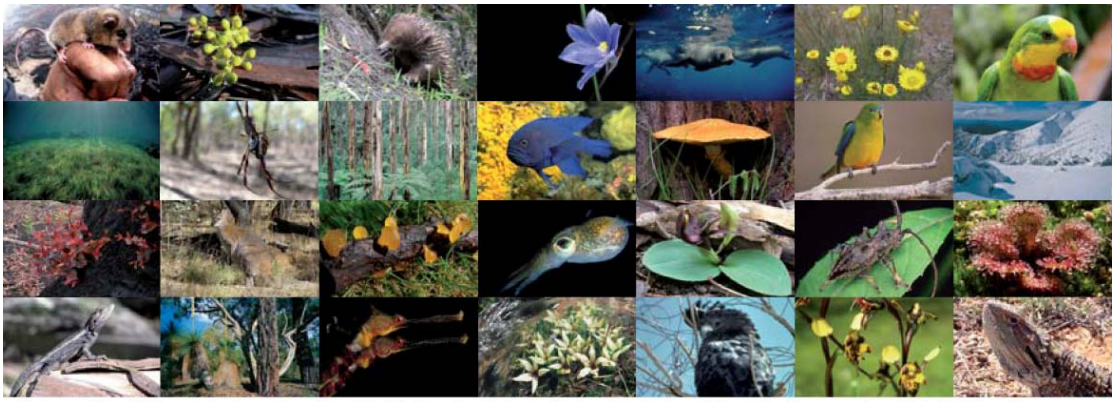
Victoria Naturally alliance

Submission to Land and Biodiversity White Paper, June 2007



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"…there are possible strategies for improving conservation outcomes in a world with rapid climate warming. Two key steps are improving connectivity between reserves and identifying areas of remaining native vegetation that are likely to form refuges for ecological communities threatened by a warming climate."

Nature Conservation Review, Barry Trail and Christine Porter. VNPA 2001, p.110

The Victoria Naturally alliance - connecting people and nature

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Summary and recommendations

Many ecological indicators point to the conclusion that Victoria's ecological processes and biodiversity are in crisis. Efforts over several decades have not stemmed the overall decline and loss, resulting from the ongoing operation of many threatening processes.

The White Paper process gives Victorians the opportunity to develop and implement a bold new vision; to align legislation, institutional arrangements, funding and community engagement to reverse the decline in biodiversity and landscape health. This is the time for innovation and for developing and implementing a new paradigm for landscape-scale protection and restoration of biodiversity. We must recognise that without long-term environmental sustainability, there will be no long-term future for our society or economy.

We need to identify and tackle the social, economic and biophysical drivers of ongoing loss of biodiversity, if our responses are to be effective. There are also drivers and emerging trends that facilitate ecological protection and restoration; these need to be supported and extended.

In developing long-term policy frameworks, we need to examine potential risks over a similar time frame. We need better ways of assessing and tackling the cumulative environmental impacts of actions.

The Victoria Naturally alliance proposes the following as essential aspects of a comprehensive and strategic approach to the conservation of Victoria's biodiversity:

- A vision, goals, and targets that articulate biodiversity outcomes
- Maintenance and restoration of ecological processes
- Avoiding clearing of native vegetation
- A resilient, comprehensive conservation reserve system
- Very large-scale restoration
- Private land conservation programs
- Coastal-marine-land links
- Threatened species and communities recovery
- Tackling threatening processes (including invasive species) and drivers of loss
- A scientific basis for actions, targets and monitoring
- Involvement of Traditional Owners
- Major increase in community awareness and engagement and participation in decision making
- Institutions and regulatory framework that are aligned with the vision
- Sufficient resourcing to deliver the vision
- Systematic long term biodiversity monitoring
- Research and extension

Summary of recommendations

White Paper process recommendations:

- Biodiversity must be a clear focus and strongly emphasised in the White Paper. The Green Paper must articulate that a fundamental goal of the process is the development and

resourcing of a bold new vision and framework that delivers 'flourishing biodiversity in healthy ecosystems.

- The White Paper process needs to review successes and shortcomings of the existing framework, and put in place a suite of reforms to align institutional arrangements, policy settings and tools, legislation, funding and community education and engagement.
- Focus on marine and coastal environments, with recognition of the linkages and interactions between terrestrial and coastal and marine environments.
- The White Paper should take a dynamic view of land and biodiversity at a time of climate change, based on the maintenance and restoration of ecological processes and the anticipation of future threats.
- Analyse and address drivers of changes, both positive and negative, to inform decisions on protection and enhancement of biodiversity values.
- The process must draw on 'state of the art' knowledge.
- A strong all-of-government input and engagement is required.
- Indigenous issues must be recognised and addressed and appropriate consultation undertaken with Traditional Owners.
- Community awareness-raising about the current biodiversity crisis, and community benefits of healthy biodiversity, land and catchments must be an integral part of the White Paper process.
- The White Paper must identify roles in implementation, and establish a mechanism that will drive implementation and monitor the achievement of outcomes.

Threatening processes recommendations:

- Identify key threats to biodiversity and prioritise for action (direct and indirect, including threatening processes).
- Develop and resource policies/strategies and programs for effective management and control of threats, including invasive species.

Status and trends recommendations:

- The Green Paper should provide information on the status and trends in Victoria's biodiversity, in order to communicate to the community and decision-makers the extent of losses and the ongoing decline that is occurring.
- An analysis of the underlying causes or drivers of change in biodiversity status/condition should be undertaken for the Green Paper. This analysis should include both current and projected drivers, drivers for loss as well as drivers for recovery, including drivers that cause small incremental losses/gains that result in significant cumulative losses over time.
- An analysis of the success and failure of existing/historical projects or programs and support or scale-up the successful ones as practical models that will quickly drive recovery. A series of such successful models exist across Australia and abroad and should be closely examined.

Assessing risk recommendation:

- Scanning and assessment of possible future risks to biodiversity and land health over the next 20-50 years is crucial for input into the White Paper.

Values of biodiversity recommendation:

- White Paper needs to outline the economic and non-economic values of biodiversity and land health. While recognising that many of the values of biodiversity and healthy landscapes are close to impossible to cost (such as value to future generations), assess the economic costs – both up front and long term – both of business as usual, as well as the economic benefits of protecting, restoring and enhancing land and biodiversity must be analysed.

Articulating a vision recommendation:

- That the Green Paper present a draft vision for securing biodiversity and land health, to be revised through consultation and presented as a final version in the White Paper.

Setting targets recommendation:

- The Green Paper should present a draft set of 'SMART' targets for the achievement of biodiversity conservation outcomes.

Ecological processes recommendations:

- The White Paper should take a dynamic view of land and biodiversity at a time of climate change, based on the maintenance and restoration of ecological processes and the anticipation of future threats.
- Undertake case studies in a number of bioregions in order to investigate the status, trends and risks for the ecological processes that sustain biodiversity in Victoria (including marine and coastal). This could be done for example around the connectivity needs of a range of species in a given bioregion.

Implementing the Native Vegetation Management Framework recommendations:

- Review the Framework and put in place a rigorous, whole of government approach to applying the Native Vegetation Management Framework including: emphasis, as per policy, of avoiding clearing; strong compliance measures; and undertake strategic land use and project planning early enough to deliver effective biodiversity outcomes.
- monitor and publicly report on achievement of net gain, detailing all vegetation gains and losses including clearing under permit exemptions.
- Support the framework with education, extension and adequate resourcing of implementing agencies.

A resilient, comprehensive conservation reserve system recommendation:

- The Green Paper should examine what extensions are required to achieve a representative conservation reserve system, the resources needed to successfully manage the ecological systems in protected areas.

Very large scale restoration recommendations:

- The Habitat 141 project, and others underway, should be assessed with reference to how State, regional and local government policies, institutions and funding assist or hinder the implementation of the recovery.
- The White Paper should include regional scale biolinks programs for all of Victoria.
- A whole of landscape approach is required for large scale protection/restoration programs.

- The management regime for stream frontages should be reviewed and reformed to support their restoration for river health and as key components of large-scale revegetation programs.
- Build virtual resource/knowledge centre for vegetation restoration and investigate establishing a Cooperative Research Centre on biodiversity restoration.

Private land conservation programs recommendations:

- Recognising the increasingly important role of private land conservation organisations (including Trust for Nature as a statutory authority) in large scale restoration determine the most effective state government institutional support for their programs.

Coastal - marine - land links recommendations:

- The management of marine, coastal and terrestrial environments needs to take into account their connections and associated interacting threats.
- As part of a co-ordinated statewide response to climate change, plans are required to deal with the impacts on plant and animal communities of projected sea level rise, and increased coastal storm surges.
- Public education is required about the management and public use of the marine and coastal environment, as well as catchment to marine linkages.
- The White Paper needs to instigate a process to establish an integrated system of marine national parks, marine corridors and marine protection plans.

A scientific basis for actions, targets and monitoring recommendations

- Review the current status of and gaps in Victoria's research, data and monitoring systems and processes, followed by prioritisation of research and data collection efforts.
- Develop a systematic long term biodiversity monitoring program, including a suite of indicators in order to quantitatively evaluate and publicly report on progress.
- Establish monitoring systems and supporting databases focused on ecological process, not just "static" compositional lists.
- Invest in long term systematic, publicly accessible ecological monitoring system, with a key focus on coordination/standardisation of data bases, formats and availability, data collection (baseline and ongoing monitoring), and high resolution mapping.
- Ensure data collection and analysis for publicly-accessible fine scale tracking of land clearing losses and gains in a GIS database, including ongoing reporting on status of offsets, with a clear implementation timeline.
- Create a "2030 vision" EVC/biolinks map as part of the White Paper's target setting process, to provide goals for protection of existing vegetation and large scale revegetation of regional biolinks across the State.
- Undertake comprehensive mapping/modelling of effects of climate change on land and biodiversity values.
- Establish/fund knowledge brokering services, and centres for biodiversity research and information management for instance in regional academic institutions and/or CMAs.

Involvement of Traditional Owners Recommendations:

- The White Paper process should offer and resource an appropriate consultation process to engage Indigenous communities.

- Significant work should be undertaken to build understanding of traditional knowledge and Traditional Owner roles in land and biodiversity management, and how these can contribute to the State's overall approach to biodiversity conservation.
- Investigate governance models that involve Indigenous people in direct decision making regarding biodiversity conservation and land management.

Community education and awareness Recommendation:

- Enhance awareness of the values and condition of Victoria's biodiversity, and achieve behaviour changes through targeted public awareness and education programs.

Institutions, regulatory framework and resourcing to deliver the vision Recommendations:

- Develop and implement a bold new vision and framework: a quantum shift that delivers 'flourishing biodiversity in healthy ecosystems'.
- Undertake a detailed, comprehensive review of current institutional arrangements for land management and biodiversity conservation. Particular attention should be paid to identifying the success or otherwise of existing arrangements.
- Develop a strategic large scale whole of landscape approach to planning and implementation.
- Undertake a comprehensive review and revision of key relevant legislation ensuring that objects and purposes reflect current knowledge and core ecological principles, clarify responsibilities and remove contradictions.
- Put in place/utilise an overarching independent arrangement to audit outcomes and reveal performance including against statutory obligations.
- Provide legal standing to the public to enforce biodiversity and land conservation legislation.
- Integrate land health and biodiversity values into all planning and decision making.
- Identify and remove competing priorities and instruments and improve integration between jurisdictions and within/between agencies, departments and local government.
- Determine how present arrangements for vegetation retention, catchment management and land use planning can be improved, including review of VPPs with respect to their ability to protect biodiversity.
- Determine the role of and mechanisms for MBIs.
- Fully fund programs needed to deliver 'healthy biodiversity in flourishing ecosystems', improve speed of delivery and scale up pilot programs.
- Adequately fund bodies delivering and implementing policies and programs, and undertake capacity building.
- Undertake a detailed investigation of public and private funding models and institutional delivery options available to increase investment in protected areas and landscape scale corridors and linkages.
- Review different policy tools and delivery mechanisms for improving biodiversity conservation on private land, including land stewardship schemes.

1. Introduction

The Victoria Naturally alliance

Victoria Naturally is an alliance of eight peak environment groups working to reverse Victoria's biodiversity crisis. Victoria Naturally is led by the Victorian National Parks Association, and includes the Australian Conservation Foundation, The Wilderness Society, Environment Victoria, Trust for Nature, Greening Australia Victoria, Bush Heritage Australia and the Invasive Species Council. It is promoting solutions which include protection and improved management of existing biodiversity and significant, very large scale restoration of native vegetation in order to deliver resilient, functional natural systems in the face of climate change. Victoria Naturally is very pleased to engage with our constituents and other stakeholders as the basis for our participation in the White Paper process.

Importance of the White Paper process

Land clearing and land use since European settlement in Victoria have had profound effects on native vegetation, biodiversity, and land health. Close to 70% of the State has been cleared which has led to high numbers of extinct and threatened species, and degraded ecological processes. According to the Victorian Catchment Management Council (2002, pvi), "if we are to protect and enhance the natural capital of the State, revolutionary change is required in the way we manage much of Victoria's landscape".

This White Paper gives Victorians the opportunity to develop and implement a bold new vision for healthy ecosystems, resilient ecological processes and flourishing biodiversity across the State. It gives us the chance, for the first time ever, to align legislation, institutional arrangements, funding and community engagement to reverse the decline in biodiversity and landscape health. This is an historic opportunity for innovation and for developing and implementing a new paradigm for landscape-scale protection and restoration. This process must identify the key issues and potential solutions to achieve long term resilience and health for Victoria's biodiversity.

The process must be underpinned by intellectual rigour drawing on 'state of the art' knowledge in a range of areas including biodiversity, ecological processes, ecology, primary industry, water, soil health, economics, impacts of climate change, integrated catchment management, socio-demographic changes, community engagement, institutional structures and funding options.

It is essential that there is a strong all-of-government input and interdepartmental engagement as part of the process.

Appropriate consultation with Traditional Owners is vital.

The White Paper process must acknowledge that while the community cares deeply about Victorian landscapes and long term health of the natural environment, and in fact holds a lot of information on biodiversity (Field Naturalists Club, Friends groups), further awareness-raising about the community benefits of healthy biodiversity, land and catchments must be integral.

A significant opportunity that needs to be explored is the potential for restoration of our biodiversity to contribute to regional development, jobs, new industries, as well as community wellbeing.

The White Paper must clearly spell out the roles of all decision making and implementing agencies, of community, industry, and landholders. It should create a high level co-ordinating group that will drive implementation and closely monitor the achievement of outcomes.

The scope of the challenge is immense as we strive to repay our environmental debt, working across public and private land, in coastal waters, and estuarine, freshwater and terrestrial ecosystems. There is also an imperative to integrate with social and economic needs; but we must recognise that

without long-term environmental sustainability, there is no long-term future for our society or economy.

Recommendations:

- Must clearly articulate that we are facing a biodiversity crisis in Victoria.
- Biodiversity must be a clear focus and strongly emphasised in the White Paper. The Green Paper must articulate that a fundamental goal of the process is the development and resourcing of a bold new vision and framework that delivers 'flourishing biodiversity in healthy ecosystems.
- The White Paper process needs to review successes and shortcomings of the existing framework, and put in place a suite of reforms to align institutional arrangements, policy settings and tools, legislation, funding and community education and engagement.
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- Community awareness-raising about the current biodiversity crisis, and community benefits of healthy biodiversity, land and catchments must be an integral part of the White Paper process.
- The White Paper must identify roles in implementation, and establish a mechanism that will drive implementation and monitor the achievement of outcomes.

This submission

The purpose of the submission is to contribute to an understanding of the issues we are all facing, as well as the solutions that will deliver "flourishing biodiversity and healthy ecosystems", a laudable and critically important policy of the State Government.

This submission is presented under headings to demonstrate a framework for many of the key issues that must be addressed if the White Paper is to be a successful process.

Please note:

- This submission has been signed off by the member groups of the Victoria Naturally alliance but it does not override perspectives in their individual submissions.
- For the purposes of brevity, the word 'biodiversity' in this document includes the concepts of biodiversity, ecological systems, ecological processes and land health.

The Green Paper

The Call for Submissions document (DSE 2007) is the first publication in the White Paper process. We offer the following observations and suggestions for the Green Paper.

- Victoria and Victorians are facing a biodiversity crisis yet there is no real sense of this in the document. The 'problem' should be stated much more strongly, and that the solutions will be found via White Paper, that we have some tools to address it, but we'll need your help, and it will take funds.
- The new and rapidly developing science of conservation biology is clearly saying that the health of ecological processes must be one of the conceptual frameworks that drives our thinking (including target setting) yet there is no discussion at all of this concept. Our knowledge of the health of key ecological processes is very limited, and our understanding of how they underpin our economic and social wellbeing is extremely fuzzy. This is the equivalent to a business assuming that the ingredients for its products will just keep arriving at the factory door and having no understanding of where or how they get there. Background work on the importance, status and trends in ecological processes should be undertaken to inform the Green Paper.
- There must be rigorous analysis of why we are in this state: what are the drivers that are leading to ongoing destruction, as well as improved protection? How do these drivers impact on biodiversity and land values and the risks to these values? This work is needed in order to provide a rationale for options for action. This is complex work and on a grand scale, but it is crucial that it be done effectively so that stakeholders, the community, and governments can better assess the options available for action. Those risks that are incremental and cumulative may be especially hard to pinpoint yet many of our problems arise from these – salinity and climate change are obvious ones.
- Talking about 'trade-offs' between environmental and economic/social values (Call for Submissions, p11) is not a helpful approach to policy making so early in the process. We must adopt a paradigm that accepts the fact that a healthy environment is fundamental to the economy and to human society; economic development is only sustainable if it avoids environmental decline.

We look forward to vigorous and productive discussion in the course of the White Paper process.

2. Status and trends

In bad shape

A key step for the White Paper is the clear articulation of a roadmap for securing biodiversity and land health. In order to achieve this, we first need to recognise the seriousness of the current situation. This is outlined succinctly by the CSIRO (2004, p17 and 18):

"In the course of economic and national development, most of Victoria has experienced extensive land clearance or habitat modification through soil disturbance, grazing and altered fire regimes, which has led to many species and ecosystems being greatly reduced in their extent. In addition, a large number of exotic species have become naturalised in Victoria, and many of them compete with or prey upon native species. The combination of habitat loss and degradation and exotic species has had a considerable impact on Victoria's terrestrial biodiversity."

"In both extent …and intensity the state rates very poorly for: current extent of native vegetation, connectivity in native vegetation, ecosystems at risk, number of threatened species, future dryland salinity risk and condition of riparian zone."

"*The condition of biodiversity in Australia is poorer today than it was in 1996.*" (Possingham *et al*., 2002) This is despite a plethora of policies, strategies and legislative instruments over the last 20 years aimed at conserving biodiversity.

Climate change is projected to have significant direct and indirect impacts on already stressed systems (Thomas *et al.* 2004).

There is ample documentation of the declining health of biodiversity and land in Victoria[1] (see Attachment 1). The following points illustrate our biodiversity's state of crisis:

- Victoria is the most cleared State in the Commonwealth; more than 92% cleared on private land. Our landscapes are the most stressed in the country ((NLWRA,2002).
- The highest number of threatened species in any one region in Australia occurs in north-western Victoria (NLWRA 2002).
- 44% of plants and 30% of our native animals are either extinct or threatened (DSE,2005).
- 78% of our Ecological Vegetation Classes are threatened (Traill & Porter 2001).
- 75% of our waterways are degraded and 35% of our wetlands have been totally lost (VCMC 2002).
- Under a business as usual scenario, more than 20% of agricultural land will be degraded by 2050 and more than 60% of irrigation land will be degraded (CSIRO, 2004).
- 8 to 18% of Victoria's agricultural land is considered at high risk, and 47% at moderate risk of dryland salinity (VCMC 2002).

Threatening processes

There are a number of threatening processes that are impacting on the health of biodiversity in Victoria. Thirty-six 'potentially threatening processes' are listed under the Flora and Fauna Guarantee Act. There are additional threats – including the very significant threat of climate change – which are not officially listed.

Bennett *et al* (2007, p2) have identified six major categories of threat to ecological processes as being particularly important:

- climate change
- degradation and loss of biophysical habitats
- altered hydrological flows
- nutrient and chemical additions to ecosystems
- unsustainable harvesting of natural resources
- introduced species.

These threats are important because: (1) they each extend across terrestrial, freshwater and marine systems, and (2) they each interact with, or modify multiple ecological processes.

Examples of significant threats to biodiversity in Victoria include:

- Firewood collection: 2 million tonnes taken annually in Victoria (Read Sturgess 1995, cited in Traill and Porter, 2001, p77).
- Invasive weeds: *"Environmental weeds are probably the single most important cause of habitat loss and degradation in Victoria at present."* (Wilson, Carr, Low, cited in Traill and Porter, 2001, p75). There are 584 serious or potentially serious environmental weeds in Victoria with 129 very serious.
- Invasive animals: Foxes are blamed for the extinction of several marsupials from Victoria; and cats, rabbits and trout threaten the survival of rare and endangered species today. Deer,

[1] Including: The Victorian Catchment Management Council's Health of the Catchments Report (2002), Land and Water Australia's Terrestrial Biodiversity Assessment (2002), two national State of the Environment reports (2001, 2006).

carp and rabbits degrade habitats and displace native species. Exotic marine species now dominate Port Phillip Bay.

- Invasive pathogens: Dieback fungus (*Phytophthora cinnamomi*) kills native plants and chytrid fungus has caused frog declines.
- Overgrazing: a significant degrading factor in many areas of native vegetation, wetlands and rivers (Traill and Porter, 2001).
- Intensification of land use, including conversion of sheep farming areas to cropping; raised bed cropping in native grassland; extension of infrastructure (eg water pipelines, roads) and subdivision for suburban and rural blocks for human settlement; the conversion of forests to plantations/silvicultural treatment for the timber and pulp industry.
- Poor water quality entering estuaries (pollutants, sediment, nutrient loads).
- Fishing practices – large bycatch, methods of fishing (trawling), inappropriate commercial and recreational fishing quotas and activities from people visiting the coast.
- Bay dredging.
- While there is a systematic framework for addressing fire regimes in Victoria the capacity for the system would be significantly enhanced if there were more resources for data collection.

  As well, the contested ground of fire management and the rationale for burning still spins between the emphasis on the ecological needs of ecosystems and species and the perceived need for extensive fuel reduction. With too frequent burning there is a huge risk to many plant, and hence animal, species.

  Possingham (2002) stated that implementing appropriate fire management regimes in native vegetation would save many tens of species for every $1 million spent, and that large collateral benefits would result. It could be that an extremely cost effective way of enhancing restoration of ecological systems, including threatened species, would be to ensure that burning regimes are ecologically based and, where necessary, also provide asset protection. This should be explored by the White Paper.

Recommendations:

- Identify key threats to biodiversity and prioritise for action (direct and indirect, including threatening processes).
- Develop and resource policies/strategies and programs for effective management and control of threats, including invasive species.

Trends in health of biodiversity and land

"Loss of biodiversity is Australia's most serious environmental problem. Destruction of habitat by urban development, agriculture, forestry, fishing and mining is the major cause of biodiversity loss and it is still continuing at an extensive rate. Those elements of biodiversity that can be assessed all show a declining trend." (Williams, 1999)

This is confirmed by two national State of the Environment Reports, 2001 and 2006, that show a negative trend for the health of biodiversity across Australia.

Given Victoria's high level of landscape stress there is a real possibility of ecosystems collapsing. There is a risk of regions *"finding themselves in a spiralling cycle of declining biodiversity, declining ecosystem function, escalating natural resource management problems, and increasing costs to agriculture itself"* (Possingham, 2002 p9). Even where the total extent of remnant vegetation cover within a region may appear relatively high, the level of vegetation fragmentation

may still undermine the ecological health of the landscape (James and Saunders, 2001, cited in NLWRA, 2001).

On the agricultural and socio-demographic fronts there are very significant trends identified by Barr (2005) including reduction in extent and increased intensity of agriculture, as well as the socio-demographic changes with lifestylers moving into Victoria's "amenity landscapes". There is major geographic overlap of reduced agriculture and the new amenity zones and it will be a challenge for the White Paper to take advantage of these trends to deliver biodiversity outcomes.

Commercial farming (where primary income is from farming), is being carried out on larger properties and by fewer farmers. Already 10% of farmers are producing 50% of agricultural output (Productivity Commission, 2005).

In regards to fish species, since 1992 some interesting trends have started to develop amongst the 74 species of fish that are in Commonwealth-managed fisheries. The data available from the Australian Bureau of Statistics has shown that the number of stocks that are presently over fished is at a record high, the number of primary stock not over fished has declined and the number classified as uncertain has increased. The trend is unequivocally showing that fish caught commercially are declining as a result of unsustainable fishing practices.

Efforts over the last 20 years

While we all applaud the work that has been done by governments and communities over the last two decades it is deeply disturbing that the health of biodiversity is still declining.

Part of the explanation may be that early plantings were predominantly for shade and shelter (68%) or land rehabilitation (21%). Even by the early nineties only 2% of plantings had flora and fauna conservation as their prime purpose (Bennett 2000, citing Wilson 1995).

From a scientific perspective very little information has been collected on the use of revegetation in rural environments by mammals, reptiles, amphibians or invertebrates (Kimber 1999, cited in Bennett 2000). By 2000, there were no published studies concerning ecological processes and little information on the extent to which revegetation plots in rural areas may enhance the conservation of native plant species or communities (Bennett, 2000).

Williams' (1999) conclusions still apply today:

- The rate at which revegetation is occurring means it will be many years before the regional extent of vegetation is substantially increased.
- Many blocks of revegetation are too small to have great value for nature conservation.
- Composition of revegetation frequently has little resemblance to natural plant communities, other than in tree layer.
- Revegetation is not focused on ecological functionality, for example recruitment: there usually a need for entire replacement within approximately 20 years of initial planting.
- There is a heavy reliance on private landholders with an expectation that they will shoulder the burden of revegetation.
- Any revegetation program must have multiple objectives and therefore be designed for restoring ecosystem function: hydrology, nutrient cycling, movement of biota, and maintenance of habitat.

Drivers for loss and drivers for recovery

It is essential to understand the underlying causes or drivers for ongoing loss of biodiversity and land health, as well as those for protection, regeneration and enhancement. Without critical analysis of these, our responses are likely to be piecemeal and superficial, addressing symptoms rather than

causes of problems. The positive drivers need to be identified for support or extension, to make the most of opportunities for protection and recovery.

There are many drivers of biodiversity decline, many of which are interrelated, and it is vital that the White Paper process identify the major drivers and analyse mechanisms for mitigating their effect as well as determining how they relate to protecting and enhancing biodiversity values. This information should drive major components of the White Paper.

An initial list of social (social, political and cultural) and economic drivers of ongoing loss of biodiversity is provided below.

Social:

- Increasing resource use per person (bigger houses, more electrical appliances, more air travel, more waste, - if the world's population was to live like Victorians we would require four planets).
- Wealth (recent research suggests that the wealthy have higher consumption lifestyles).
- Poverty (people being too poor to avoid undertaking environmentally degrading activities - being forced to drive to work because of lack of public transport, being too poor to afford low energy use appliances etc).
- Lack of awareness of our biodiversity crisis (VNPA focus group research shows deep concern about environmental issues generally, but lack of awareness of the scale of the problems facing biodiversity in Victoria).
- Aggregate impacts of population growth.
- Demographic changes in rural Victoria ('seachangers and treechangers') resulting in increasing subdivisions, low density settlement and infrastructure works.
- Increased city - rural divide. There is a risk that an increasing number of metropolitan residents, especially younger generations who may have little experience or connection with rural or natural environments feel increasingly remote from the very environments that sustain them.

Political:

- A lack of basic ecological literacy amongst policy makers and associated staff (e.g. treasury and industry officials, VCAT members).
- Policy directions and decisions which impact directly or indirectly on biodiversity (eg major infrastructure projects).
- Policy which is driven by short term fixes rather than long term solutions (e.g. a three year project to 'solve' weed problems).
- Chronic under-funding by state government for staff and programs to achieve biodiversity outcomes including compliance measures for native vegetation controls, support for councils to implement State Government environment policy, for market based instruments such as BushTender, for writing and implementing recovery and action plans for threatened species, ecosystems and potentially threatening processes, for systematic data collection and well-curated databases, for robust ecological research.
- Policy which is not integrated and which fails to think through the environmental consequences (what happens in other portfolios may have as much impact on biodiversity as what happens in the environment portfolio).
- Institutions whose charter or purpose works against biodiversity values.

Cultural:

- Frontier mentalities in a developed society.
- Environmentally degrading ideas about what constitutes 'wellbeing' and 'the good life'.
- The attitude that humans are the only species that matters.
- Blind faith that technology will be able to fix the problems.
- The belief that it is OK to wait until later before doing something - ignoring cumulative losses until well after we are in crisis.
- A failure to link causes with effects.

Economic:

- Urban expansion in urban fringe areas leading to significant loss of native vegetation (Bekessy 2007).
- Lack of public investment in public goods.
- Economic activity which causes negative externalities.
- Subsidisation of environmentally degrading activities (eg taxation incentives, perverse incentives, poorly targeted investment attraction, corporate welfare).
- Funding institutions/banks that lend money for developments that are not rigorously assessed for long term ecological sustainability (e.g centre pivot irrigation and clearing of threatened species habitat).
- The intensification of economic activities, particularly the intensification of agriculture in areas with biodiversity values.

Some important biophysical drivers of biodiversity decline are noted above, as ‘Threatening processes’ including invasives (plants and animals).

Positive drivers, or social and economic conditions that facilitate ecological protection and restoration include:

- People and organisations are increasingly talking of restoration across hundreds of kilometres, and planning and working at that scale is already underway.
- Decades of experience and knowledge, in natural resource management to build on including many NHT reviews, many strategic plans and many accountability exercises.
- Governments in all spheres with NRM policies and plans that are becoming more sophisticated, including landscape scale modelling.
- Increasing community festivals celebrating a sense of place.
- More funds available, including from bio-carbon sequestration, the philanthropic sector and superannuation funds.
- Restoration science is becoming more sophisticated.
- Major changes in the extent of commercial agriculture in Victoria leaving landscapes that have the potential for restoration of biodiversity values.
- Demographic changes including land managers who have ‘environmental amenity’ values.
- Duty of care for managing land is increasingly taking account of biodiversity values.
- Increased awareness of Indigenous science and culture and its role in caring for country.

- Community awareness of environmental issues including waste, water and energy, is much greater than 10 years ago.

Recommendations:

- The Green Paper should provide information on the status and trends in Victoria's biodiversity, in order to communicate to the community and decision-makers the extent of losses and the ongoing decline that is occurring.
- An analysis of the underlying causes or drivers of change in biodiversity status/condition should be undertaken for the Green Paper. This analysis should include both current and projected drivers, drivers for loss as well as drivers for recovery, including drivers that cause small incremental losses/gains that result in significant cumulative losses over time.
- An analysis of the success and failure of existing/historical projects or programs and support or scale-up the successful ones as practical models that will quickly drive recovery. A series of such successful models exist across Australia and abroad and should be closely examined.

Assessing risk

"The White Paper will prioritise the Victorian Government's policy and investment in natural resource management, land health and biodiversity for the next 20 to 50 years." (Call for submissions document, April 2007) This long-term planning horizon requires a scan of possible future risks over this period, to inform proposed policy and investment.

There is a real risk that we do too little and too late. Radical changes in policy approach, patterns of land use and investment are needed to effectively address the fundamental issues affecting biodiversity and land health.

Another significant risk is that development actions will cause environmental damage because we do not know enough about the ecological impacts, whether direct or indirect, on- or off-site, immediate or in the future. Application of the precautionary principle is therefore very important.

As a society we find it difficult to assess and tackle the cumulative impacts of current or proposed actions. The gradual changes in soil salinity that arose from irrigation and land clearing, first identified in the 1950s, is an obvious example. The crisis of climate change, with its profound risks for the future of human society, is still not being tackled effectively. We see the indicators of continuing decline in ecosystem health in Victoria, for example widespread regional extinctions of woodland birds, but getting governments to address the crisis is not yet assured (there is no mention of biodiversity crisis in the Call for submissions document).

Other risks include:

- Terms of trade, the price of oil and other impacts on natural resource management.
- Restoration ecology is still a young science and there are many aspects that are unknown. There are serious gaps in our ecological understanding of the rehabilitation processes in Australian landscapes (Williams 1999), and little work has been done on the use of native plants, their genes and the processes these plants use to capture water and nutrients.
- There is very significant lack of good data (see 'A scientific basis for action, targets and monitoring', below).
- At the community level there is not great awareness of the crisis in biodiversity and the need for urgent action, even though there is a high level of concern for the environment generally (consistently the top four issues in polls).

- Responses to the climate crisis might result in biodiversity impacts including, domestic and industry water needs over-riding biodiversity needs (environmental flows); carbon sequestration market driving a loss of biodiversity via expansion of plantation monocultures.
- Increasing trade and travel may facilitate the invasion of major new pests, such as red imported fire ants, eucalyptus rust and rock snot (didymo).

Recommendation:

- Scanning and assessment of possible future risks to biodiversity and land health over the next 20-50 years is crucial for input into the White Paper.

3. Why do biodiversity and land health matter?

Below are some of the reasons that biodiversity and land health are valued today:

- **All species have inherent value**: Humans are only one of 30 million+ species on the planet, which represent billions of years of evolution. We are currently in the grips of a human induced mass extinction globally (Planet Ark 2007). In the long run the projected loss of species across the globe, but especially in Victoria with 44% of native plants already threatened, threatens the very web of life
- There is considerable empirical evidence linking **human health** (both physical and mental) to contact with the natural environment. Some of the strongest findings relate to children's interaction with nature, which improves concentration and self-discipline, aids social, mental and physical development, and aids recovery from stress (Bird 2007).
- **Intergenerational equity** requires us to pass on to the next generation a planet that is at least as healthy ecologically as it was for our generation.
- For **Traditional Owners** a secure future for native flora and fauna is totally integrated with a secure future for traditional culture and the restoration of important cultural and ecological connections.
- **Our lives and societies depend on the earth's capacity to provide goods and services from ecosystems**, such as food, water, soil formation, disease regulation and pollination. These goods and services are delivered by large-scale ecological processes that assimilate waste, recycle nutrients and moderate climate (Folke *et al* 2002 cited in Alexandra 2006). Ecosystem services have very significant economic value, estimated in Australia to be $1327 ` per year (CSIRO, cited in Krockenberger 2000, p42).
- **There are very significant economic costs from stressed[2] ecological systems.** As an example, at a national level the cost of dryland salinity is about $130 million pa in lost agricultural production, $100m pa in damage to infrastructure and at least $40 million pa in loss of environmental assets. About 2.5m ha of land in the agricultural zone is affected (cost is $110/ha pa). (National Dryland Salinity Program 1998, cited in Possingham *et al* 2002). As another example, weeds cost Australia $4 billion each year (Sinden *et al* 2004), and feral animals $720 million. See Attachment 2 for more details.
- Natural landscapes and wildlife viewing opportunities are the basis of much of the **tourism industry** in Victoria. One component of this is the value of national parks to the economy with Parks Victoria estimating its contribution to the Victorian economy at $960 million annually through tourism, employment and management expenditure.

[2] Landscape 'stress': "the cumulative effect of pastoral-use, changed fire regimes, vegetation clearance for cereal crops and related processes that impact on the soil A-horizon, coverage of indigenous plants, feral herbivores and predators, invasive weeds and salinity". Terrestrial Biodiversity Assessment, 2002, p92.

- **Environmental amenity** is a key factor in the decision-making of people moving to 'amenity landscapes' in coastal and hilly parts of Victoria.

Recommendation:

- White Paper needs to outline the economic and non-economic values of biodiversity and land health. While recognising that many of the values of biodiversity and healthy landscapes are close to impossible to cost (such as value to future generations), assess the economic costs – both up front and long term – both of business as usual, as well as the economic benefits of protecting, restoring and enhancing land and biodiversity must be analysed.

4. Key components of a strategic approach to biodiversity conservation

A key question for the White Paper to address is: how can we design and implement a conservation system, across all tenures, that is likely to maintain biodiversity for centuries to millennia? (See Mackey *et al* 2005, p2.)

We suggest that the following are essential aspects of a comprehensive and strategic approach to the conservation of Victoria's biodiversity. These items are explained briefly below.

- A vision, goals, and targets that articulate biodiversity outcomes
- Maintenance and restoration of ecological processes
- Avoiding clearing of native vegetation
- A resilient, comprehensive conservation reserve system
- Very large-scale restoration
- Private land conservation programs
- Coastal-marine-land links
- Threatened species and communities recovery
- Tackling threatening processes (including invasive species) and drivers of loss
- A scientific basis for actions, targets and monitoring
- Involvement of Traditional Owners
- Major increase in community awareness and engagement and participation in decision making
- Institutions and regulatory framework that are aligned with the vision
- Sufficient resourcing to deliver the vision
- Systematic long term biodiversity monitoring
- Research and extension

Articulating a vision

Long-term strategic planning must be directed towards a desired future state: If we are not clear about what we want to head towards, then it is very difficult to map out a pathway to follow. So what do we (the Victorian community) want Victoria's environments to be like in the future?

We propose the following as five key components of a vision for securing biodiversity and land health:

- Victoria's catchments, coasts and marine waters have flourishing biodiversity, healthy ecosystems and resilient ecological processes that are highly valued, securely protected, sustainably managed and effectively restored by community and governments (Victoria Naturally Strategic Plan, 2007).
- Reinforce the link between biodiversity and the wellbeing of people and communities.
- Victorians value and celebrate our unique and irreplaceable natural environmental heritage.
- State Government processes, legislation, policy, institutions, funding and actions deliver integrated biodiversity and natural resource management planning that is underpinned by targets that will be used to measure our success in achieving flourishing biodiversity, healthy ecosystems and ecological processes.
- That Victorians have reduced our resource use per person to an environmentally sustainable level.

Recommendation:

- That the Green Paper present a draft vision for securing biodiversity and land health, to be revised through consultation and presented as a final version in the White Paper.

Setting targets

The White Paper process provides a key opportunity to review existing targets[3] and to establish systematic targets for Victoria's land and biodiversity, with local and bioregional (or CMA region) targets nested under statewide targets. Victoria Naturally consider it essential that targets are set for biodiversity and land health outcomes and that the White Paper provides the roadmap to achieve these.

Targets must be science-based. Note that Indigenous science and Western science each have their own value and role in caring for country and both should be taken into account in setting targets. Targets should be established for:

- maintenance and restoration of the ecological processes that sustain biodiversity
- long term sustainable populations of every species and community of flora and fauna in Victoria (including those currently under threat).

Targets set for biodiversity and land health must be SMART (specific, measurable, attainable, realistic and timely). While some targets will be generational, others must be achievable within ten years. Outcome targets are required, not just output targets.

Recommendation:

- The Green Paper should present a draft set of 'SMART' targets for the achievement of biodiversity conservation outcomes.

Ecological processes – supporting life in Victoria

Conservation biologists are now emphasising that in order to maintain natural assets, the ecological processes that sustain them must be maintained. According to Soule *et al* (2004), dynamic ecological processes are essential for the persistence of species and ecosystems, and their evolution (see Attachment 3).

[3] There are many national and regional NRM targets and timelines already, however these targets are not being met. There is an urgent need to understand why.

Bennett *et al* (2007, p2) have grouped the key ecological processes that sustain biodiversity into seven themes: (1) climate, (2) primary productivity, (3) hydrological processes, (4) biophysical habitats, (5) interactions between organisms, (6) movements of organisms, and (7) natural disturbance regimes. They identify a range of interacting threats that impact on ecological processes, and consider that *"the greatest potential to sustain biodiversity and evolutionary processes in Victoria in the long-term (and their concomitant benefits for people), will come from conservation strategies that are directed toward maintaining, or re-establishing, the integrity of ecological processes."*

Victoria Naturally has commissioned Deakin University to investigate appropriate policy responses to address the urgent need to maintain or re-establish the integrity of Victorian ecological processes. We will be providing the findings to the White Paper process when they become available.

Management of ecological processes requires a significant shift from a static view of ecosystems to a dynamic one, where spatial and temporal changes are considered. This is illustrated by the challenges we face in restoring vegetation, where significant time lags occur in availability of ecological resources such as tree hollows. Vesk & Mac Nally (2006 p363) recommend an integrated spatial and temporal framework *"for making optimal decisions for replanting natural vegetation that takes into account time-lags in vegetation development, tree senescence, and the time course of providing ecological resources"*. They consider that timeframes of centuries are required for planning and modelling.

Another dynamic factor which must be addressed is climate change. CSIRO modelling (R. Jones, pers comm.) indicates that under lower warming scenarios (0.2°C per decade), species climatic envelopes may move up to 100km, while for higher warming scenarios (0.5°C per decade), species may need to move up to 250km per decade to find suitable habitat.

"Many, but not all, existing conservation programs are based, implicitly or explicitly, on the notion that what we want to conserve is 'exactly what we have now, where it is now'-a static view of biodiversity. However, future climate change is very likely to result in a pattern of shifting mosaics of ecosystems in more human time scales (10-100 years), thereby undermining this static notion of biodiversity. To be effective, future conservation programs will have to acknowledge and accommodate this dynamic view of biodiversity. Indeed, in our highly modified landscapes, active management of these shifting mosaics will become increasingly important if we are to achieve conservation objectives." (Department of Environment and Water Resources 2002).

Weed and pest invasions represent another dynamic process. Weedy garden plants are continually escaping from cultivation into bushland, where they displace native vegetation. Feral deer are expanding their ranges in Victoria, and the invasive orange pore fungus has recently appeared in Melbourne reserves. New pests can be expected in future.

Recommendations:

- The White Paper should take a dynamic view of land and biodiversity at a time of climate change, based on the maintenance and restoration of ecological processes and the anticipation of future threats.
- Undertake case studies in a number of bioregions in order to investigate the status, trends and risks for the ecological processes that sustain biodiversity in Victoria (including marine and coastal). This could be done for example around the connectivity needs of a range of species in a given bioregion.

Implementing the Native Vegetation Management Framework

It is widely acknowledged that avoiding clearing is the first step to reversing the decline of biodiversity (SoE reports, VCMC, 2001, DSE – many reports). It is in fact not yet possible for humans to fully replace an ecosystem that has been cleared (Bekessy, pers comm) hence clearing

controls are a vital component of biodiversity protection in Victoria. The Victorian Native Vegetation Management Framework is valuable, but requires improvement.

The Exemptions under Section 52.17 in the VPPs result in loss of native vegetation and are thus contributing to the loss of the community good of biodiversity health; they are a negative in the goal of Net Gain which must then be made up by others.

As they are largely for private gain this could be said to be an unfair burden on the rest of the community and/or on government. While we accept that there are efficiency gains for these exemptions it is imperative that they ensure minimal loss of the community good, ie loss of native vegetation, and that they are monitored and accounted for so that the goal of Net Gain is realised through other means. A recording system via local councils could be the simplest mechanism.

In order for it to be effective, the Framework's key principle of 'avoid' clearing of native vegetation needs to be rigorously implemented. There is a need to strengthen this within the current Framework, with potential to achieve this through a range of mechanisms. A key shortcoming of the Framework is its discretionary nature as a policy tool under the Planning and Environment Act. Mechanisms to ensure rigorous, whole of government application of the Framework are needed to achieve avoidance of clearing – which needs to be ensured at the early stages of project and landuse planning and on an application by application basis. The White Paper process needs to determine how present arrangements for vegetation retention can be improved.

It is vital to recognise that without compliance actions and prosecution of those who clear illegally or do not adhere to permit conditions the Framework does not send a message that government is serious about its policy. The failure to enforce the policy, places the burden of reversing the decline of native vegetation on those who will abide by the law which is clearly unfair.

Implementation of the Framework has fallen on Councils who often do not have the resources or the training to implement it effectively, let alone the capacity to undertake compliance measures. Sufficient resources must be provided to implementation agencies.

There is a clear need to increase ecological expertise of local government planners, DSE officers and VCAT members.

The success of the Framework also depends on publicly reported achievements re net gain through monitoring of vegetation gains and losses, including of clearing undertaken under permit exemptions, as outlined below in the section of this submission 'scientific basis for action, targets and monitoring'. Where offsets are used, mechanisms are needed to ensure, monitor and publicly report on their ongoing maintenance and protection.

The successful achievement of avoiding clearing and implementation of the Framework requires community education and extension services highlighting the values of native vegetation and informing landholders about available incentives.

Recommendations:

- Review the Framework and put in place a rigorous, whole of government approach to applying the Native Vegetation Management Framework including: emphasis, as per policy, of avoiding clearing; strong compliance measures; and undertake strategic land use and project planning early enough to deliver effective biodiversity outcomes.
- monitor and publicly report on achievement of net gain, detailing all vegetation gains and losses including clearing under permit exemptions
- Support the framework with education, extension and adequate resourcing of implementing agencies.

A resilient, comprehensive conservation reserve system

Victoria's national parks and other conservation reserves play a particularly important part in the long-term protection of Victoria's biodiversity in the face of climate change. Public land and parks especially will act as refuges for the species they already harbour, as well as acting as refuges for species migrating from other climate-affected systems. As large, relatively intact natural areas, with high ecological integrity, they are a vital point of reference for recoverable natural systems across the landscape.

If we are to have a park system with ecological integrity and the resilience to truly fulfil these functions, we must:

1. Extend and 'complete' the conservation reserve system in relation to the habitats and communities (EVCs) represented. This will require land purchase as well of changes to the designation of areas of public land.
2. Significantly increase the resources available to enable successful long-term protection and management of the ecological systems within parks and reserves, in accord with the best available scientific advice.
3. Ensure investment for public access and recreation is directed towards activities and infrastructure that ensure protection of natural values is increased, not compromised.
4. Set up comprehensive monitoring of ecological systems in parks and reserves, consistent with Statewide monitoring programs.
5. Retain existing native vegetation across the landscape, and re-establish connectivity to allow for species migration and effective functioning of ecological processes.

Recommendation:

- The Green Paper should examine what extensions are required to achieve a representative conservation reserve system, the resources needed to successfully manage the ecological systems in protected areas.

Very large scale restoration

It is now widely acknowledged that we need to work at a large scale to deal with threatening processes, protect species, manage land degradation, maintain ecological processes and implement ecological restoration. Large regional or landscape-scale restoration is just getting under way in Australia. From the work so far, such as Gondwana Link in south-west Western Australia, and from the experiences of The Nature Conservancy in the US and elsewhere, the following are seen to be important.

Ecological processes provide the major conceptual framework for thinking about the protection, regeneration and restoration of biodiversity and land health and engagement with social and economic goals. Thinking is required at a very large landscape scale, some would say inter-continental as this is the migratory range of many of our bird and marine species.

The scale for planning of restoration projects will vary enormously depending on social and ecological factors. It may be as small as the Melbourne metropolitan area and related catchments, a circle of about 150km radius round the central city. On the other hand, for Gondwana Link, it is hundreds of kilometres for the long term planning underway on linking the tall forest country of far south-west WA across the Nullarbor and into South Australia. Gondwana Link is currently working to re-connect from the Fitzgerald River National Park to the Stirling Ranges.

The DSE has already promoted this scale of planning via its biolinks proposals. Work is starting on the tri-State Habitat 141 project (see below). Attachment 4 gives examples of work already underway that are underpinned by thinking at a landscape scale.

Such a scale increases our capacity to use the conceptual framework of ecological processes. This in turn helps us incorporate climate change gradients, to see the drivers across a landscape and operate across political/administrative and tenure boundaries. On the ground it will lead to large-scale connectivity as distinct from many small bits with large gaps. Within Victoria there may be five to ten such large-scale restoration projects undertaken.

Improving connectivity across the landscape is key to maintenance of ecological processes and provides species with room to move under climate change as suitable climates move south and uphill.

Restoration of riparian habitat and drainage lines, as well as protection and restoration of roadsides are key elements in landscape-scale restoration. River and stream systems and their associated riparian environments will form the backbone of landscape restoration, particularly in biolinks. Victoria's rivers and streams are under stress and in poor condition (VCMC 2002). Climate change (drought, extreme rainfall/runoff events) will exacerbate the problems. Better management of stream frontages is crucial if the health of river systems is to be improved. We need to revegetate the streamsides to improve water quality (shading) for instream and terrestrial biodiversity. Restoration needs to be integrated with environmental flows for river systems.

Since 1903, stream frontages could be licensed to adjacent private owners. Currently there are about 90,000 hectares of public land frontages under license. These licences are under the Lands Act (1958) and based on legislation designed in the colonial days to assist land settlement. In 1970 the Crown Land Reserves Act was designed to 'take out' key areas and reserves from the historical Lands Act. However streamside reserves remained under the antiquated Lands Act. Since then, annual licensing went to a 35 year licence (99 years for unused roads) with a review every 5 years. The next review is due in 2009.

Riparian land is of such importance to the functioning of both terrestrial and aquatic ecosystems that it deserves a focus on its conservation management. The stream frontages are Crown land so would be amenable to a VEAC review. Just as there is legislation for coasts, roads, etc, it may be appropriate to introduce a Riparian Land Management Act.

Large-scale vegetation restoration work needs to be framed by overarching state policy directions and enablers, while implementation needs to be locally driven and involve a key group of stakeholders whose values and work correlate highly with the task at hand (Michael Looker, CEO The Nature Conservancy, Australia, pers.comm.). This should include government agencies.

The tools to be used are many and varied including: regulation, planning provisions including covenanting, precinct plans, subdivision rules; strategic plans; a wide array of research and monitoring.

Adaptive management loops (plan, do, monitor, review) are required to achieve iterative improvement and to capture valuable knowledge in the process. Unless program systems are structure explicitly around this framework they will struggle to put the intent into practice. There is much literature on this concept and we encourage the use if this thinking to ensure little time is spend reinventing the wheel and most energy is invested in apply the theory in the most effective ways.

Funding sources are also diverse and for 'on ground' activities don't have to rely totally on government. Both Gondwana Link and Habitat 141 have sufficient non-government funds for on-ground works for the early phase of their development. However, government funds and institutional arrangements are vital to leveraging many other sources. Sources of funding and resources include: grants from government and philanthropic funds; market-based instruments; philanthropic direct input eg purchase; pooled private donations to NGOs; voluntary labour; and a burgeoning carbon sequestration market (provided it is directed to also deliver biodiversity outcomes).

In setting targets for restoration it is imperative that the priorities for the large-scale projects are science-based including both Indigenous and Western science. They must also address threatening process including invasives (plant and animal).

These goals need to be integrated with other social and economic needs, however, they should not compromise the underlying need for a truly ecologically sustainable natural environment.

Knowledge and management work together – caring for country creates new knowledge and knowledge helps us better care for country. It is crucial that there is rigorous science-based monitoring of outcomes that contribute not only to adaptive management, but also to community understandings. We should also learn from the social processes underway – what works, what doesn't – and roll these findings into the next work programs.

Ecological processes, plants and animals do not recognise administrative or tenure boundaries. Action to protect or restore natural assets can be ineffective without a co-ordinated effort across a wide area. Fox control or management of firewood collection are two examples. Victoria Naturally is linked to an innovative tri-State example of very large scale restoration in the Habitat 141 project, driven by Greening Australia Victoria in partnership with other alliance members (Trust for Nature and The Wilderness Society) as well as CMAs and non-government partners. Supported financially by Greening Australia Limited, the vision for Habitat 141 partners is restoration of biodiversity and land health in a wide swathe, along the 141º W longitude, from the south coast to north of the Murray River into south-west NSW and both sides of the Victorian and South Australian border.

Restoration on this scale needs to be supported by research and knowledge sharing capacities. A key opportunity is the establishment of a virtual resource/knowledge centre for vegetation restoration, which can provide large and small scale projects and programs with a suite of information, tools and access to lessons learnt as well as advice on funding sources and potential avenues of institutional support and networking. Potential for a Cooperative Research Centre on biodiversity restoration should also be investigated.

Recommendations:

- The Habitat 141 project, and others underway, should be assessed with reference to how State, regional and local government policies, institutions and funding assist or hinder the implementation of the recovery.
- The White Paper should include regional scale biolinks programs for all of Victoria.
- A whole of landscape approach is required for large scale protection/restoration programs.
- The management regime for stream frontages should be reviewed and reformed to support their restoration for river health and as key components of large-scale revegetation programs.
- Build virtual resource/knowledge centre for vegetation restoration and investigate establishing a Cooperative Research Centre on biodiversity restoration

Private land conservation programs

This topic is covered in detail in the individual submissions provided by Trust for Nature and Bush Heritage Australia. Private land conservation programs have delivered considerable biodiversity conservation with a key advantage that they provide access to nature conservation outcomes not possible in the public estate. Land purchase and covenanting can provide permanent habitat protection. Incentives provided by private land conservation programs are successfully building community capacity in management of native vegetation and biodiversity. Trust for Nature's submission outlines the value of incentives combined with on-ground extension for private land conservation and recommends removal of land tax on Trust for Nature Covenants in recognition of their contribution to Victoria's conservation estate.

Government sponsored strategic land purchase programs such as the Commonwealth's National Reserve System program (as well as taxation incentives for conservation philanthropy) have proven to be highly effective for leveraging private and philanthropic investment and delivering consistently high quality conservation outcomes that fulfil government policy. Furthermore, the grantor (the government) is relieved of the burden of on-going management responsibilities and management is often easier and more effective because the reserves are not publicly owned. A number of other successful programs are private land based including Market Based Instruments such as Bush Tender and biobanking that should also be ramped up in Victoria as they are demonstrably effective. Also, Trust for Nature has a long established voluntary conservation covenanting program and over the last ten years has established a successful Revolving Fund, which is also demonstrably effective but under resourced. These and other models would greatly enhance the level of private land conservation in Victoria and significantly contribute to improving biodiversity conservation with minimal (and often one-off) public investment. Resourcing needs for Trust for Revolving Fund are discussed under section 5 on institutions below.

Recommendations:

- Recognising the increasingly important role of private land conservation organisations (including Trust for Nature as a statutory authority) in large scale restoration determine the most effective state government institutional support for their programs.

Coastal - marine - land links

Our coasts and marine environments require greater protection. Current and emerging threats need to be addressed and funding, institutional structures and integration need to be improved. The current review of the Victorian Coastal Strategy, and this White Paper provide key opportunities to further develop and implement an integrated vision and strategy to address the challenges facing Victoria's marine and coastal environments.

Victoria Naturally considers that biodiversity management in Victoria needs to be undertaken with recognition of the linkages and interactions between terrestrial and marine environments. The coastal environment is the interface between the forces of the sea and those of the land. It is a dynamic environment, which is constantly evolving. The management of each of these broad environments needs to take into account their connections and associated interacting threats.

CMAs need to have plans that link catchments to coastal and marine environments, for example to ensure water quality entering estuaries does not contain high sediment, nutrient or pollution loads.

Research and monitoring is a key need for marine and coastal environments, and the White Paper should investigate an information gathering and sharing framework that is streamlined with terrestrial databases and monitoring.

The White Paper should determine the most appropriate institutional structures for coastal and marine management, to establish a decision making and planning framework for the marine environment outside Marine National Parks and Sanctuaries, and link governing bodies and management plans between marine, coast and terrestrial environments.

Climate change is a key threat that requires a coordinated statewide response plan. We need to start to put in place the plans now to cope with sea level rise which according to the 2007 IPCC Fourth Assessment Report is projected to be between 0.18 and 0.59 metres by 2100 (allowing for different emissions scenarios and uncertainty ranges). Within the next five years, increased storm surges will have increasingly big impacts and need to be adequately considered and factored into statewide planning. Saltmarsh, mangroves and intertidal zones will need to migrate inland with the water bodies if large scale extinction is to be prevented.

It is expected that the White Paper will lead to a comprehensive public education and engagement strategy on biodiversity. This should include public education about the management and public use of the marine and coastal environment as well as catchment to marine linkages. The employment of

dedicated permanent education officers made accessible to coastal boards and CMAs might be a good place to start.

Victoria needs to take the next step in marine protection. Improved protection of marine species through an integrated system of marine national parks, marine corridors and marine protection plans using ecosystem based management practices should be undertaken. The first step in this process was undertaken in 2002; it is now time to complete the process.

Recommendations:

- The management of marine, coastal and terrestrial environments needs to take into account their connections and associated interacting threats.
- As part of a co-ordinated statewide response to climate change, plans are required to deal with the impacts on plant and animal communities of projected sea level rise, and increased coastal storm surges.
- Public education is required about the management and public use of the marine and coastal environment, as well as catchment to marine linkages.
- The White Paper needs to instigate a process to establish an integrated system of marine national parks, marine corridors and marine protection plans.

Recovery of threatened species and communities

The management of threatened species and vegetation communities needs to be approached at a landscape level. By working at the landscape scale we can protect threatened species while at the same time generating multiple benefits for other species of flora and fauna as well as multiple ecosystems and ecosystem processes. The Recovery and Action Plans for the threatened species and communities should inform large landscape scale thinking, planning and funding and must be included in monitoring. It is extremely likely that the biodiversity restoration priorities across the landscape will have major overlaps with the needs of the threatened species.

A 'safety net' for individual threatened species or community must be maintained through legislation, land use planning and environmental effects assessment procedures, and mechanisms such as Recovery or Action Plans and use of Critical Habitat Determinations. Adequate resourcing of these would go a long way towards protecting those elements of our biodiversity closest to extinction.

A scientific basis for actions, targets and monitoring

Knowledge of the status and trends of land health and biodiversity are essential for their effective conservation and management. Currently, a variety of data sets relating to Victoria's biodiversity are held by a number of State agencies. However data sets are not being adequately updated, are not integrated or compatible between agencies (Parks Victoria and DSE for instance), and available remote sensing data are inadequate. Most data are added ad hoc by consultants and other non-government people.

And, according to Bennett et al (2007, p3) data sets *"primarily represent a static view of assets. To understand the status of ecological processes, we need to have quantitative measures of change through time. There is an extraordinary scarcity of systematic long term data sets on the status of flora, fauna and natural resources in Victoria. There is a clear need for systematic, long-term monitoring of biodiversity across the state. Likewise, there is a clear need for systematic monitoring of the responses of biota to management programs and natural disturbance events (e.g. bushfire)."*

There are substantial gaps in data coverage particularly on private land, as well as through time, and inadequate provision of data and data management capacity for local government planners and other implementers. A major problem is the lack of resourcing and support, especially regarding the on-going input of data to keep the information up-to-date and dynamic. Furthermore, all staff using

the databases must be properly trained and educate to know how to use and interpret the information in terms of ecological processes, not just as a list of static entities.

There are significant research, data collection and management and monitoring gaps that need to be overcome. It is essential that the White Paper undertakes a review of the current status of and gaps in Victoria's research, data and monitoring systems and processes. The prioritisation of research and data collection efforts should follow this.

The next step, as part of measuring the achievement of targets developed through the White Paper is the development of a systematic long term monitoring program, including a suite of indicators in order to quantitatively evaluate and publicly report on progress on a regular basis, with annual reporting for some indicators.

This work should be undertaken utilising expertise across academic and State agencies, and should be supported by the resourcing of knowledge brokering services to ensure alignment of research with the needs of biodiversity and natural resource management, and availability of research outcomes to on-ground work. Opportunities should be investigated in order to fund and establish centres for biodiversity research and information management in regional academic institutions as well as a Cooperative Research Centre for biodiversity restoration.

As part of the current evaluation of the Victorian Biodiversity Strategy, it has been noted that one of its key achievements was mapping of pre-1750 versus current vegetation according to ecological vegetation classes (EVCs). These maps highlighted the most cleared areas and EVCs, and provide a coarse scale benchmark against which we can measure progress in restoration of land and biodiversity in Victoria. There is however, also a need for fine scale mapping and ground truthing of EVCs, and for these data to be made freely available to local governments, CMAs, other agencies responsible for planning and management decisions and the community. For example, many councils lack overlays of vegetation significance and EVC mapping is inadequate to inform their development.

The extent of achievement of the key target of net gain in native vegetation (in the Victorian Biodiversity Strategy, and in Our Environment Our Future) must be quantitatively monitored and publicly reported at least annually. In order to do this, there is a clear need for systematic monitoring, and recording of vegetation gains and losses that is publicly accessible. This should include both clearing under permits, as well as clearing exempt from permits, as well as ongoing monitoring of offsets which are promising improvements in condition and increases in area. A clear timeline of the delivery of this is required as a permit tracking system has already been promised for a number of years.

A logical next step is for the White Paper to create a 2030 "future vision" EVC/biolink map as part of the White Paper's target setting process, to provide a roadmap for implementation of protection of existing vegetation and large scale revegetation of regional biolinks across the state. Mapping of this vision will require statewide and regional revegetation targets, and detailed scientific and cultural analysis and community participation to determine of appropriate biolink locations.

This "future vision" should be informed by statewide mapping and modelling of climate change impact scenarios on land and biodiversity values, including ecological processes. Such models should include projections in likely longitudinal and altitudinal shifts in species and communities bioclimatic envelopes under different warming scenarios in order to a) determine appropriate species for revegetation and b) investigate options for translocation of species.

Recommendations

- Review the current status of and gaps in Victoria's research, data and monitoring systems and processes, followed by prioritisation of research and data collection efforts.
- Develop a systematic long term biodiversity monitoring program, including a suite of indicators in order to quantitatively evaluate and publicly report on progress.

- Establish monitoring systems and supporting databases focused on ecological process, not just "static" compositional lists.
- Invest in long term systematic, publicly accessible ecological monitoring system, with a key focus on coordination/standardisation of data bases, formats and availability, data collection (baseline and ongoing monitoring), and high resolution mapping.
- Ensure data collection and analysis for publicly-accessible fine scale tracking of land clearing losses and gains in a GIS database, including ongoing reporting on status of offsets, with a clear implementation timeline.
- Create a "2030 vision" EVC/biolinks map as part of the White Paper's target setting process, to provide goals for protection of existing vegetation and large scale revegetation of regional biolinks across the State.
- Undertake comprehensive mapping/modelling of effects of climate change on land and biodiversity values.
- Establish/fund knowledge brokering services, and centres for biodiversity research and information management for instance in regional academic institutions and/or CMAs.

Involvement of Traditional Owners

The White Paper process and its stakeholders need to achieve meaningful engagement of Victoria's oldest land custodians, Indigenous Traditional Owners. This will require the government to offer an appropriate consultation process and be prepared to provide resources to enable Traditional Owner organisations to engage their communities.

It is vital that the White Paper process recognises and accommodates Traditional Owner rights and interests, and recommends legislation and policy to recognise those rights.

Indigenous people's approaches to land management are structured in accordance with traditional land and custom, which do not always accord with Western approaches. However, Indigenous approaches to conservation should not be seen as competing with Western scientific models. Rather than adopting a singular technical and legislative approach, Indigenous or non-indigenous, it has been widely suggested that both have much to contribute to effective biodiversity conservation.

Indigenous participation must now be approached as an essential consideration in Victorian environmental legislation and policy. Governance models for implementation of Indigenous involvement in land and biodiversity need to be explored to expand participation from mere consultation to direct decision-making. Well-known models at the federal level include jointly managed national parks such as Kakadu, and Indigenous Protected Areas. Such initiatives for Indigenous participation which are grounded in biodiversity conservation and land management have frequently brought success for Indigenous communities.

Recommendations:

- The White Paper process should offer and resource an appropriate consultation process to engage Indigenous communities.
- Significant work should be undertaken to build understanding of traditional knowledge and Traditional Owner roles in land and biodiversity management, and how these can contribute to the State's overall approach to biodiversity conservation.
- Investigate governance models that involve Indigenous people in direct decision making regarding biodiversity conservation and land management.

Community education and awareness

The success of biodiversity conservation in Victoria depends on the awareness of and valuing by Victorians of our unique and remarkable biodiversity and the vital ecological processes and services it provides. It is clear that Victorians have a high concern for the environment. There is considerable celebration of the natural environment in Victoria including visits to National Parks, art and festivals that celebrate sense of place, and its appreciation as the backbone of the tourism industry.

There is growing interest in and desire to act to conserve water and tackle climate change and mega-fires. In regard to climate change, most Victorians are aware of mounting evidence that climate change is real, is here and needs to be addressed. However, few Victorians are adequately aware of the very poor state of our biodiversity, and the threats posed to it, including from climate change and invasive weeds, including from garden plants. VNPA's focus group work shows that when, for instance, 'light greens' are shown statements illustrating the biodiversity crisis they are deeply concerned (VNPA 2006, unpublished). There is a clear need to educate the Victorian community about biodiversity – what it is, the ecosystem services it delivers, its status and threats, and what we as Victorians can do about it.

The need to link awareness and behaviour change has been recognised in the State Government's successful marketing exercises including the black balloons, drink driving, water and energy. A similar long term education and behaviour change program is required for biodiversity. Such a program must be outcome focused, with defined target audiences and tested messaging. There are many important target audiences for such programs including the metro audience, rural and regional audiences, tree/sea-changers, and of course for long term change it is vital that schools and tertiary institutions deliver ecological literacy.

Concerted community awareness raising is vital for the uptake of the tools and the behavioural change required and to engender support for various programs, regulation and funding needed to achieve goals and objectives. Such programs must also contribute to an understanding of what governments are doing and why.

Recommendation:

- Enhance awareness of the values and condition of Victoria's biodiversity, and achieve behaviour changes through targeted public awareness and education programs.

5. Institutions, regulatory framework and resourcing to deliver the vision

We emphasise that reversing the parlous state and ongoing decline of land and biodiversity in Victoria requires a quantum shift in our institutional approach. Small tweaks will simply not be enough to achieve the required results. It is necessary to comprehensively review and reform the institutional, policy and legislative settings and instruments – assessing what is and isn't working, and why – in order to develop and implement a bold new vision and framework that delivers 'flourishing biodiversity in healthy ecosystems'. This demands a strategic approach to planning and delivery at a landscape scale.

A strategic approach requires determining what vision, goals and objectives we want to achieve, with specific and measurable targets at a range of scales, which in turn can be used to develop a suitable mix of organisational, policy, legislative and funding options and tools. One of the vital questions the White Paper must address is how to ensure that biodiversity is considered in all decision making in Victoria.

There are a number of principles that should guide review and reform of institutional arrangements, decision making processes and programs. These are:

- Increased emphasis on strategic planning for the protection, enhancement and restoration of terrestrial and aquatic habitat at a landscape (rather than individual site) scale.
- Increased emphasis on maintaining and restoring ecological processes.
- Decision making should be made based on best available science (both western and indigenous), the precautionary principle and the irreversibility of biodiversity loss.
- Strategic, integrated decision making and management across all land tenures.
- Long, medium and short term, measurable (statewide, local and regional) science based targets.
- Monitoring, and public reporting of achievements.
- Public interest in land management and biodiversity conservation.
- Allocation of necessary resources.
- Accountability.
- Fairness (duty of care versus cost of providing a public good).
- Public participation in planning and decision making.
- Independent auditing of the implementation of policies and strategies.

Policy

It is vital that the White Paper delivers institutional and policy settings which support its objectives. For example, in relation to biolinks, it will be important to identify current policy barriers, and to determine appropriate policy settings to support their development.

A clear question that has arisen in relation to the current review of the Biodiversity Strategy is: how will it be renewed in the context of the White Paper? There is a clear need for a biodiversity strategy, and it is expected that the form it takes will be resolved through the White Paper. It is vital that biodiversity becomes a clear government focus, and it is open to question whether the best way to achieve this is through a stand-alone biodiversity strategy, or through an integrated, all of government approach to land and biodiversity. (only if they have power)

Legislation

A key starting point for legislative review and reform is the recognition that biodiversity in Victoria is still in decline despite significant legislative and policy innovation in the past 20 years including:

- Planning and Environment Act 1987
- Flora and Fauna Guarantee Act 1988
- Native vegetation retention controls (1989) and adoption of 'net gain' and associated policies in *Victoria's Native Vegetation Management: A Framework for Action* (2002)
- Integrated catchment management with introduction of the Catchment and Land Protection Act 1994.

There is a long list of other legislation that relates to the protection of land and biodiversity, including marine and coastal. This complicated legislative framework lacks clear overarching objectives and provides decision makers with a confusing and overlapping array of legislation and

lack of clarity regarding roles and responsibilities. There is considerable discretion in decision making, for example in relation to implementation of clearing controls. The tyranny of small decisions, with discretionary approval for successive actions which individually may have only a small effect are leading to greater incremental decline over time. The failure to address cumulative impacts is a fundamental problem.

Victoria's biodiversity legislation lacks enforcement provisions for breaches to various provisions, and there are no third party rights to enforce breaches. Better decisions result when public participation and accountability requirements are built into decision making. We recommend that legislative reform undertaken through the White Paper leads to incorporation of third party rights/standing into all relevant legislation covering native vegetation and biodiversity.

The reasons for the widespread failure of legislative initiatives to adequately address the legacy of past clearing, associated loss of biodiversity and extinction debt must be investigated, understood and resolved through the White Paper process. Legislative review and reform should address the concerns raised above, with particular attention given to the FFG Act and the planning framework. The Victorian State Government's election commitment to update legislation more than 10 years old, provides additional impetus and opportunities to ensure resources are allocated to this work.

As part of legislative review, it is necessary to incorporate new thinking, particularly in relation to ecological processes, as current approaches are largely static and assets-based. The threat of climate change also needs to be accommodated.

Planning and catchment management

Land use planning and the management of land continue to be delivered through distinctly different sets of institutional arrangements and despite endeavours, the existing arrangements have failed to bridge the divide between the management of natural resources and statutory land use planning. For example, there is a lack of integration between Regional Catchment Strategies and planning schemes under the Planning and Environment Act. There is a clear lack of integration between CMAs plus coastal boards and the planning system and inconsistent implementation between councils, in part due to lack of resources and capacity. New institutional arrangements are now needed to set common standards and drive the integration of the way non-urban land is strategically planned, used and managed. Capacity building and additional resourcing are required for responsible agencies.

The current land use planning system is unable to achieve environmental objectives on a statewide scale. The Victorian Planning Provisions (VPPs) strategic environmental objectives cannot be achieved because the bulk of the VPP provisions are intended to facilitate development, and explicitly work against biodiversity outcomes. Implementation of the limited range of biodiversity conservation measures in the planning and development control system is dependent on individual local government authorities. Precinct planning and environmental overlays are inconsistently used, and are not extensively applied, and recent studies by RMIT indicate that zoning does not correspond with biodiversity values.

The White Paper needs to consider how to achieve improvements that ensure that land health and biodiversity objectives are met. For example, it is clearly the intent of the Native Vegetation Management Framework to protect high conservation value vegetation. However, a major deficiency of the Native Vegetation Management Framework is its implementation as a discretionary policy under the Planning and Environment Act, rather than as a binding statutory document. It is considered by planners as one document among many, and its flexibility and discretionary status results in significant negative consequences for example for high conservation value vegetation, (ie rare EVCs, depleted EVCs, and threatened species habitat).

- The White Paper process needs to determine how present arrangements for vegetation retention, catchment management and land use planning can be improved, including review of VPPs with respect to their ability to protect biodiversity.

Consideration needs to given to allocation of roles, and exploration of opportunities to make decisions at larger and ecologically more appropriate scales. A key question is: what should be CMAs roles in land use planning within a statewide framework, for example in relation to zoning tools, referral authority status? Whatever model is chosen, there is a clear need for far greater integration between state government goals, CMAs and local government. This is required, for example, in order to integrate statewide goals, regional catchment and native vegetation plans with local planning.

Mechanisms to deliver outcomes

We emphasise the importance of getting the right mix of 'carrot and stick'. An effective, strong and enforced regulatory framework is a vital tool, and regulation has achieved laudable results, for example in reducing land clearing.

However, there are a range of other tools that are gaining currency, and have potential to deliver significant improvements for land and biodiversity. There is a need to increase our understanding of the role of and mechanisms for market based instruments (MBIs) and ecosystem services. For example, a market for biodiversity credits could be created to encourage biodiverse conservation planting by private landholders. We clearly need to recognise that MBIs won't work in all settings (for example grasslands around Melbourne where land value and development potential is high, demonstrating the need for longer term strategic planning and zoning that reflects biodiversity values as well as mechanisms for purchasing development rights). It is therefore imperative that the appropriate settings and processes for MBIs are investigated and understood. It is recognised that biodiversity conservation is a public good, therefore it is imperative to investigate models for balancing ecosystem services/stewardship payments with volunteerism and increasing capacity of duty of care to deliver biodiversity outcomes.

Resourcing

Increased investment in biodiversity protection and restoration is required, particularly in the face of climate change. This is required across private and public land.

A clear case for funding requirements to achieve no net loss (as distinct from Net Gain) is presented in the Victorian Biodiversity Initiative (Attachment 5) at a cost of $190 million per year plus a $10 million one off grant to Trust for Nature's Revolving Fund. This argument clearly demonstrates the need for a substantial increase in funding in order to achieve the reversal of decline across the landscape and flourishing biodiversity as per government policy. A key recommendation is to improve speed of delivery and scale up successful pilot programs.

Resourcing needs for private land conservation are outlined in Trust for Nature's individual submission, in which they outline that the success of their Revolving Fund for land purchase is '*hampered by lack of liquidity and the need for agility in the property market*'. Victoria Naturally highlights Trust for Nature's recommendation that the Victorian Government should provide them with a dedicated minimum addition of $10 million to the Revolving Fund.

The White Paper must undertake a detailed investigation of public and private funding models and institutional delivery options in order to increase investment in biodiversity outcomes, including improved management of protected areas and landscape scale corridors and linkages (biolinks). There may be solutions comparable to the funding of river work through increased water rates, which resulted from the Water White Paper. It will be vital to explore the role of payments for carbon sequestration, and a clear need for the right policy and regulatory settings to ensure that carbon dollars result in multiple benefits that include biodiversity outcomes. Superannuation funds are also likely to be part of any successful investment framework.

There is an imperative, particularly in the face of changing rural demographics, to link restoration economies with building resilience for rural communities and regional development.

Recommendations:

- Develop and implement a bold new vision and framework: a quantum shift that delivers 'flourishing biodiversity in healthy ecosystems'.
- Undertake a detailed, comprehensive review of current institutional arrangements for land management and biodiversity conservation. Particular attention should be paid to identifying the success or otherwise of existing arrangements.
- Develop a strategic large scale whole of landscape approach to planning and implementation.
- Undertake a comprehensive review and revision of key relevant legislation ensuring that objects and purposes reflect current knowledge and core ecological principles, clarify responsibilities and remove contradictions.
- Put in place/utilise an overarching independent arrangement to audit outcomes and reveal performance including against statutory obligations.
- Provide legal standing to the public to enforce biodiversity and land conservation legislation.
- Integrate land health and biodiversity values into all planning and decision making.
- Identify and remove competing priorities and instruments and improve integration between jurisdictions and within/between agencies, departments and local government.
- Determine how present arrangements for vegetation retention, catchment management and land use planning can be improved, including review of VPPs with respect to their ability to protect biodiversity.
- Determine the role of and mechanisms for MBIs.
- Fully fund programs needed to deliver 'healthy biodiversity in flourishing ecosystems', improve speed of delivery and scale up pilot programs.
- Adequately fund bodies delivering and implementing policies and programs, and undertake capacity building.
- Undertake a detailed investigation of public and private funding models and institutional delivery options available to increase investment in protected areas and landscape scale corridors and linkages.
- Review different policy tools and delivery mechanisms for improving biodiversity conservation on private land, including land stewardship schemes.

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Attachment1. Terrestrial Biodiversity Assessment 2002 - data for Victoria

Reference: National Land and Water Resources Audit (2002) *Australian Terrestrial Biodiversity Assessment 2002*.

The collating of work from States and Territories in the early 2000s resulted in an extraordinary set of data as comprehensive as could be found at the time (and maybe since). Below are figures extracted for Victoria as much as possible however the description of the Interim Biogeographic Regions of Australia (IBRA, or just Bioregions) ignore state boundaries, as they should, so the main Bioregions mentioned below all have a major portion of them within Victoria. (NOTE: the documents are still available free from

Victoria has lost a higher proportion of its bushlands than any other state or territory, and now has very high numbers of threatened species. A range of threats continue to impact on Victoria's bushlands, presenting significant conservation challenges, as the following excerpts illustrate:

Threatened species

"The highest number [of threatened species per subregion in Australia] occurs in the Murray Mallee sub-region in north-western Victoria. Other subregions in Victoria also have very high numbers of threatened species, particularly subregions of the Murray-Darling Depression, Victorian Midlands, South-East Highlands, Victorian Riverina, South Coast Plain, and Victorian Volcanic Plains bioregions. These [largely] equate with highly cleared regions…" (p. 56)

"Overall, the Murray-Darling Basin, coastal parts [of Australia] associated with intensive development, parts of Tasmania and the south-west of Western Australia are the areas most important in terms of threatened species." (p. 56)

Clearing and degradation of bushlands

"Greater than 95% of all native vegetation [in the Victorian Volcanic Plain subregion 1] has been cleared. … Fifteen percent of …[native vegetation types] are probably extinct and 78% threatened. Plains grassland and grassy woodland once covered three quarters of the subregion. Today only approximately 1% remains and much of this is degraded." (p. 175)

"Native vegetation now covers around 28% of the Goldfields (Victorian Midlands) bioregion. …The condition of the threatened ecological vegetation classes is generally declining, and the condition of the majority of the box-ironbark vegetation is highly modified. Key threats include: Grazing…; Over-browsing by kangaroos and vegetation destruction and erosion by rabbits; Predation by foxes and cats; Timber and firewood harvesting…; Changed fire regimes; Changed hydrological cycles …; Mining and fossicking." (p. 181)

Birds as indicators

Relative abundance of introduced bird species is a measure of habitat alteration, which in turn has been related to changes in bird abundance and distribution. Highest abundance of introduced species is found in southern Victoria… making up to 15% of all birds recorded. In the rest of Victoria the figure is 3-8% (p72).

If birds used as indicator of ecosystem health (p 74+):

> "specialised surveys suggest that the decline may also be related to long-term declines in the health of many catchments. … decrease in reporting rate of several species with distributions centred on the uplands of south-eastern Australia. .. may have been caused by a general increase in minimum temperatures in south-eastern Australia, a trend most likely to first affect species from the highest altitudes."

Reduction in range of species, irreplacability and endemicity

Up to eight species in the pre-European fauna have contracted from more than 90% of the bioregions that they originally occupied (Map p87).

Moderate to high irreplacability concentrations occur on the western slopes of the Great Dividing Range from Cape York Peninsula to central Victoria. This correlates with the regions most extensively cleared, fragmented and salinised (p100, 104).

In Victoria, the Index of Endemicity (number of endemic species in a region, high value regions have more species and more endemic species) shows that the IBRA regions of SE Highlands, SE Coastal Plain, the SE Corner, the Victorian Midlands have an index of 1 – 1.4 (p106), the third highest level of endemism (there are four categories). This is similar rating to the Jarrah Forests of WA and Cape York Peninsula.

The Irreplacability Index (p107) measures the degree to which the species complement of a region can be substituted for by another region/s. It takes account of endemism and the diversity of species in a region. In Victoria, the regions of SE Highlands, SE Coastal Plain, the SE Corner, the Victorian Midlands all have high Irreplacability Indices. When only acacias and eucalypts are used some the SE Corner subregion also has a high rating.

If regions of high Irreplacability are compared to the the Landscape Stress classes (p109) in Victoria, then the Subregions of parts of Volcanic Plains, Coastal Plains, and the SE Corner show up (see map, p110, fig 7.7 if you can).

Attachment 2. Costs of environmental degradation, and dollar benefits of ecosystem services

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Summary:

Erosion: gross opportunity costs of water erosion across the agricultural zone of NSW is around $10 per ha pa (p.4, citing Walpole et al 1996).

Turbid water: annual costs of water turbidity are estimated at $28m, costs of eutrophication as $200m and costs of sedimentation $4m. Together these make about $230m pa (citing NLWRA).

Pollination and honey production: 80% of honey produced in Australia comes from native plants: the gross value of production of the apiary industry is about $60m pa (citing Gibbs and Muirhead 1998). Value to agriculture of paid plus unpaid pollination services of bees and native insects is about $1.2b pa (ibid). Honeybees largely depend on native vegetation for food while they carry out pollination on agricultural crops. Assume 80% of the $1.2b pa is due to either native pollinators or food provided to honeybees from native vegetation.

Tourism: Australians spend $17.2 b annually on tourism and international visitors spend a further $8.9b pa. If 20% of this involves a visit to a site of natural attraction, that is $6.6b pa (citing Bureau of Tourism Research 2002). In 2000-01 industry was worth $16b to Australia and was expected to be $30b by 2010.

Value of biodiversity can be measured by the community's willingness to pay for improvements in non-market aspects of biodiversity and has been estimated by choice modelling as: 8c/household for swimming and fishing for every 10km of degraded waterway that is restored ie $259,200/10km for all Australian households willing to pay; 7c/household for landscape aesthetics for every 10.000 ha of farmland rehabilitated ie $23 per ha. (citing NLWRA unpublished data).

Regional employment: For every 10,000 visitors to a regional National Park in NSW, some 4 to 7 local jobs are generated and regional business turnover is increased by some $130,000 to $270,000 (citing Gillespie 2000).

The repair bill for salinity and water logging due to removal of the vegetation that regulated groundwater flow: $20 – 65 billion over 10 years, depending on what aspects of salinity are included (p6).

Current investment in repair: $1.5billion pa in biodiversity and natural systems, $1.2 billion of it from govt.)

Annual costs to agriculture of lost production is around $1.2b, **and of environmental repair** is $2-6b and are already eating into annual production value of $25b (p7).

Attachment 3. Ecological processes critical to whole of landscape conservation

The WildCountry Science Council has identified seven ecological processes and connections that are critical to the implementation of whole of landscape conservation:

1. Species that have a major impact on the habitat in which they live.

2. Animals that migrate over long distances or spend different parts of their life in different places. A pelican in St Kilda will head north to Lake Eyre after a cyclone dumps water in the Lake's northern tributaries.

3. Natural disturbance regimes, such as fire, maintain diversity in many habitats.

4. Natural and human induced climate change affects species, their distributions, and their habitats. Refugia have been critical in colder and warmer periods in the past.

5. Hydroecology – the links between water, vegetation & wildlife, including water flows below and above ground.

6. Coastal zone fluxes are the transport of water and nutrients from inland to coastal ecosystems.

7. Long term evolutionary processes.

Attachment 4. Examples of large-scale restoration/protection programs in Australia

Title of project and scope	Organisation/ government agency leading the work	What or who is driving this work and what are some of the conceptual frameworks underpinning the work	Main sources of resources
GONDWANALINK Southwest WA initial focus for on ground protection and restoration to create connections between Fitzgerald R Nat Park and Stirling Ranges Nat Park. Long term to connect Jarrah Forests in se corner across Nullarbor to SA.	Bush Heritage Australia, TWS, Greening Aust (WA) and others.	Keith Bradby is key person who set up Gondwana Link organisation as a not-for-profit organisation. For first five years their priorities were driven by opportunities – where could partners buy properties, where could an area by protected, which landowners would revegetate. Now more tied into expert advice on priorities eg from the Wild Country Science Council. Strong engagement with Traditional Owners.	Many and varied but includes private donations, philanthropics, and prospective bio-carbon dollars and considerable landowner and community volunteer time.
Visionary Landscape Initiatives.	Greening Australia Limited (and state/territory affiliates)	Working with individuals, land managers, businesses and government, Greening Australia implements large-scale landscape initiatives across Australia. The best available science is utilised to identify actions to protect natural assets and address the sources of environmental degradation. Eg Gondwana Link, Habitat 141 and proposals soon for Melbourne metro to West Gippsland.	Governments, philanthropics, corporates, community volunteers, land owners.
Habitat 141	Greening Australia Victoria with partners including Trust for Nature, TWS and CMAs.	Driven by Horsham office of GAV Habitat 141 goes from south coast of Vic/SA into sw NSW and SA. Underpinned by the Wild Country scientists and others to determine targets, and The Nature Conservancy for Conservation Action Planning.	As above.
Conservation Management Networks Networks of landholders working in same region to restore biodiversity.	Trust for Nature	Run by Trust for Nature's regional staff with very participatory approach to landowners. Scientific basis, participatory/stakeholder, single or multiple EVC approach On ground outcome oriented.	State and federal govt dollars including NHT; private donations; land owner and community volunteer time.
Wild Country's approach is for very large scale	The Wilderness	Driven by The Wilderness Society in partnership with the Wild Country Science Council headed up by Prof Harry Recher and Prof Brendan Mackey.	Funds from ARC grants, private donations,

restoration; science based; partnership programs.	Society with partnerships in Gondwana Link; N Aust; Habitat 141.	Provides scientific expertise via the Council to partners working on very large scale restoration with emphasis on restoration of ecological processes eg migration, as the means to supporting all species,	philanthropics
Bookmark Biosphere Reserve Over 900,000 ha of private land.	Australian Landscape Trust	Stakeholder approach. Bookmark includes working sheep stations, orchards and vineyards (including Banrock Station) - all striving to implement 'best practice'. The Trust works within degraded landscapes targeted as high priority areas for remediation by the Australian government. The Trust partners with individuals in the resident communities who have sought the assistance of the Trust. The Trust collaborates with government in seeking to deliver practical demonstrations on the ground of effective applications of environmental policies.	Federal government; philanthropics especially Ian Potter Foundation; land owners; community volunteers.
East Gippsland/ Gippsland Lakes.	Australian Landscape Trust	The Trust also works in east Gippsland in an area subject to a range of environmental changes that are the result of unsustainable uses of natural resources. The Trust and members of the farming community are exploring areas of new knowledge required by farmers to manage better their resources in the pursuit of regional sustainability. The Trust has assumed responsibility for Strathfieldsaye Estate, an historic farm with manifestations of the environmental issues that characterise the farms of the region. In partnership with the farming community, the Trust is providing support for leaders who seek changes in farming practices that will enable their farms and ultimately the farms in the region to be more productive, more resilient and able to benefit from and contribute to essential ecosystem services.	Federal government; philanthropics especially Ian Potter Foundation; land owners; community volunteers.
Red Gum Plains Restoration Project based around the Strathfieldsaye Estate	Australian Landscape Trust	Restoration of the Red Gums Plains veg community via integration of sustainable resource management and production. ALT hopes to enhance these areas to provide a key component of a sustainable production system, seen as an important adjunct to a profitable farming enterprise. ALT's partnerships with CSIRO Entomology and Sustainable Ecosystems, Gippsland Coastal Board, Chicago Zoological Society, and community members living on the Red Gum Plains, are based on building capacity to address environmental threats to the Lakes and the Plains which are inextricably linked with unsustainable agriculture.	
Heartlands: comprehensive research and implementation of farm mngt and reveg on broad scale in four catchments in MDBasin: 2001-05	CSIRO: Sustainable Ecosystems	The Heartlands initiative aims to design and achieve socially acceptable land use change in selected focus catchments and to monitor its effectiveness in alleviating environmental degradation. The initiative is focussed on identifying workable vegetation design strategies to effectively rehabilitate agricultural landscapes, solutions that integrate social and economic objectives for rural communities as well as environmental imperatives. In particular, it will address salinity, water quality, water yield, biodiversity, and carbon sequestration potential. The initiative will also provide verification of the revegetation strategies at catchment scale.	Governments, CMAs; land owners; community volunteers.
CMA wide view and often beyond	Vic CMAs	State govt agencies. Required to develop various regional strategies including catchment, native vegetation, invasives. Not much power to implement. Can have very good liaison	State govt funded, NHT funds for some programs

		with CMA 'environment community' and others eg Councils	and other various.
	Vic DPI - Rutherglen	Work done on outlining a framework for testing currently recommended practices against economic and environmental indicators, describing in measurable terms what a productive, sustainable landscape might look like including production, water flows, soil stability, nutrient discharge, salinity, soil acidity and biodiversity and demonstrates the beginnings of a science to guide future multi-objective farming systems in what might be termed 'sustainable landscapes'.	State govt funded
Project Hindmarsh	Hindmarsh Landcare Network	Series of projects that aim to protect and enhance existing vegetation and to restore vegetative 'Biolinks' between the Big Desert and Little Desert, while protecting soils and enhancing agric production.	NHT, Councils, lots of volunteers.
Bunyip Biolinks Plus	Bunyip Landcare Network	Project in early stages, community driven, building on achievements of last 5 years of major fencing off of remnants and plantings, with goal to deliver biodiversity health across the region.	NHT, Melbourne Water, own consultancies for reveg, Net Gain
WA Bush Forever		See national SoE 2001 p7 for urban bushland protection	WA Government
South Coast of sw WA: the region that runs from Walpole in the west, north to Broomehill and east of Esperance (a total of 5.4 million hectares)	South Coast Regional Initiative Planning Team (SCRIPT) Inc	An incorporated non-profit association owned and directed by the people of the South Coast Region of Western Australia and is strongly independent, benefiting from a high degree of volunteerism, which reflects the strong sense of ownership and commitment within its community. SCRIPT embodies a close working relationship between community and government agencies. Of note is the input from government agencies via their regional managers and involvement and commitment of community stakeholder groups. SCRIPT relies heavily on other key partners - the six SCRIPT subregional groups, LCDCs, farmers, tertiary institutions, environmental groups, Local Government, industry groups, non-government organisations, coastal and marine groups and Indigenous organisations. The South Coast NRM Region covers an area of more than 6 million hectares including hinterland, coastal and marine environments. This geographical area embodies a unique medley of landscapes, habitats and eco-systems, each with their own threats, opportunities and priorities. SCRIPT's significant recent achievement is the development of a $74 million Regional NRM Strategy and Investment Plan that has had strong stakeholder engagement in its development and that will deliver on ground actions to combat degradation issues afflicting the South Coast environment in an integrated multidisciplinary manner. This builds on SCRIPT's successful delivery of more than $40 million NRM funding since its inception through such initiatives as the Remnant Vegetation Protection Scheme (RVPS) - a State scheme that had stalled, which when devolved to the Region became oversubscribed.	C'ty tapping into govt funds eg NHT

Attachment 5. Victorian Biodiversity Initiative

See attached document