation measures to ensure they are effectively used
  - processes and tools to facilitate adaptation to rapid climate change.

## Biosecurity

- G3 Develop new biosecurity legislation to more effectively prevent, eradicate, control invasive species that threaten the natural environment that includes:
- a lead role for the environment department and environment ministers in developing policy and administering legislation and policy for invasive species that threaten the natural environment
  - ecologically sustainable development as a guiding principle, which includes the precautionary principle, conservation of biodiversity, intergenerational equity, valuation and pricing and public participation
  - a permitted (safe) list approach to define which non-indigenous taxa (including species native to Australia but not to Victoria) can be introduced, sold, moved or kept in Victoria on the basis of risk assessment, with the precautionary principle applying where information is lacking

- a requirement for systematic risk assessment and categorisation of already introduced species to optimise the potential to prevent establishment, eradicate, contain or control harmful species
- an independent expert committee to advise on risk assessments, declarations and policy
- a 'duty of care' obligation to require all biosecurity participants to exercise a general biosecurity obligation to take reasonable and practical measures to prevent and minimise biosecurity risks.

## Enforcement and compliance

- G4 Strengthen the compliance framework for environmental laws by:
- developing whole-of-department and specific regulator compliance monitoring and enforcement policies,
  - transparently identifying and monitoring high compliance risks across all legislation,
  - improving oversight of compliance functions – by monitoring, regular external review and assigning clear accountability for compliance responsibilities, and
  - publicly reporting on compliance monitoring and enforcement activities and outcomes for each relevant law and regulation.

## Institutional structures and processes

- G5 Restructure Victoria's institutions for conservation and natural resource management to establish clear lines of accountability, to separate regulatory roles from policy setting and management and to maximise the independence of environmental regulators. The recommended structure includes the following bodies:
- Nature Victoria (statutory government agency): conservation management and delivery
  - Communities & Landscapes Victoria (statutory government agency): landscape management within an environmental framework
  - Production Victoria (statutory government agency): support for sustainable production within an ecological sustainability framework

- Environmental Regulator (statutory government authority with independent board): compliance monitoring and enforcement of environmental regulations
  - Native Vegetation Regulator (independent authority): operational functions of native vegetation management
  - Marine and Coastal Authority (statutory independent body): integrated planning and management of marine and coastal areas
  - Victorian Environmental Assessment Council (independent council): investigations on the protection and sustainable use of public and private land
  - Environmental Audit Office (independent office of the parliament): reviews of environmental performance
  - Catchment management authorities: facilitation and coordination of the integrated and sustainable management of catchments
  - Trust for Nature (independent statutory body): facilitation of conservation on private land.
- G6 Set targets to define a measurable pathway to improving the natural condition of Victoria:
- Focus targets on measurable outcomes for conservation priorities such as native vegetation (condition and extent), ecological vegetation classes, private land protection and protected areas management.
  - Incorporate five-year rolling targets into state budget portfolio service delivery targets and agency director performance agreements.
  - Independently audit agency performance against targets in each state of the environment report.
  - Embed ecological sustainability and biodiversity conservation as core principles for all departments through their enabling legislation, mission statements and strategic plans. Require high-level biodiversity objectives to be addressed in all relevant government programs and projects. Take an integrated whole-of-government approach to biodiversity management.

## Local government

- G7 Encourage local governments to prepare local biodiversity action plans and offer matching funds for implementation of these plans.
- G8 Provide a statutory mechanism under the planning system or local government laws for local governments to achieve permanent protection of council lands with high conservation values as 'local conservation reserves'.
- G9 Strengthen the implementation of catchment management plans by aligning local government land-use planning with catchment management plans and priorities.

## Planning and priorities

### Nature conservation strategy

- G10 Develop a Victorian nature conservation strategy that includes the following elements:
- long term, measurable targets that can be adapted as conditions change or as monitoring suggests changes are required
  - outcome-focused performance indicators
  - strategies to drive conservation at landscape and seascape scales (to avoid ad hoc decision making)
  - a requirement for publicly accessible and independent auditing of program implementation and outcomes
  - a mixture of conservation tools including regulation, enforcement and market-based initiatives
  - strategies to integrate biodiversity conservation and ecologically sustainable development across public and private land tenures,
  - a commitment to long-term allocation of resources to enable organisations to implement strategies
  - a requirement for regular five-yearly reviews.

### Management plans and action plans

- G11 Closely align departmental performance targets to the outcomes defined in the biodiversity strategy and subsidiary plans and strategies.

G12 Provide the resources necessary for the environment department to systematically list threatened species, ecological communities and threatening processes, and develop action plans for all listed entities within five years.

G13 Ensure that all protected areas have up-to-date management plans and publicly accessible web-based maps and information about their values.

## Climate change

G14 For climate change mitigation, identify carbon sequestration opportunities that complement biodiversity protection and restoration:

- Assign value to biodiversity assets that reflects sequestration opportunities and invest in biosequestration projects in rural landscapes.
- Identify carbon sinks such as forests, seagrass meadows and streams. Manage native forests to conserve carbon stocks instead of logging them.
- Recognise the important role played by streams and their environs in landscape connectivity and as carbon sinks by incorporating them into broader connectivity, restoration and carbon sequestration programs.
- Require assessment of the greenhouse gas implications of land use changes.

G15 To foster ecological resilience and promote adaptation to climate change:

- Develop regional climate adaptation plans (every 5 to 10 years) and incorporate measures into all relevant plans, strategies and programs, including the biodiversity strategy, coastal plans, regional catchment management strategies and national park plans.
- Develop statewide targets for biodiversity and land health that drive investment in resilience.
- Ensure that the condition of biodiversity assets is maintained at a very high level to ensure maximum resilience and adaptability to change, including by reducing invasive species threats, implementing ecologically appropriate fire regimes, and addressing the needs of priority taxa and communities.
- Put in place a systematic and long-term ecological monitoring program to monitor progress against

biodiversity targets and ensure high quality data to assist with adaptive management.

- Incorporate climate change criteria into all relevant plans, strategies and programs, including the biodiversity strategy, coastal plans and regional catchment management strategies.
- Build the knowledge base about the impacts of climate change on biodiversity, and management approaches and techniques to foster resilience and adaptation.
- Adopt a 'foresighting' approach to planning for climate change; plan for possible outcomes taking account of potential interactions and worst-case scenarios.

G16 Investigate and implement measures to preserve the biodiversity values of the national park and conservation system under climate change:

- Expand the national park and conservation system area and improve management to foster resilience and adaptation (refer to recommendations in previous chapters).
- Identify important climate refugia and protect them within the national park estate.
- Link the national park estate along environmental gradients.

## Federal protected area policy

G17 Amend the federal Environment Protection and Biodiversity Conservation Act to make national parks a matter of national environmental significance, requiring assessment of any activities likely to have a significant environmental impact.

G18 Establish a Natural Icons Resilience Program with federal government funding for management of strictly protected areas on public or private lands that goes beyond 'duty of care or baseline management' or for special programs to improve the resilience and conservation value of protected areas. Funding could be directed to areas that meet one or more of the following criteria:

- their conservation values are of national conservation significance
- management is cross-jurisdictional
- they provide significant ecosystem services
- they are highly vulnerable to climate change.

## Funding

- G19 Establish a Victorian Biodiversity Fund to improve environmental program delivery, management of public conservation reserves and measures to build the resilience of ecosystems. Investigate potential sources of revenue, including lotteries and new or expanded charges and levies such as a 'bed tax' from tourism.
- G20 Increase funding to the environment. To identify core funding needs, conduct an audit of essential environmental functions arising from national and international commitments, including recovery of threatened biodiversity and mitigation of threatening processes. Make long-term funding commitments to guarantee conservation management over ecologically relevant timeframes.
- G21 In recognition that a healthy environment is essential to Victoria's future and underpins economic and social health, allocate a defined proportion of the state budget to maintaining and restoring Victoria's environment.
- G22 Increase the transparency of funding arrangements, including for management of the public reserve system and the allocation of resources for different functions such as visitor and facility management and conservation.

## Knowledge needs

### Skills

- G23 Conduct a training needs assessment by auditing the skills and expertise within the biodiversity sector, especially of state and local government personnel and contractors. Address the gaps identified, and improve skills and expertise at all levels.

### Research

- G24 Maintain a fixed proportion of departmental budgets to employ research staff and run research programs.

## Monitoring and reporting

- G25 Support the community to undertake scientifically robust monitoring by providing expert advice and feedback, protocols to ensure the data is effectively used and databases accessible to the public and researchers.
- G26 Ensure collection, storage and management of information is subject to standard protocols and guidelines and is freely accessible to all users.
- G27 Establish a long-term ecological monitoring network to monitor and report on conditions and trends in ecosystem components and processes, especially those most susceptible to climate change
- G28 Identify priority gaps in information collection and monitoring through consultation with the biodiversity sector, to include a focus on:
- systematic surveys prioritising poorly known and threatened biodiversity
  - interactions between taxa, and between taxa and the biotic and abiotic environments, ecological processes, and effective techniques for biodiversity conservation
  - systematic surveys for weeds and invasive animals that threaten biodiversity
  - integrated and standardised data collection and management framework for biodiversity to facilitate evaluation of long-term trends.
- G29 Implement statewide standards to be developed by the Environmental Audit Office for the collection, management and dissemination of environmental data and reports.
- G30 Make greater use of Indigenous knowledge in all areas of conservation management.

## 5.5 SOURCES

### Endnotes

- <sup>1</sup> Department of Sustainability and Environment (2010)
- <sup>2</sup> Department of Sustainability and Environment (2009b)
- <sup>3</sup> Natural Resource Management Ministerial Council (2010)
- <sup>4</sup> Commissioner for Environmental Sustainability (2008)
- <sup>5</sup> Victorian Auditor General (2010a)
- <sup>6</sup> Victorian Auditor General (2011a)
- <sup>7</sup> Victorian Auditor General (2010c)
- <sup>8</sup> Victorian Auditor General (2013b)
- <sup>9</sup> Environment Defenders Office (Victoria) (2014)
- <sup>10</sup> Department of Sustainability and Environment (2010)
- <sup>11</sup> Victorian Catchment Management Council (2012); Commissioner for Environmental Sustainability (2013)
- <sup>12</sup> Victorian Auditor General (2013b)
- <sup>13</sup> Victorian Auditor General (2010a)
- <sup>14</sup> Victorian Auditor General (2011a)
- <sup>15</sup> Victorian Auditor General (2011c)
- <sup>16</sup> Parks Victoria (2012). There was no equivalent information provided in the 2012-13 annual report.
- <sup>17</sup> Matthews et al (2011)
- <sup>18</sup> Matthews et al (2011)
- <sup>19</sup> Victorian Auditor General (2011a)
- <sup>20</sup> Teague et al (2010)
- <sup>21</sup> Victorian Catchment Management Council (2012)
- <sup>22</sup> Commissioner for Environmental Sustainability (2013)
- <sup>23</sup> Victorian Auditor General (2009)
- <sup>24</sup> Victorian Auditor General (2013a)
- <sup>25</sup> Victorian Budget Papers 2012-13 Service Delivery, Environment and Primary Industries pp 94-116
- <sup>26</sup> Victorian Auditor General (2009)
- <sup>27</sup> Victorian Auditor General (2011b); Victorian Auditor General (2013b)
- <sup>28</sup> Victorian Auditor General (2009); Victorian Auditor General (2010d); Victorian Auditor General (2010a); Victorian Auditor General (2010b); Victorian Auditor General (2011c); Victorian Auditor General (2011a); Victorian Auditor General (2011b); Victorian Auditor General (2012); Victorian Auditor General (2013b); Victorian Auditor General (2013a)
- <sup>29</sup> Environment Defenders Office (Victoria) (2014)
- <sup>30</sup> Environment Defenders Office (Victoria) (2008)
- <sup>31</sup> Victorian Competition and Efficiency Commission (2009)
- <sup>32</sup> Victoria Naturally Alliance (2007)
- <sup>33</sup> Environment Defenders Office (Victoria) (2008); Environment Defenders Office (Victoria) (2014)
- <sup>34</sup> Environment Defenders Office (Victoria) (2012a)
- <sup>35</sup> Victorian Auditor General (2009); Environment Defenders Office (Victoria) (2012b)
- <sup>36</sup> Sutton (1987)
- <sup>37</sup> Victorian Auditor General (2009)
- <sup>38</sup> Victorian Auditor General (2009)
- <sup>39</sup> Department of Environment and Primary Industries (2014a).
- <sup>40</sup> Department of Environment and Primary Industries (2013)
- <sup>41</sup> Department of Sustainability and Environment (2007)
- <sup>42</sup> Department of Sustainability and Environment (2005); Department of Sustainability and Environment (2009a); Department of Sustainability and Environment (2013)
- <sup>43</sup> Environment Defenders Office (Victoria) (2012b)
- <sup>44</sup> Environment Defenders Office (Victoria) (2008);
- <sup>45</sup> Environment Defenders Office (Victoria) (2012b)
- <sup>46</sup> Environment Defenders Office (Victoria) (2012b)
- <sup>47</sup> The Wildlife Act defines 'wildlife' as indigenous vertebrate animals, invertebrate animals listed under the FFG Act and 'all kinds of deer, non-indigenous quail, pheasants or partridges'.
- <sup>48</sup> Environment Defenders Office (Victoria) (2012b)
- <sup>49</sup> Craig (2010)
- <sup>50</sup> Craig (2010)
- <sup>51</sup> Craig (2010)
- <sup>52</sup> Victorian Auditor General (2012)
- <sup>53</sup> Victorian Auditor General (2010d); Victorian Auditor General (2011c)
- <sup>54</sup> Victorian Competition and Efficiency Commission (2009)
- <sup>55</sup> Krpan (2011)
- <sup>56</sup> Krpan (2011)
- <sup>57</sup> Victorian Competition and Efficiency Commission (2009)
- <sup>58</sup> Ombudsman Victoria (2009); Victorian Auditor General (2010b)
- <sup>59</sup> EPA Victoria (2013)
- <sup>60</sup> Hawke (2009); Environment Defenders Office (Victoria) (2013). A National Environment Commission was proposed by the Hawke 2009 review of the EPBC Act but rejected by the federal government.
- <sup>61</sup> The figures come from the 2012-13 annual reports of Hindmarsh Shire Council and Melbourne City Council.
- <sup>62</sup> Municipal Association of Victoria (2004); Victorian Competition and Efficiency Commission (2009); Matthews et al (2011)
- <sup>63</sup> Heycox et al (1997)
- <sup>64</sup> Binning & Young (1999)
- <sup>65</sup> ICLEI (nd)
- <sup>66</sup> Hawke (2009)
- <sup>67</sup> Warboys & Good (2011)
- <sup>68</sup> Warboys & Good (2011)
- <sup>69</sup> Clear Horizon (2007)
- <sup>70</sup> Victorian Auditor General (2009)
- <sup>71</sup> Resilience and adaptivity are closely related, for resilient systems are inherently more adaptable.
- <sup>72</sup> Bernhardt & Leslie (2013)
- <sup>73</sup> Department of Sustainability and Environment (2010)
- <sup>74</sup> Dunlop & Brown (2008)
- <sup>75</sup> Dunlop et al (2012)
- <sup>76</sup> Ombudsman Victoria (2009)
- <sup>77</sup> Attributed to Gaylord Nelson, the US founder of Earth Day
- <sup>78</sup> Marsden Jacobs and Associates (2004)
- <sup>79</sup> Matthews et al (2011)
- <sup>80</sup> Victorian Auditor General (2010a)
- <sup>81</sup> Victorian Auditor General (2011a)
- <sup>82</sup> Victorian Auditor General (2009)
- <sup>83</sup> Parks Victoria (2013)

- <sup>84</sup> Parks Victoria (2013)
- <sup>85</sup> ABC News (2012)
- <sup>86</sup> The rabbit elimination program on Lady Julia Percy Island was abandoned when only 15 rabbits remained, thus squandering 100% of the resources allocated to this laudable program.
- <sup>87</sup> Matthews et al (2011)
- <sup>88</sup> Gunningham & Young (1997)
- <sup>89</sup> Most are from Matthews et al (2011)
- <sup>90</sup> Matthews et al (2011)
- <sup>91</sup> Victorian Competition and Efficiency Commission (2009)
- <sup>92</sup> Australian Environmental Grantmakers Network (2009)
- <sup>93</sup> Hawke (2009)
- <sup>94</sup> Martin Taylor, WWF Australia (pers. comm.) 21 Jan 2014; Taylor et al (2011). Victoria attracted 29% of the market share of Australia's international overnight nature-based tourism visitors in June 2007.
- <sup>95</sup> Heritage Lottery Fund (2014)
- <sup>96</sup> Lotterywest (2012)
- <sup>97</sup> Nationale Postcode Loterij (2014)
- <sup>98</sup> Land & Water Australia (2007)
- <sup>99</sup> Department of Sustainability and Environment (2008)
- <sup>100</sup> Matthews et al (2011)
- <sup>101</sup> Matthews et al (2011)
- <sup>102</sup> Victorian Auditor General (2013b)
- <sup>103</sup> Victorian Auditor General (2010a)
- <sup>104</sup> Victorian Auditor General (2011a)
- <sup>105</sup> Victorian Auditor General (2010d)
- <sup>106</sup> Victorian Auditor General (2010c)
- <sup>107</sup> Victorian Auditor General (2009)
- <sup>108</sup> Victorian Coastal Council Science Panel (2011)
- <sup>109</sup> Natural Resource Management Ministerial Council (2001); Municipal Association of Victoria (2004); Victorian Competition and Efficiency Commission (2009)
- <sup>110</sup> Victorian Auditor General (2011a)
- <sup>111</sup> Victorian Coastal Council Science Panel (2011)
- <sup>112</sup> Matthews et al (2011)
- <sup>113</sup> Victorian Catchment Management Council (2002)
- <sup>114</sup> Victorian Auditor General (2009); Victorian Auditor General (2010d); Victorian Auditor General (2010c); Victorian Auditor General (2011a); Victorian Coastal Council Science Panel (2011); Victorian Catchment Management Council (2012); Commissioner for Environmental Sustainability (2013)
- <sup>115</sup> Commissioner for Environmental Sustainability (2013)
- <sup>116</sup> Victorian Catchment Management Council (2012)
- <sup>117</sup> Victorian Coastal Council Science Panel (2006)
- <sup>118</sup> Matthews et al (2011)
- <sup>119</sup> Department of Environment and Primary Industries (2014b)
- <sup>120</sup> VNPA (2010)
- <sup>121</sup> Victorian Auditor General (2009); Environment Defenders Office (Victoria) (2012b)

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