

**Conservation Council
of South Australia Inc**

Biodiversity in a Changing Climate

Draft Report

Conservation Council of South Australia Inc.
November 2008

The **Conservation Council of South Australia Inc (CCSA)** is the peak conservation body for South Australia, representing over 50 of the State's environment and conservation organisations. CCSA is an independent non-profit, non party-political, community based organisation which provides resources, advice and representation for the SA environment movement, and which leads many of the key conservation campaigns in SA. CCSA is also known for its success in developing long term community development, education, and on-ground environmental restoration programs.

CCSA regularly liaises with Local, State and Federal Governments, Government agencies, media, educational institutions, NGOs, unions, industry, business and other groups on matters relating to the environment and social justice. As a community organisation, much of what CCSA achieves is through a large network of skilled volunteers from all walks of life for its office, on-ground, governance and campaign activities.

The Conservation Council of South Australia Is committed to a healthy environment for South Australia.

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Message from the CEO

Biodiversity is the term we use to describe the amazing palette of plants, birds and animals that has evolved around us, right down to the molecular level. It is the food chain, the web of life.

As an island nation, Australia has a high proportion of species that occur nowhere else on earth. Within the large expanse of South Australia we have diverse ecosystems, from water-dependent swamps to our spectacular arid lands in the red centre, and everything in between. But we also have amongst the highest extinction rates in the world.

We are losing this genetic diversity, our natural heritage. Past practices, born of good intentions but imported from very different landscapes, have taken an enormous toll on our flora and fauna. We have lost huge swathes of habitat, which realistically will never be returned in their original form. Special remnant pockets exist, but they are often marooned by intensive development, both urban and rural.

It is not only our plants and animals that are at stake here. Our way of life and livelihoods depend on healthy, functional ecosystems. We only have to look to the decline of the Murray to see how much value an ecosystem adds to our economy.

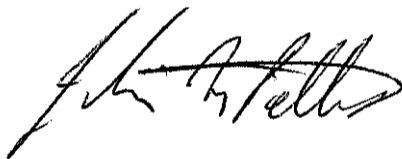
While we have learned a great deal from past mistakes and are trying to change our ways, new challenges have presented themselves. Our climate is changing at an unprecedented rate and the fragmentation of habitats means species do not always have the ability to move to cooler climes.

To prevent extinction rates escalating dramatically, we have to turn our attention to this situation urgently. We need to decide if we are willing to make substantial investments to protect our natural heritage, or if we would rather treat the landscape as nothing more than as a resource to exploit until it is depleted beyond repair.

At CCSA, we believe that we cannot afford the latter option. We must act now and we must act together. That is why we have undertaken this process to assess state environmental policy. We are looking for solutions and we need many minds turned to the task.

We welcome you to the fourth of our policy Summits, and look forward to hearing your ideas as we grapple with the challenges for Biodiversity in a Changing Climate.

Best wishes



Julie Pettett
CEO
Conservation Council of SA

Executive Summary

The Convention on Biological Diversity, an international agreement signed by 120 nations, including Australia, has defined biodiversity as:

...the variability among living organisms from all sources, including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species [genetic], between species and of ecosystems¹.

On a global scale species extinction rates have increased by 1,000 times over background rates, dramatically impacting genetic diversity. Studies have estimated that 10-30% of the world's mammal, bird and amphibian species are now threatened with extinction². The Millennium Ecosystem Assessment also chillingly concludes that unless we take action to mitigate current rates of decline in ecosystem services, the costs to society will be substantial³.

South Australia's biodiversity is declining at an alarming rate. It has been suggested by scientists that it will take many millions of years for biodiversity to recover from the impacts of humans over the last 200 years. In South Australia the key threat to biodiversity is land clearance; clearance of remnant native vegetation and subsequent fragmentation of habitat for native fauna species. Other key threats to biodiversity in South Australia include⁴:

- Habitat fragmentation from development
- Competition from introduced flora
- Predation by introduced animals
- Direct competition for food, shelter and resources from introduced fauna
- Introduced diseases
- Collection of firewood from remnant vegetation
- Altered fire regimes
- Inappropriate grazing/overgrazing
- Inappropriate management activities
- Water extraction/pollution
- Climate change – including increasing oceanic temperatures and acidification

Much of South Australia's economy is based on the use of biological resources and the need to maintain ecosystem services. This includes activities such as tourism and recreation, nature conservation, pastoralism, agriculture, horticulture, and forestry which all benefit from healthy ecosystems.

¹ United Nations (2000) *Convention on Biological Diversity*, Accessed online 29 September 2008
<<http://www.cbd.int/convention/convention.shtml>>

² Earthwatch Institute, World Resources Institute, World Business Council for Sustainable Development and World Conservation Union (2006) *Business and Ecosystems*, Atar Roto Presse SA, Switzerland

³ World Conservation Union (2005) *Depend on Nature: Ecosystems Systems Support Human Livelihoods*, The World Conservation Union, Switzerland

⁴ SA Urban Forest Biodiversity Program (2000) *Conserving Adelaide's Biodiversity*, accessed online 2 October 2008
<<http://www.backyards4wildlife.com.au/>>

Our primary production systems require biodiversity for pest control/management, soil conservation, enhanced productivity and stabilisation, pollination, salinity amelioration, and water purification⁵.

To address and reverse current biodiversity trends our society must recognise, understand and value biodiversity. Land managers, indigenous communities, local industries, government and the broader community may value biodiversity in different ways, however conservation and effective management of biodiversity is essential to ensure the continuation of these values for future generations.

Biodiversity values may include⁶:

- Production value for the provision of food, medicines, clothing and building materials consumed by society
- Ecosystem services for the maintenance of ecosystem services (natural storing and cycling of nutrients, stabilising soil formation, protection of water resources and breakdown of pollution), and maintenance of biodiversity
- Socio-economic value for recreation, research, education and monitoring, and cultural values
- Future value to maintain the capacity to identify future direct or indirect utilitarian value

The South Australian government has recognised the significance of biodiversity through integrated approaches such as the National Strategy for the Conservation of Australia's Biological Diversity, a joint initiative of the Commonwealth and State and Territory governments. This strategy supports other intergovernmental agreements, such as the National Strategy for Ecologically Sustainable Development, the National Greenhouse Strategy, the National Forest Policy Statement, the Decade of Landcare Plan, the Wetlands Policy of the Commonwealth Government of Australia, the Inter-Governmental Agreement on the Environment, the Natural Heritage Trust Partnership Agreements and the National Framework for the Management and Monitoring of Australia's Native Vegetation⁷. The South Australian government has also implemented its own biodiversity focused strategies including No Species Loss, NatureLinks, Tackling Climate Change, and the State Strategic Plan. Regional biodiversity plans are being facilitated to assist in the management and rehabilitation of natural habitats throughout regions of the state.

However, despite the government's recognition of biodiversity as a serious issue, South Australia's biodiversity continues to decline at an alarming rate. Actions for conservation, management and awareness raising must be backed by political will and be targeted and supported financially⁸.

⁵ Department for Environment and Heritage (2007) *No Species Loss Strategy: A Nature Conservation Strategy for South Australia 2007-2017*, Government of South Australia, Adelaide

⁶ SA Urban Forest Biodiversity Program (2000) *Conserving Adelaide's Biodiversity*, accessed online 2 October 2008 <<http://www.backyards4wildlife.com.au/>>

⁷ Department of the Environment, Sport and Territories (1996) *National Strategy for the Conservation of Australia's Biodiversity*, Commonwealth Government of Australia, Canberra

⁸ World Conservation Union (2005) *Depend on Nature: Ecosystems Support Human Livelihoods*, The World Conservation Union, Switzerland

Investing in biodiversity is essential to maintaining ecosystems services and in turn to provide dividends to human health and wellbeing. Policies and regulations must ensure all stakeholders are accountable for their environmental footprint and role in implementing change for the future protection of our state's biodiversity. The aim of this report is to provide policy recommendations to increase the effectiveness of biodiversity conservation in South Australia's changing climate.

To clarify our position and recommendations the report is divided into the following three sections:

1. The Current State of Biodiversity in South Australia;
2. What Are We Doing to Protect Biodiversity?; and
3. What Tools Do We Need in the Future for Biodiversity Conservation?

Summary of Recommendations

Current Native Vegetation Management

1. Integrated pest/weed management programs and the management of abundant native species require further investment, both on and off reserve.
2. Referrals for native vegetation clearance need to be made relevant to DEH branches to help strengthen formal ties with the Native Vegetation Council.
3. The Native Vegetation Program continues to be under-resourced. Existing levels of resourcing are inadequate to provide for compliance audits to ensure offsetting activities are being undertaken, or for the necessary monitoring and evaluation of offsets to ensure benefits are being achieved.

Habitat Degradation

4. Fire management needs to be planned at a landscape scale (both reserve and off-reserve), based on the precautionary principle and good science and must prioritise the maintenance of natural biodiversity protection.

Threatened Species

5. The *No Species Loss* Strategy needs to be supported by (the State Biodiversity Act) to ensure that targets are set and objectives are met. These should also be included in the State Strategic Plan.

Forests

6. South Australian forestry management practise, legislation, regulation and administrative arrangements (permits) need to better take into account the use of natural resources (specifically water resources) and the conservation of biological diversity.
7. There is a need to provide private forest owners with technical advice about improved ways of managing for the conservation of biological diversity and offer incentives to promote conservation activities, including rehabilitation programs.
8. There is a need to review agroforestry's impact on indigenous environments due to including groundwater drawdown through water affecting activities, and encourage the use of indigenous species over exotic species.

Wetlands

9. The assessment of wetlands and other water-dependant ecosystems in Water Allocation Plans needs to be monitored carefully in the first few years of the program. This will require sufficient resources for R&D research, monitoring and evaluation..
10. Wetland services to an area need to be evaluated in the context of the regional impact of clearance and development. This could include:
 - nutrient and carbon cycling
 - substrate stabilisation
 - contribution to flood mitigation and aquifer storage & re-charge

11. Given the problem of land availability within the Adelaide metropolitan region, we should:
 - increase the use of wetland areas in small to medium green strips. These could include small parklands and sports fields. These would encourage a greater appreciation of biodiversity in local areas
 - introduce, where possible, area-specific flora within created wetlands to assist in encouraging back our native fauna etc.

Wildlife Utilisation and Take

12. There is a need to ensure that native vegetation protection intersects development and planning processes at an inter-agency, whole of government scale by promoting its proper and early consideration in relevant policy and legislation.
13. The State Biodiversity Conservation Act must be established following a review of other relevant legislation and all matters relating to biodiversity management incorporated into the one Act that provides guidance to other Acts engaged in supporting biodiversity conservation – the NPW Act, the WP Act, the NRM Act, the Native Vegetation Act are examples.

National Parks and Wildlife Act

14. The provisions relating to conservation of plants and native animals and threatened species should be included in the State Biodiversity Conservation Act and updated in line with legislation in other Australian jurisdictions to give legislative backing to planning measures such as threat abatement plans, as in the EPBC Act (C'wth) or the Threatened Species Conservation Act (NSW).
15. The statutory protection of game reserves should be increased, including higher penalties for breaches. It is preferable that State Game Reserves be re-proclaimed as Conservation Parks.

Wilderness Protection Act

16. The Wilderness Protection Act needs greater implementation. The nature of and difference between wilderness protection areas and wilderness protection zones needs to be made clearer (it is not spelt out in the Act).

Native Vegetation Act

17. The many exemptions to the Native Vegetation Act should be streamlined, particularly as they relate to subdivision.
18. The Native Vegetation Act urgently requires stronger regulations and management, not the opposite, which has been the trend for the last 5 years.
19. The Native Vegetation Program continues to be under resourced. Existing levels of resourcing are inadequate to provide for compliance audits to ensure offsetting activities are being undertaken, or for the necessary monitoring and evaluation of offsets to ensure benefits are being achieved.
20. There needs to be an expansion of third party appeal and enforcement rights, and a review of the credit system.

Environment Protection and Biodiversity Conservation Act

21. The open nomination and listing process should be reinstated.
22. The Environment Protection and Biodiversity Conservation Act needs to deal more effectively with outstanding nominations, and strengthen critical habitat provisions and recovery planning.

Natural Resource Management Act

23. The Natural Resource Management Act needs biodiversity management guidelines to be developed to provide guidance on the management and protection of natural resources as required under the general statutory duty.

State Strategic Plan

24. The SA Strategic Plan needs to demonstrate why its population growth targets will benefit sustainability in general, and biodiversity protection in particular.

NatureLinks

25. The scale of the restoration task ahead needs greater recognition, eg 30% minimum for bioregions if we are to keep our landscapes functioning.
26. Specific partnerships need to be developed with relevant environmental NGO's and NRM Boards to implement Nature-links.

Heritage Agreement Grant Scheme

27. The Heritage Agreement Scheme needs to be amended to accommodate biodiversity management stewardship incentives to help progress biodiversity corridors between protected reserves.

Protected Areas

28. There needs to be an increase in the amount/area of the reserve system protected from the impacts of mining exploration and production.
29. We need to increase investment for protected areas/reserves acquisition to achieve CARRS (20% of terrestrial and marine ecosystems) and management and subsequently increase the health of habitat in reserves.
30. The Classification Review for Protected Areas needs to be completed with appropriate public consultation.
31. The NPW Act needs review in the context of a State Biodiversity Act and to refocus on protected area management as habitat for native species.

Wildlife Corridors

32. The State and Federal Governments need to invest strategically in the concept of 'stewardship' and other forms of incentives for farmers/landholders in particular to participate in biodiversity conservation. As well as contributing to biodiversity management in wildlife corridors in landscape scale land planning, it offers an option for a struggling farmer to stay on the land.

Natural Resource Management

33. The State Government needs to better incorporate local government into the NRM process. They deliver many of the on-ground services that can enhance biodiversity conservation.
34. Greater priority needs to be placed on biodiversity outcomes in NRM Regional plans. This would require greater detail of data, targets and priorities, supported by increased resourcing.

Integration Beyond NRM

35. South Australia needs a comprehensive Biodiversity Act.

Research and Data

36. The current scientific and baseline data on biodiversity is poor, particularly in the marine environment. Resources need to be significantly increased to provide:
 - a greater understanding of what elements of the landscape are critical to provide ecosystem services
 - a better understanding of the management activities that need to be made available, including ecological restoration and implementing disturbance regimes
 - long-term ecological research and strategic monitoring of key biodiversity indicators.
37. There needs to be consistency of access to information between government agencies, as well as cooperative agreements of information sharing between government, NGOs and industry.
38. GIS technology provides the opportunity to record quality data on key areas of biodiversity that we have not had until recently. This area of government research needs to be significantly resourced.
39. The State Government needs to complete SA's Biological Survey program, in both the terrestrial and marine sectors.

Offsets and Incentives

40. The State Government needs to review the existing frameworks being implemented and discussed for biodiversity offsets, to deliver consistent biodiversity conservation outcomes. These could include using income from voluntary offsets to fund the expansion of WildCountry/NatureLinks corridors.
41. Bio-carbon- bio-planting and credits for biodiversity need to be explored for accreditation.

Aboriginal People

42. Given the extent of indigenous managed land within SA, and the largely high quality of its vegetation, communities there need to be more involved and better equipped in habitat and species protection. The State Government must expand the co-operative management program with Aboriginal communities for protected areas.

Industry

43. Businesses, particularly corporate workers, need to be targeted in a biodiversity awareness campaign, to help them understand how to minimise risk to biodiversity and how to make a more positive contribution.

44. The environment sector needs to view business engagement as an opportunity to source investment in biodiversity.

State Government

45. The State Government needs to work with local government to:

- address the lack of urban environmental corridors. These could deliver increased biodiversity benefits, and help engage an urban populace as to the value of increased native vegetation in an urban environment
- use the opportunity to link South Australian waterways as biodiversity corridors.

Biodiversity Education

46. Education needs to extend beyond single aspects of biodiversity such as trees, to incorporate projects such as NatureLinks, which can demonstrate how those single aspects contribute to the bigger picture.

47. We need to mandate the knowledge, education and requirements of biodiversity conservation in school curriculums. Currently it is up to individual schools or passionate teachers to educate children about our local biodiversity.

Strengthening Capacity to Act

48. Public liability can be prohibitive for community groups engaging volunteers in their work. Government resourcing would make a big difference in this capacity.

Biodiversity in a Changing Climate

Climate change will have an impact on all aspects of life in South Australia. However impacts that are social and economic in nature, pertaining directly to the wellbeing of our species, tend to receive priority⁹. Thousands of Australia's native animals, birds and plants are facing extinction with nearly 3,000 unique natural habitats disappearing, taking more than 1,500 species with them. Failure to acknowledge the value of our natural systems has left us a legacy of environmental problems that ultimately affect our social and economic health very considerably.

Biodiversity (biological diversity) means the variety of all life forms, their genes, and the ecosystems they make up. Biodiversity is essential to the maintenance of life on Earth, and can provide some natural insurance against disease, climate change, fire and drought, and preserve the basic resources of many industries.

Climate change has been recognised as the increasingly prominent direct driver of ecosystem change¹⁰. Currently in South Australia we do not have the systems in place to protect our species and ecosystems from further dramatic decline caused by climate change¹¹. This is of concern to CCSA as climate change involves profound challenges. Climate change has the potential to fundamentally re-shape our social, environmental and economic landscapes- accelerating losses of biodiversity worldwide, changing productivity and growing zones of vegetation, causing sea level rise, and expanding the prevalence of pests and diseases¹².

⁹ Conservation Council of South Australia and The Wilderness Society (2006) *Comments on the Climate Change and Greenhouse Emissions Reduction Bill*, Submission to the Government of South Australia

¹⁰ Earthwatch Institute, World Resources Institute, World Business Council for Sustainable Development and World Conservation Union (2006) *Business and Ecosystems*, Atar Roto Presse SA, Switzerland

¹¹ Conservation Council of South Australia and The Wilderness Society (2006) *Comments on the Climate Change and Greenhouse Emissions Reduction Bill*, Submission to the Government of South Australia

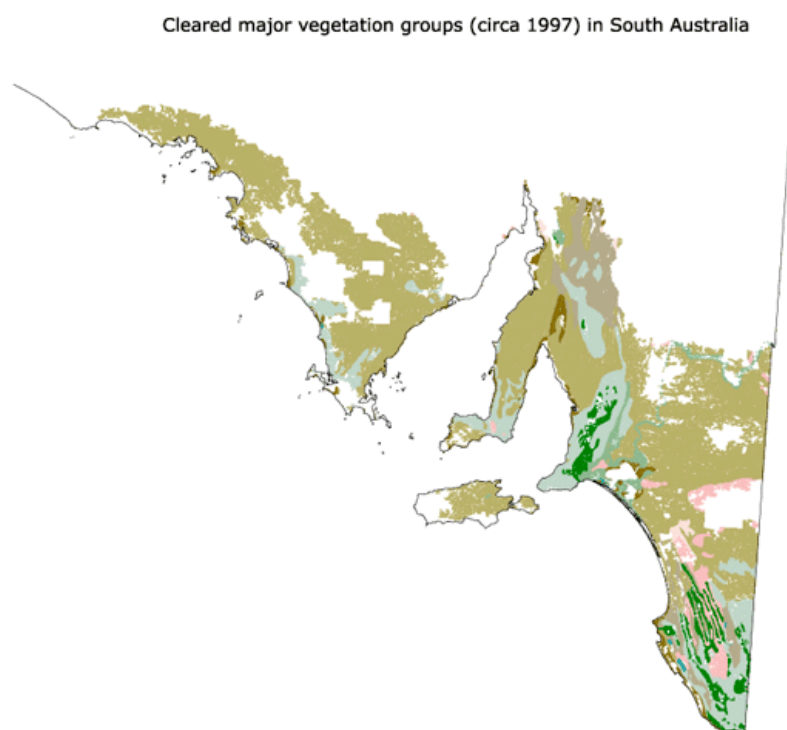
¹² Earthwatch Institute, World Resources Institute, World Business Council for Sustainable Development and World Conservation Union (2006) *Business and Ecosystems*, Atar Roto Presse SA, Switzerland

The Current State of Biodiversity in South Australia

Past Land Clearance

Land clearing has now been revealed as the greatest threat, past or present, to Australia's biodiversity. Clearing or altering landscapes for human use disrupts the function of natural ecosystems, and alters the availability and suitability of habitat for our native species. The loss of native vegetation in South Australia associated with land clearance, fragmentation and degradation is significant to biodiversity loss. Dr Adrian Stokes states more than 82% of the native vegetation that was present in South Australia's agricultural region when Europeans arrived has now been cleared¹³. Estimates suggest overall 11% or 10.4 million hectares of South Australia's native vegetation has been removed, with mallee woodlands and shrublands, eucalypt woodlands, acacia shrublands, hummock grasslands and eucalypt open forests being most affected¹⁴. Figure 1, below, exhibits the cleared major vegetation groups in South Australia prior to 1997.

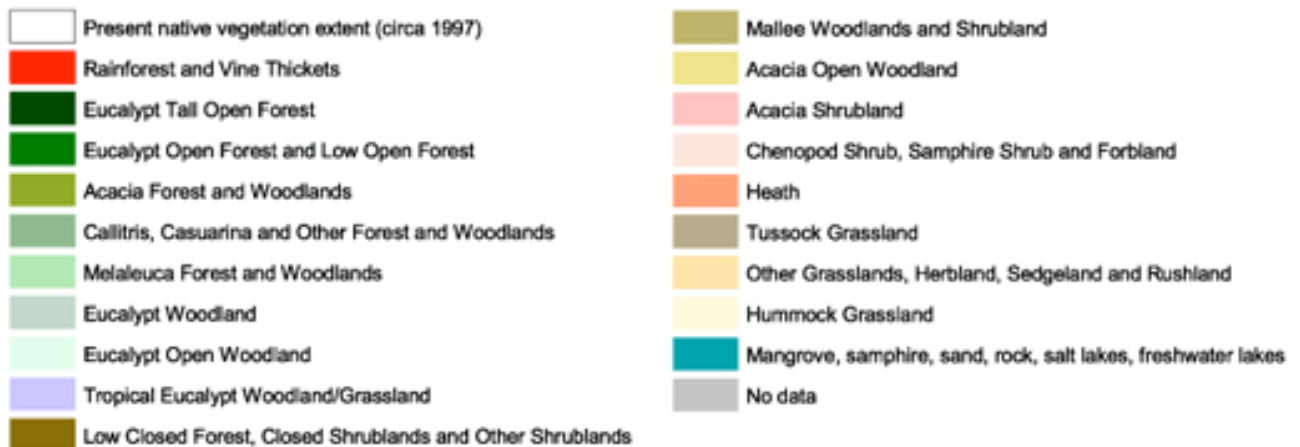
Figure 1: Cleared Major Vegetation Groups in South Australia, 1997



¹³ Stokes, A. (2002) 'The Impacts of Firewood Collection on Native Vegetation in South Australia', Paper presented at the conference *No Smoke Without Fire*, Hosted by the Conservation Council of South Australia, June 2002

¹⁴Kraehenbuehl, D. (2005) 'The Ecological History of Adelaide', in *Adelaide: Nature of a City*, edited by Christopher Daniels and Catherine Tait, BioCity: Centre for Urban Habitats, Adelaide; Rolls, E. C. (1999) 'Land of Grass: The Loss of Australia's Grasslands', *Australian Geographical Studies*, Vol 37: 3, November 1999

Cleared major vegetation groups (circa 1997)



Source: Department of the Environment, Water, Heritage and the Arts (2008) *Biodiversity and Vegetation- South Australia*, Australian Natural Resources Atlas, Accessed online 3rd October 2008
<<http://www.anra.gov.au/topics/vegetation/clearing/sa/index.html>>

Current Vegetation Management

Recognition of the importance of native vegetation for our state's ecosystems has seen broadscale vegetation clearance end due to legislative clearance controls¹⁵. Causes of native vegetation loss include:

- Land clearance for housing, industry, recreation and other development projects;
- Introduced exotic and non-local flora and fauna species;
- Human influence on natural fire frequency;
- Direct human activity for example cars and/or recreation;
- Vandalism of trees; and
- Firewood collection.

The Native Vegetation Council is the designated body that authorises native vegetation clearance applications from landholders and industry. Fragmented sections of vegetation remain an issue, however, with failure to place an economic value on native vegetation and many biological resources meaning that they fail to compete on a level playing field with damaging development projects directly causing of vegetation loss¹⁶. Placing an economic value on native vegetation and

¹⁵ Stokes, A. (2002) 'The Impacts of Firewood Collection on Native Vegetation in South Australia', Paper presented at the conference *No Smoke Without Fire*, Hosted by the Conservation Council of South Australia, June 2002

¹⁶ Department of Water, Land and Biodiversity Conservation (2005) *Guidelines For a Native Vegetation Significant Environmental Benefit Policy for the Clearance of Native Vegetation Associated with the Minerals and Petroleum Industry*, Government of South Australia, Adelaide

biodiversity is a challenge we need to overcome as currently their values defy easy description and quantification.

Continued loss of remnant native vegetation through clearance and attrition is unsustainable, presenting the single biggest threat to South Australia's biodiversity. It is important that remaining vegetation be managed sensitively to minimise ongoing degradation and loss of biodiversity. Recognition of the function of native vegetation, and its intrinsic, scientific, and educational value is critical to the future of our states natural ecosystems.

Recommendations

- 1) Integrated pest/weed management programs and management of abundant native species require further investment, both on and off reserve.
- 2) Referrals for native vegetation clearance need to be made relevant to DEH branches to help strengthen formal ties with the Native Vegetation Council.
- 3) The Native Vegetation Program continues to be under resourced. Existing levels of resourcing are inadequate to provide for compliance audits to ensure offsetting activities are being undertaken, or for the necessary monitoring and evaluation of offsets to ensure benefits are being achieved.

Habitat Degradation

Modification of habitats greatly changes the distribution of native species and has potential to lead to higher rates of extinction. In addition to the destruction of nesting sites, habitat loss can be influenced by other impacts of land clearance such as salinity or an increase weed and pest species¹⁷. Future projections for the rate of habitat loss over the next 50 years following current trends estimate that land use change will continue to be a major driver of ecosystem change, with habitat losses leading to global extinctions including a 10-15% reduction in plant species¹⁸. Key threats to habitat degradation in South Australia include those associated with fire, water, salinity, grazing, drought and pollution.

¹⁷ Australian Conservation Foundation (n.d.) *Australian Terrestrial Biodiversity Assessment 2002: Land Clearing*, Accessed online 13th October 2008 <http://www.acfonline.org.au/articles/news.asp?news_id=355>

¹⁸ Ibid.

Fire

Fire is a natural component of the South Australian environment and ecosystems. The Department of Environment and Heritage manages biodiversity values and ecosystem processes which are dependent on the maintenance of appropriate fire regimes. Concerns in fire management include the amount of landscape subject to adverse fire regimes; effects of extreme inter-fire intervals; decline or extinction of species; and fire frequency and intensity¹⁹. Habitat fragmentation, grazing pressure, diseases, weed invasion and a landscape shaped by fire over long periods of time make ecologically sensitive can make fire management a difficult technical task in South Australia²⁰. We need to include critical elements of habitat for fauna as well as flora in developing ecological fire management schemes.

Water

The health of rivers, streams and wetlands in South Australia are declining due to the increasing extraction of water for industrial, agricultural and domestic use²¹. Rivers, wetlands and streams support the biodiversity of unique communities of plants and animals that are not found elsewhere. Major causes of altered water flow patterns include: regulation (weirs, barrages, large dams/reservoirs) such as the series of Locks and Weirs along the River Murray and Barrages maintain highly stable weir pools as opposed to river habitat; farm dams which can have a large impact on seasonality by holding back or capturing runoff; instream works (dredging, modifications, road crossings) can lead to a rapid drop water levels, stranding eggs or juvenile stages and removing access to important types of habitat; and climate change which may lead to altered rainfall patterns and timing reducing the onset of flow and altering the timing and frequency of larger flow events for which biota might be unaccustomed to²².

Salinity

Australia's groundwater quality is declining with an increase in salinity. Groundwater is fundamental to maintaining hydrological flows in many of the State's creeks, rivers, wetlands and coastal waters, as well as providing irrigation water for horticulture, agriculture and viticulture and an invaluable drinking water supply to regions where there is little surface water run-off and effective storage sites are not available²³. Until European settlement this salt remained deep in the soil, below the root zone of native vegetation, however, since settlement large areas of native vegetation have been cleared for agriculture and replaced with shallow-rooted annual crops and pastures which have significantly disrupted the natural balance. On ground action

¹⁹ Developing ecological fire management

²⁰ Environment Protection Authority (2003) *The State of Our Environment: State of the Environment Report for South Australia 2003*, Government of South Australia, Adelaide

²¹ Ibid.

²² Department for Environment and Heritage (2007) *Draft Freshwater Fish Action Plan*, Native Fish Australia (S.A.) Inc., Adelaide

²³ Environment Protection Authority (2003) *The State of Our Environment: State of the Environment Report for South Australia 2003*, Government of South Australia, Adelaide

such as revegetation and drainage to intercept rising ground water is essential to limit increasing salinity in the future.

Grazing

Grazing has had a significant impact on biodiversity, with a large amount of native vegetation clearance in South Australia done to create pasture for grazing animals. Direct impacts of grazing on biodiversity include: erosion of riverbanks, elevated levels of nutrients into waterways, impacts of grazing native vegetation on habitat loss, weed invasion, and soil erosion²⁴. The simplest and most effective way of protecting remnant native vegetation is to fence it off from stock, however, this is not always feasible and in these instances other methods such as strategic grazing (considering timing, intensity and duration) can be used.

Drought

Drought is widely talked about in South Australia, with the impacts of current dry conditions effecting habitats of many native species. An example of the effects of drought is the Southern Bentwing Bat in Naracoorte. Dry conditions and freezing nights have reduced food sources and affected the bat species breeding²⁵. A lack of available surface water at present for wild animal populations is highlighting the importance of preserving wetlands and other key habitats for all species.

Pollution

Local pollution from industrial discharges and spills can introduce nutrients, pesticides, heavy metals and organic pollutants that may seriously degrade South Australia's ecosystems. Pollution is a significant threat through the disposal of treated wastewater and urban stormwater into waterways, seepage from septic tank systems, faecal contamination from grazing animals, disposal of excess irrigation drainage and illegal waste dumping²⁶. Pollution can significant impact ground water, surface water and the state's habitats, and needs to be incorporated into biodiversity management planning to limit effects on biodiversity.

The economic value of converted land is often far less than that of sustainably managed natural systems, which provide us with a far greater variety and quantity of services it is important we act to change the current projections. Controlling land clearing would be one of the most cost-efficient ways to protect Australia's biodiversity. Other interventions may include enhancing the efficacy of resource use and management; preventing pollution; encouraging the establishment and expansion of protected areas; reducing impacts over-grazing; and controlling the

²⁴ WetlandCare Australia (2008) *Ecologically Sustainable Grazing*, WetlandCare Australia, Ballina N.S.W

²⁵ Department for Environment and Heritage (2007) *Drought Impacts on Bats in Naracoorte Caves*, News Release 9 January 2007, Government of South Australia, Adelaide

²⁶ Environment Protection Authority (2003) *The State of Our Environment: State of the Environment Report for South Australia 2003*, Government of South Australia, Adelaide

spread of pests and weeds²⁷. The time lag between climate change and extinction provides us with a vital opportunity to invest in habitat restoration and to re-establish threatened wildlife populations²⁸. Revegetation and restoration projects are needed to increase habitats, but are more expensive and involve greater investment of resources than preventing clearing in the first place.

Recommendation

- 4) Fire management needs to be planned at a landscape scale (both reserve and off-reserve), based on the precautionary principle and good science and must prioritise the maintenance of natural biodiversity protection.

Threatened Species

The 2008 IUCN Red List of Threatened Species has revealed that 16,928 species across the globe are now threatened with extinction. Of these species 3,246 are critically endangered, the highest category of threat; 4,770 are endangered and 8,912 are vulnerable to extinction²⁹. South Australia's State of the Environment Report documents "1041 of the approximately 4350 species recorded in the State are listed as threatened at the State level: 785 plant, 88 mammal, 127 bird, 39 reptile and 2 amphibian species"³⁰.

European settlement in Australia has accelerated the rate of species loss and increased the number of threatened species. Since European settlement, the impact of vegetation clearance, introduced plants and animals, and unnatural fire regimes, have resulted in the fragmentation and degradation of ecosystems across South Australia. Currently there are over 300 plant species in South Australia that are listed as threatened³¹. In total about one-quarter (over 1000 species) of all terrestrial flora and fauna in our State are considered to be threatened – 63% of the State's mammals and 22% of the State's vascular plants are formally listed as threatened at the State level under the National Parks and Wildlife Act, 1972³².

The IUN has confirmed an extinction crisis with one in four species of mammals at risk of extinction³³. However, research has shown that conservation can bring species

²⁷ Ibid; Australian Conservation Foundation (n.d.) *Australian Terrestrial Biodiversity Assessment 2002: Our species in peril*, Accessed online 13th October 2008 <http://www.acfonline.org.au/articles/news.asp?news_id=329>

²⁸ Earthwatch Institute, World Resources Institute, World Business Council for Sustainable Development and World Conservation Union (2006) *Business and Ecosystems*, Atar Roto Presse SA, Switzerland

²⁹ World Conservation Union (2008) *IUCN Red List of Threatened Species*, Press Release from the World Conservation Union, Switzerland

³⁰ Environment Protection Authority (2003) *The State of Our Environment: State of the Environment Report for South Australia 2003*, Government of South Australia, Adelaide

³¹ Department of Environment and Heritage (2008) *Threatened Flora*, Accessed online 2nd October 2008 <http://www.environment.sa.gov.au/biodiversity/threatened.html#threatened_flora>

³² Department for Environment and Heritage (2007) *No Species Loss Strategy: A Nature Conservation Strategy for South Australia 2007-2017*, Government of South Australia, Adelaide

³³ World Conservation Union (2008) *IUCN Red List of Threatened Species*, Press Release from the World Conservation Union, Switzerland

back from the brink of extinction. As environmental managers we must prioritise which elements of biodiversity require attention first to maximise effectiveness of often scarce funds³⁴. Dr Jane Smart, Head of IUCN's Species Programme states "We now know what species are threatened, what the threats are and where we have no more excuses to watch from the sidelines"³⁵.

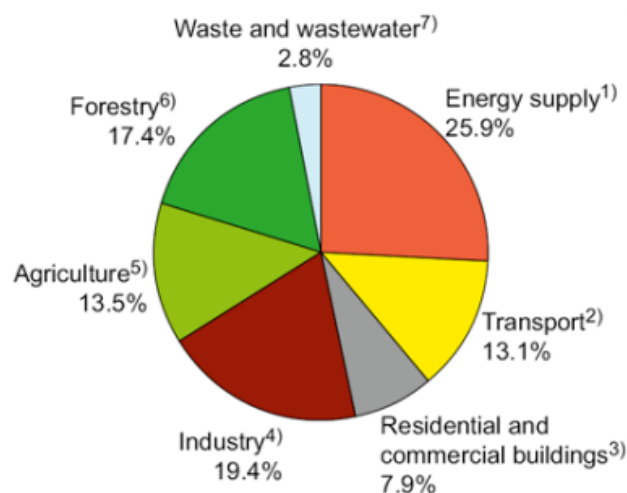
Recommendation

- 5) The *No Species Loss Strategy* needs to be supported by (the State Biodiversity Act) to ensure that targets are set and objectives are met. These should also be included in the State Strategic Plan.

Forests

Natural forests provide many ecosystem services such as diverse habitat for species, species and genetic richness, and carbon storage that may help to regulate the strength of the greenhouse effect³⁶. Natural forests are more resilient than plantations because of their genetic, taxonomic and functional biodiversity³⁷. Deforestation and forest degradation from the removal of natural forests have been recognised as increasing greenhouse emissions that are contributing to the climate change problem (See figure 2).

Figure 2: Global Greenhouse Emissions from Different Sectors, 2004



Source: Intergovernmental Panel on Climate Change (2007) *Climate Change 2007: Synthesis Report*, Accessed online 5th October 2008 <http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf>

³⁴ World Conservation Union (2007) *Identification and Gap Analysis of Key Biodiversity Areas: Targets for Comprehensive Protected Area Systems*, IUCN, Switzerland

³⁵ World Conservation Union (2008) *IUCN Red List of Threatened Species*, Press Release from the World Conservation Union, Switzerland

³⁶ Mackey, B., Keith, H., Berry, S. and Lindenmayer, D. (2008) *Green Carbon: The Role of Natural Forests in Carbon Storage*, Australian National University E Press, Canberra

³⁷ Department of Climate Change (2008) *Carbon Pollution Reduction Scheme Green Paper*, Commonwealth of Australia, Canberra

In South Australia ForestrySA manages 1 125,000 hectares of land, of which 95,000 hectares are planted mostly with pine³⁸. One unique aspect of the forestry industry in South Australia is that ForestrySA manages natural forests for conservation not to be harvested, in addition to commercial plantations³⁹. The concept of ecologically sustainable forestry incorporates biodiversity conservation in its aim to limit the negative environmental effects of the forestry industry. In 1992 the Native Vegetation Council and ForestrySA agreed to a process for the vegetation zoning of forest reserves, creating three management zones⁴⁰:

1. *General Forestry Zones*: includes commercial plantations and other plantings and land uses related to commercial timber production. These areas are exempt from the requirements of the *Native Vegetation Act 1991*.
2. *Conservation Zones*: contain areas of remnant and regenerating native vegetation managed for conservation purposes. These zones are protected under the *Native Vegetation Act 1991* and remain protected for conservation purposes in perpetuity.
3. *Transition Zones*: contain both commercial and non-commercial pine trees, sometimes in significant numbers, as well as native vegetation. These zones are managed to increase their conservation values through the removal of the remaining pines; through weed control to encourage regeneration of native plant species and sometimes additional revegetation with tubestock plants.

Yet, while ForestrySA has recognised the need for ecologically sustainable forestry, there is a need to reconsider forests in a climate change context. Temperate ecosystems such as South Australia's natural forests have higher carbon value, slower decomposition, higher wood density, and have been greatly underestimated in overall value⁴¹. The 'green carbon' of our natural forests is significant, and the standing stock of carbon that currently exists should be protected from carbon emitting land-use activities. Challenges to overcome in valuing the green carbon of our natural forests include:

- Lack of recognition of the value of different forms of carbon and their function;
- Most allometric models to measure carbon only measure trees when they are young in plantations, making it difficult to transfer this data to measure the carbon of old trees in natural forests;
- Collaborating carbon-accounting models with the appropriate ecological field and data in order to generate reliable estimates for natural forests; and
- Increasing the role of green carbon accounting and protection of the natural forests in solving climate change associated problems.

³⁸ Government of South Australia (n.d.) *Draft South Australian Action Plan for Firewood Collection and Use*, Government of South Australia, Adelaide

³⁹ Ibid.

⁴⁰ Northern forests draft management plan

⁴¹ Mackey, B., Keith, H., Berry, S. and Lindenmayer, D (2008) *Green Carbon: The Role of Natural Forests in Carbon Storage*, Australian National University E Press, Canberra

Recommendations

- 6) South Australian forestry management practise, legislation, regulation and administrative arrangements (permits) need to better take into account the use of natural resources (specifically water resources) and the conservation of biological diversity.
- 7) There is a need to provide private forest owners with technical advice about improved ways of managing for the conservation of biological diversity and offer incentives to promote conservation activities, including rehabilitation programs.
- 8) There is a need to review agroforestry's impact on indigenous environments due to groundwater drawdown, and encourage the use of indigenous species over exotic species.

Wetlands

Wetlands are among the most imperilled of all ecosystems across the planet, being disproportionately removed from our landscapes and acutely affected by other human induced threatening processes. In SA, wetlands are managed under the NV Act, DWLBC Water Allocation Planning and Water Licensing, and some under the EPBC Act. In the short term, what is required is a recognition that we need to lose no more wetland area and no form of offsetting has been shown to be as cost efficient or actually functional as retaining and improving existing systems. In the long term, existing wetlands provide ideal starting points for large-scale habitat restoration, and we therefore need to be buffering and connecting these remnant areas.

The International Convention on Wetlands defines a wetland is an area of "marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres"⁴². Wetlands provide important ecosystem services including: improving water quality; reducing the impact of storms, floods and droughts; providing habitat and nesting sites for birds, mammals, reptiles, amphibians, fish and invertebrate species; providing natural long-term storage of carbon; and stabilising local climatic conditions.

In South Australia we have already lost 70% of our natural wetlands. It is therefore vitally important to implement sustainable management practices focused on the conservation and restoration of remaining wetlands. The City of Salisbury in Adelaide has numerous wetlands within its area managed as part of a vision to improve biodiversity and increase community education. Examples such as this should be adopted by local government councils across South Australia, contributing to regional biodiversity with support from the state government.

⁴² Department for Environment and Heritage (2008) *Wetlands*, Accessed online 8 October 2008
<<http://www.environment.sa.gov.au/biodiversity/wetlands.html>>

Recommendations

- 9) The assessment of wetlands and other water-dependant ecosystems in Water Allocation Plans needs to be monitored carefully in the first few years of the program. This will require sufficient resources for R&D research, monitoring and evaluation
- 10) Wetland services to an area need to be evaluated in the context of clearance and development. This could include:
 - nutrient and carbon cycling
 - substrate stabilisation
 - contribution to flood mitigation and aquifer storage & re-charge.
- 11) Given the problem of land availability within the Adelaide metropolitan region, we should:
 - increase the use of wetland areas in small to medium green strips. These could include small parklands and sports fields. These would encourage a greater appreciation of biodiversity in local areas
 - introduce, where possible, area-specific flora within created wetlands to assist in encouraging back our native fauna etc.

Introduced and Abundant Pests

Introduced flora and fauna species can have a significant impact on biodiversity, competing with native species for space, light, food, water, nutrients, nesting sites, and by over-grazing native vegetation. Some native plant and animal species also become pests if they are introduced to areas beyond their natural range. These are often species which have generally been advantaged by European settlement and associated changes including increased availability of water and reduced predation⁴³. Corellas and cockatoos are abundant pest species in South Australia through activities such as defoliating red gums, damaging installations covering grain bunkers, eating seed from crops, and creating a noise nuisance⁴⁴.

There is a need for control measures to have considered specific conservation outcomes to be undertaken over time and to be accompanied by habitat restoration outcomes⁴⁵. Currently the Department for Environment and Heritage (DEH) provides a permit system to allow individuals to destroy or remove animals that are causing, or are likely to cause, damage to the environment, crops, stock or other property with consideration of the National Parks and Wildlife Act 1972 and Animal Welfare Act 1985. Pest control in South Australia must aim to reduce and maintain

⁴³ Department for Environment and Heritage (2008) *The Kangaroo Conservation and Management Plan for South Australia 2008-2012*, Government of South Australia, Adelaide

⁴⁴ Department for Environment and Heritage (2008) *Wildlife in Conflict*, accessed online 9th October 2008 <<http://www.environment.sa.gov.au/animalwelfare/wild/conflict.html>>

⁴⁵ Environment Protection Authority (2003) *The State of Our Environment: State of the Environment Report for South Australia 2003*, Government of South Australia, Adelaide

pest density at levels where the benefits for specific conservation goals are maximised in comparison to the costs of control. Research has shown pest control is most effective when it is conservation outcome-focused⁴⁶. This means that management actions are aimed at reducing the impact of pests, rather than simply reducing pest density.

Wildlife Utilisation and Take

Development

Biological resources provide the basis for many of the industries we rely upon for the state's economy. This includes raw materials for pharmaceutical and food industries; open space and resources such as pollination for agriculture; natural pest and disease control; cultural wildlife used for recreation and in the tourism industry; raw materials extracted in mining and used for social and industrial uses; and the use of biological resources in new biotechnology industries which are developing new products⁴⁷. Because we rely upon healthy ecosystems for these industries it is important to adequately avoid or minimise the impacts of operations on biodiversity threats and risks that can materially affect business's operations⁴⁸. Risks and impacts to business for failing to adequately manage biodiversity issues may include⁴⁹:

- Increased regulation and liability to prosecution;
- Increased rehabilitation, remediation and closure costs;
- Social risks and pressure from surrounding communities, civil society and shareholders;
- Restricted access to raw materials (including access to land, both the initial stages of project development and for ongoing exploration to extend the lifetime of existing projects); and
- Restricted access to finance and insurance.

Sustainable development refers to the concept of 'needs', but limitations imposed by the state of technology and social organizations on the environment's ability to meet present and future needs are also a central concern⁵⁰. Currently in South Australia many sectors of the agriculture industry remain unsustainable. Agriculture has had a significant impact on biodiversity. Serious environmental problems including surface and ground water pollution, soil degradation and erosion, salinity and an overuse of chemicals as a result of unsustainable agricultural practices can all contribute to rapid loss of biodiversity.

⁴⁶ Ibid.

⁴⁷ Earthwatch Institute, World Resources Institute, World Business Council for Sustainable Development and World Conservation Union (2006) *Business and Ecosystems*, Atar Roto Presse SA, Switzerland

⁴⁸ Department of Industry Tourism and Resources (2007) *Biodiversity Management: Leading Practice Sustainable Development Program for the Mining Industry*, Commonwealth of Australia, Canberra

⁴⁹ Ibid.

⁵⁰ Sharma, S. and Rudd, A. (2003) 'On the Path to Sustainability: Integrating Social Dimensions into the Research and Practice of Environmental Management', *Business Strategy and the Environment*, Vol 12

It can be difficult for industries to see the benefits of sustainable practices as priorities, time scales and jargon between business and conservation can greatly vary. Industry awareness of their reliance on biodiversity and the mutual benefits that can be attained through sustainable practices is essential. Law enforcement and implementation of sustainable business operations need to be more stringent to ensure compliance⁵¹. The Earthwatch Institute et al. state that "a combination of increased rewards for conservation, increased penalties for biodiversity loss and increased information on the biodiversity performance of business will help to create a biodiversity-friendly economy"⁵². Proactive and forward looking approaches to the management of biodiversity in business plans are essential for leading practice in sustainable development⁵³.

Freshwater Fisheries

Catch and use of freshwater fish occurs for a variety of purposes including⁵⁴:

- Recreation;
- Commercial use;
- Cultural reasons;
- Research;
- Biodiversity enhancement projects (e.g. collecting fish for stocking wetlands); and
- Personal enjoyment or observation such as keeping native fish in aquariums.

Many of these uses can increase awareness and knowledge of the value of native fish. However, the inappropriate or excessive use of native fish populations could provide an additional stress to threatened species and those with temporarily restricted distributions. Reduced abundance and changes in ecosystem food chains as a direct result of freshwater can have significant impacts on South Australia's biodiversity. Efforts to understand and conserve native fish species have often fallen behind that of other fauna species, and research is needed to address this gap. Management of freshwater fisheries must be done in sustainable manner while recognising the social, economic and recreational value of the fishery. One potential way of achieving this is to provide fishing free refuges within freshwater

⁵¹ World Conservation Union (2007) *Learning to Live on Planet Earth: National Conference on Education or Sustainable Development*, March 20-21, 2007, IUCN, Switzerland

⁵² Earthwatch Institute, World Resources Institute, World Business Council for Sustainable Development and World Conservation Union (2006) *Business and Ecosystems*, Atar Roto Presse SA, Switzerland

⁵³ Department of Industry Tourism and Resources (2007) *Biodiversity Management: Leading Practice Sustainable Development Program for the Mining Industry*, Commonwealth of Australia, Canberra

⁵⁴ Department for Environment and Heritage (2007) *Draft Freshwater Fish Action Plan*, Native Fish Australia (S.A.) Inc., Adelaide

ecosystems, to protect breeding stock and promote safe handling of large fish by anglers and researchers⁵⁵.

Firewood

Firewood collection has impacted the South Australian environment from the physical destruction of habitats and native vegetation by wood cutting and wood collection, to the air quality, emission and health impacts of burning the wood⁵⁶. There are two serious problems associated with firewood use: ecological damage through inappropriate firewood collection; and decreased urban air quality through poor combustion of firewood⁵⁷. Unfortunately the most preferred firewood is also often the preferred habitat for many wildlife species. Fallen timber provides refuge, forage substrate and homes for many fauna species, while dead branches and dead trees provide perches, nesting hollows and habitat for birds, mammals, amphibians, reptiles and invertebrates. If certain components of the ecosystem are removed, such as fallen timber, it may cause a sequence of events affecting the whole system leading to impacts on the functioning of the ecosystem. While state legislation has been effective in controlling the harvesting of live native vegetation, there are currently no controls on the collection of dead timber on privately owned land.

In South Australia firewood collection has been linked to decline and loss of woodland bird species including South-eastern Red-tailed Black Cockatoo (endangered), Regent Parrot (vulnerable), Swift Parrot (endangered), and Regent Honeyeater (endangered). Other species likely to be effected by firewood collection include the Little Pied Bat, Greater Long-eared Bat, Carpet Python (Vulnerable) and the Yellow-bellied Sheath-tail Bat (Rare)⁵⁸. Activities that need to be addressed and better managed include the collection of fallen timber, removal of dead branches and hollow logs on live trees, and the cutting of standing dead trees. The firewood industry in South Australia is not currently sustainable. Management guidelines need to be developed to ensure the conservation of biodiversity and the maintenance of essential habitats for significant species. In creating management guidelines for firewood collection it is also important to consider problems that may arise such as financial hardship for those relying on low cost fuel for heating, loss of jobs, and increased greenhouse gas emissions⁵⁹.

⁵⁵ Ibid.

⁵⁶ Government of South Australia (n.d.) *Draft South Australian Action Plan for Firewood Collection and Use*, Government of South Australia, Adelaide

⁵⁷ Stokes, A. (2002) 'The Impacts of Firewood Collection on Native Vegetation in South Australia', Paper presented at the conference *No Smoke Without Fire*, Hosted by the Conservation Council of South Australia, June 2002

⁵⁸ Government of South Australia (n.d.) *Draft South Australian Action Plan for Firewood Collection and Use*, Government of South Australia, Adelaide

⁵⁹ Stokes, A. (2002) 'The Impacts of Firewood Collection on Native Vegetation in South Australia', Paper presented at the conference *No Smoke Without Fire*, Hosted by the Conservation Council of South Australia, June 2002

Recommendations

- 12) There is a need to ensure that native vegetation protection intersects development and planning processes at an inter-agency, whole of government scale by promoting its proper and early consideration in relevant policy and legislation.
- 13) The State Biodiversity Conservation Act must be established following a review of other relevant legislation and all matters relating to biodiversity management incorporated into the one Act that provides guidance to other Acts engaged in supporting biodiversity conservation – the NPW Act, the WP Act, the NRM Act, the Native Vegetation Act are examples.

What Are We Doing to Protect Biodiversity?

Summary of Legislation Relating to Biodiversity in South Australia

For more detail on the following summarised legislation please refer to Appendix One.

National Parks and Wildlife Act 1972

The NP&W Act is the 'mainline' legislation relating to protection of biodiversity in S.A. The Act is in two main parts, one dealing with creation of reserves; the other relating to provisions which deal directly with the conservation of native plants and animals. At a statutory level, the latter part is recognised as being very much out of date compared with biodiversity legislation in other jurisdictions, although administrative initiatives make up for this to some extent.

Recommendations

- 14) The provisions relating to conservation of plants and native animals should be updated in line with legislation in other Australian jurisdictions to give legislative backing to planning measures such as threat abatement plans, as in the EPBC Act (Cwth) or the Threatened Species Conservation Act (NSW).
- 15) The statutory protection of game reserves should be increased, including higher penalties for breaches. It is preferable that State Game Reserves be re-proclaimed as Conservation Parks.

Wilderness Protection Act 1992

The Act was established in 1992 for the protection of the wilderness and to aid in the restoration of land to its pre-colonial state in terms of biodiversity. Wilderness unlike a national park is an area of land in a state that has had a relatively little intrusion by humans, human activity or exotic plants and animals.

The Act allows for the establishment wilderness protection areas and wilderness protection zones. Under section 22 the Governor can proclaim a reserve, part of a reserve or any other Crown land or piece of land a wilderness protection area or a wilderness protection zone, on recommendation of the Minister and with the consent of the owner. Wilderness protection areas or zones are a special classification of protected area as a result of their relatively natural state and low level of human interference. The difference between a wilderness protection area and a wilderness protection zone is that mining activity may take place in a wilderness protection zone, but not in a wilderness protection area. Other activities which are prohibited in the zones or areas are the grazing of stock and all other forms of primary production and the construction or erection of roads, tracks, buildings or structures, unless specifically authorised by the plan of management (section 26).

Recommendations

- 16) . The Wilderness Protection Act needs greater implementation. The nature of and difference between wilderness protection areas and wilderness protection zones needs to be made clearer (it is not spelt out in the Act).

Native Vegetation Act 1991

The Act applies to the whole State, except most of metropolitan Adelaide other than those areas which are within the zone designated as the Metropolitan Open Space System and some outer areas including the Hills Face Zone.

Clearance of native vegetation may be undertaken only with the consent of the Native Vegetation Council under sections 26 and 27. Clearing is defined in section 3 of the act rather broadly and includes the destruction and removal of vegetation, burning and severing of branches and limbs, removal of vegetation, the draining or flooding of land with the purpose of killing native vegetation and any other substantial damage to native vegetation. In determining consent the Native Vegetation Council must consider the principles of native vegetation clearance listed in schedule 1 of the Act. These principles include broad objectives aimed at preserving biological diversity. The Native Vegetation Regulations 2003 provide for a number of exceptions to the need for consent from the Native Vegetation Council for clearance of native vegetation. The exceptions listed in regulation 6 cover a broad range of activities including road building, firewood collection (solely for the purpose of heating or cooking), and the in the course of an undertaking by an electricity entity. Penalties for clearance of vegetation not in accordance with part 5 of the act are severe with the maximum penalty being a sum calculated at the prescribed rate for each hectare (or part of a hectare) of the land in relation to which the offence was committed or \$100 000, whichever is greater (section 26).

Recommendations

- 17) The many exemptions to the Native Vegetation Act should be streamlined, particularly as they relate to subdivision.
- 18) The Native Vegetation Act urgently requires stronger regulations and management, not the opposite, which has been the trend for the last five years.
- 19) The Native Vegetation Program continues to be under resourced. Existing levels of resourcing are inadequate to provide for compliance audits to ensure offsetting activities are being undertaken, or for the necessary monitoring and evaluation of offsets to ensure benefits are being achieved.
- 20) There needs to be an expansion of third party appeal and enforcement rights, and a review of the credit system.

Environment Protection and Biodiversity Conservation Act 1999 (Cwth)

While this is Commonwealth legislation, this law is central to the operation of biodiversity conservation in South Australia and therefore needs some discussion. One of its main purposes is conservation of biodiversity by enforcing a listing process for extinct, threatened and vulnerable species and communities to ensure their survival.

Threatened ecological communities: Similarly under section 181 of the Act provides that the Minister must establish a list of threatened ecological communities divided into the following three categories:

1. Critically endangered;
2. Endangered;
3. Vulnerable.

The criterion for inclusion in these categories is the same as for the equivalent threatened species discussed above.

Recommendations

- 21) The open nomination and listing process should be reinstated.
- 22) The Environment Protection and Biodiversity Conservation Act needs to deal more effectively with outstanding nominations, and strengthen critical habitat provisions and recovery planning.

Reserves in Resources Legislation

Acts such as the *Forestry Act 1950* contain provisions for reserves ('forestry reserves', section 3) the primary purpose of which is to preserve the resource for expected future exploitation but incidentally operates as a reserve to maintain plant and animal biodiversity. [Cf. Regulation 16.] The *Crown Lands Act 1929* effectively also allows for the creation of miscellaneous reserves through the notion of dedicated lands, although specialised Acts (such as the national Parks & Wildlife Act and the Forestry Act) have taken over provision for most established types of reserves.

The *Fisheries Management Act 2007* (and the *Marine Parks Act 2007*, most of which is still, however, not in force) provide for aquatic reserves and marine parks. While these will generally not be important for the issue of terrestrial biodiversity, they may extend to land abutting on the waters of a reserve (Fisheries Management Act, sections 3, 4 and 40).

Natural Resources Management Act 2004

The functions of this Act were discussed in our paper on water policy. Briefly, the Act sets up a system of Natural Resource Management Council, boards, plans etc. These are created to deal with the management of various resources, one of which is water, across the State and in regions.

Chapter 8 of the Act (sections 174-192) deals with the prevention of introduction and spread of pest animals and plants. It does this by providing that it is an offence to move, possess, sell, or release certain classes of animals and plants into a control area, which can be part of or the whole state. The Act also provides for permits to be obtained to sell, possess and move animals and plants of a specified class.

Recommendations

- 23) The Natural Resource Management Act needs biodiversity management guidelines to be developed to provide guidance on the management and protection of natural resources as required under the general statutory duty.

Environment Protection Act 1993

The principles of environmentally sustainable development under section 10(1)(a) of the Act clearly cover without mentioning explicitly the notion of biodiversity conservation. These principles are to inform the administration of the Act, for instance in the granting of authorisations to pollute.

References to avoiding environmental harm elsewhere in the Act (for instance in the general environmental duty, section 25) should also be interpreted as including a duty to maintain biodiversity.

The quinquennial State of the Environment Report is required to assess the condition of the State's major environmental resources and identify significant trends in environmental quality (section 112(3)(a) and (b)). This would clearly include observation on the state of biodiversity.

Development Act 1993

The usual, everyday function of the Act involves the assessment of proposed development (development applications) against the development plan for the area concerned. The development plans therefore encapsulate the development criteria on the basis of which a proposed development will be approved or not.

It would be appropriate, however, to review all development plans to incorporate biodiversity protection measures, as well as ensuring that developments with potential negative impacts on biodiversity are identified and made subject to public notification and 3rd party appeal rights and to amend the Development Regulations to require that all development applications that may have negative impact on biodiversity must be referred to relevant government agencies (DEH, NPWS) for advice or direction.

Limiting issues which apply to the Development Act are:

- Only activities defined as development are covered, so existing use cannot be controlled
- Only the Planning Minister has power to call for EIA, not local councils who process the vast majority of development applications
- The trigger for EIA is the Minister's opinion that a matter of major social, environmental or economic importance exists, unlike in other jurisdictions which refer to lists of different types of development (e.g., N.S.W.)
- An EIA process allows ongoing monitoring of the effect of the development, but not common practice in the case of ordinary development approvals
- There are shortcomings in the production of an EIS, not least that it is usually produced by the developer
- Cumulative impacts on biodiversity are not generally considered
- No consideration as a matter of course of global impact or precautionary principle
- No provision for strategic environmental assessment, that is, assessment of the environmental implications of decisions to enact legislation, implement policies or plans that can provide biodiversity protection earlier and at a higher level than project level assessment
- A consideration of modifications to, or alternative models of, a proposed development need not be demonstrated in an EIA. A "do nothing" scenario is rarely evaluated
- The decision-making process for major projects is protected from legal challenge. Judicial review is specifically disallowed (48E), hence if proper administrative process is not followed there is no recourse.

Pastoral Land Management and Conservation Act 1989

The "Pastoral Act" covers around 40% of South Australia in the North and West of the State. Although the Act's focus is on the pasturing of stock, one of its purposes is to provide for the "the prevention of degradation of the land and its indigenous plant and animal life", as well as "the rehabilitation of the land in cases of damage" (s4(b)). Lessees are under a general duty to prevent degradation of the land (s7(b)). Further, a lessee must comply with several other Acts:

(A) The Natural Resources Management Act 2004

(B) The Dog Fence Act, 1946;

(C) The Mining Act, 1971;

(D) The Petroleum Act, 2000;

(E) The Soil Conservation and Land Care Act 1989; and

(F) Any other prescribed Act (s22(1)(a)(v))

Mining Act 1971

Under the Mining Act before the Minister grants an exploration license, he or she must give proper consideration to the protection of "flora and fauna that may be endangered or disturbed by those operations" (s30(2)(b)). In this context, however,

"endangered" refers to the species in a particular area, and not the overall endangered status of a species. Similarly, before a Minister grants a mining lease, he or she shall, "in determining the terms and conditions subject to which a lease is to be granted under this Part, give proper consideration to the protection of ... flora and fauna that may be endangered or disturbed by those operations" (s34(6)(b)).

Mining tenements (e.g., leases) do regularly have environmental protection conditions attached to them in the nature of the requirements under the Petroleum Act (below).

Petroleum Act 2000

The Petroleum Act contains a detailed procedure for the production of an environmental impact report (EIR) in relation to 'regulated activities', which appear to include most major activities under the Act. This then leads to their being classified as low, medium or high impact activities by the Minister for Mineral Resources. (Cumulative effect of recurrent activities must be taken into account in this process: section 98(4).)

Government Strategies

National Strategy for the Conservation of Australia's Biodiversity

The National Strategy for the Conservation of Australia's Biodiversity recognises that the conservation of biological diversity provides significant cultural, economic, educational, environmental, scientific and social benefits for all Australians. It acknowledges there is a need for more knowledge and better understanding of Australia's biological diversity, and a need to strengthen current activities and improve policies to achieve conservation and sustainable use of biodiversity⁶⁰

The National Strategy for the Conservation of Australia's Biodiversity also highlights that decision making processes should integrate both long and short term economic, environmental, social, and equity considerations with input from all stakeholders. As stakeholders in biodiversity we need to develop a strong, growing and diversified economy which can enhance the capacity for environmental protection. To be successful in biodiversity conservation the strategy suggests it is vital to anticipate, prevent and attack at source the causes of significant reduction or loss of biodiversity.

⁶⁰ Department of the Environment, Sport and Territories (1996) *National Strategy for the Conservation of Australia's Biodiversity*, Commonwealth Government of Australia, Canberra

SA Strategic Plan 07

South Australian premier, Mike Rann, introduces the SA Strategic Plan as a plan for everyone – for business, for the community, and for government – not a plan for government alone. He suggests when South Australians work towards common goals, we can achieve so much more than if we go it alone. Biodiversity targets within the plan are⁶¹:

1. *Lose no species: lose no known native species as a result of human impacts.*
2. *Land biodiversity: by 2010 have five well-established biodiversity corridors aimed at maximising ecological outcomes particularly in the face of climate change.*
3. *Soil protection: by 2014, achieve a 20% increase in South Australia's agricultural cropping land that is adequately protected from erosion.*

Recommendations:

- 24) The SA Strategic Plan needs to demonstrate why its population growth targets will benefit sustainability in general, and biodiversity protection in particular.

Tackling Climate Change Strategy

South Australia's Tackling Climate Change strategy includes a biodiversity conservation objective to increase the capacity of ecosystems to adapt to climate change. It recognises that healthy, biologically diverse ecosystems are of intrinsic value and underpin South Australia's environmental, social, cultural, spiritual and economic well being. Because climate change is very likely to exacerbate existing threats to biodiversity, the strategy aims for South Australia's natural resources sector and ecosystems to be managed sustainably with optimum resilience.

Actions for government are an essential component of biodiversity conservation and climate change, with the strategy outlining actions including⁶²:

- *To develop models and predictive tools that use climate change scenarios (including sea level rise) and biological data to identify terrestrial, marine, estuarine and freshwater species, ecological communities and ecosystem processes that will be most: vulnerable to climate change, resilient to climate change, and advantaged by climate change;*
- *To assess the risk of threatening processes and the impact of climate change on these processes to predict impacts on species status and ecosystem function; and*
- *To implement the River Murray Forest policy and NatureLinks plans, incorporating opportunities for biosequestration, in partnership with key*

⁶¹ Government of South Australia (2007) *South Australia's Strategic Plan 07*, Government of South Australia, Adelaide

⁶² Department of Premier and Cabinet (2007) *Tackling Climate Change: South Australia's Greenhouse Strategy 2007-2020*, Government of South Australia, Adelaide

stakeholders, including private landholders and organisations that can contribute key habitat management outcomes.

No Species Loss Strategy

The State's No Species Loss strategy is a direct response to the target 'lose no species' in South Australia's Strategic Plan. The vision of the strategy is for the people of South Australia to actively support their native plants, animals and ecosystems to survive, evolve and adapt to environmental change. It is envisaged this vision will be delivered through the following five goals⁶³:

- 1. Conservation of South Australia's biodiversity;*
- 2. Community ownership and stewardship for biodiversity;*
- 3. Ecological knowledge that can influence decision making;*
- 4. Adjustment to the impacts of climate change; and*
- 5. Active and integrated natural resources management partnerships.*

No Species Loss is a well informed and thorough strategy, outlining responsibility for the delivery of the recommendations and targets amongst stakeholders. To ensure effective monitoring of progress DEH are responsible for reporting to the Minister on progress towards targets every five years. However, there is one major gap in achieving the goals of the strategy- the strategy has no legislative backing.

NatureLinks

The goal of the NatureLinks program is to enable South Australian species and ecosystems to survive, evolve and adapt to environmental change. It aims to create connected habitat across South Australia, comprising a comprehensive system of core protected areas buffered and linked by land and sea managed for conservation objectives. NatureLinks recognises that biodiversity conservation activities should be planned at a landscape scale, with an ecological community approach. Through this program the South Australian government recognises that true ecological restoration may take a generation or longer to achieve, although short term objectives are required. NatureLinks is comprised of four key elements⁶⁴:

- 1. Connectedness – connected habitat facilitating ecological flows across the land and sea.*
- 2. No species loss – our native species and ecological communities surviving and continuing to evolve.*
- 3. Integration and partnerships – natural resource management across the landscape meeting common biodiversity objectives.*

⁶³ Department for Environment and Heritage (2007) *No Species Loss Strategy: A Nature Conservation Strategy for South Australia 2007-2017*, Government of South Australia, Adelaide

⁶⁴ Department for Environment and Heritage (2004) *Naturelinks: Implementing the WildCountry Philosophy in South Australia*, Government of South Australia, Adelaide

4. *People in nature – South Australians sharing the benefits of ecological sustainability.*

The Naturelinks project of SA, which grew from the Wild Country project, is currently being revitalised. Instead of writing another policy, Naturelinks looks to unite community, government and industry in delivering core biodiversity requirements based on existing policies/plans. Initially, Naturelinks was about corridors – as that is a concept that captures people's imaginations. However, scientifically the meaning and utility of a corridor, or connected areas is fraught with many unknowns.

Recommendations

- 25) The scale of the restoration task ahead needs greater recognition, eg 30% minimum for bioregions if we are to keep our landscapes functioning.
- 26) Specific partnerships need to be developed with relevant environmental NGO's and NRM Boards to implement Nature-links.

Planting Indigenous Species Policy

The Department for Environment and Heritage adopted a Planting of Indigenous Species Policy in 2001. The policy was designed to “promote the use of plants adapted to the South Australian environment; to contribute to the conservation of native vegetation and biodiversity values; and to support government agencies for the conservation of biodiversity”⁶⁵.

Benefits of the policy include it's potential to contribute to the viability native ecosystems and species, reduce the need for watering, and increase knowledge of how South Australian indigenous species are suitable for horticultural and landscape use. This policy applies to all land under the direct management of the South Australian government. It is also consistent with objectives b) and e) of the Native Vegetation Act 1991 for:

(b) the conservation of the native vegetation of the State in order to prevent further reduction of biological diversity and further degradation of the land and its soil; and

(e) the encouragement of the re-establishment of native vegetation in those parts of the State that have been cleared of native vegetation.

⁶⁵ Department for Environment and Heritage (2003) *Planting Indigenous Species Policy*, Government of South Australia, Adelaide

Policy for Sustainable Forestry Management

ForestrySA manages around 30,000 hectares of its estate for conservation purposes. The majority of these areas are managed as Native Forest Reserves and are located within the Southern Flinders Ranges, Mt Lofty Ranges, and the Lower South East of South Australia.

Specific management objectives for Native Forest Reserves include⁶⁶:

- Managing the reserves for the long-term conservation of native plant and animal communities;
- Managing the community use of the reserves in a manner compatible with conservation values;
- Protection of the reserves from human-induced or natural disturbances.
- Rehabilitation of sites that have been extensively degraded by human-induced or natural processes; and
- Encouraging the community to participate in the implementation of the plans.

Forests owned by ForestrySA are managed with a variety of focuses including to protect biodiversity and cultural heritage; and to provide for a range of recreational activities, community events and educational values, while optimising economic value to regional communities through plantation forest operations. ForestrySA is planning to progressively develop management plans for all of the forests it manages. Management objectives for the plans incorporate involving the community and industry, conserving and enhancing biodiversity, and contributing to the state's economy.

Caring for our Country

The goal of the Caring for our Country program is to create an environment that is healthy, better protected, well managed, resilient and provides essential ecosystem services in a changing climate⁶⁷. To achieve this goal the Australian government has committed \$2.25 billion in funding over the first five years for six national priorities:

1. The national reserve system;
2. Biodiversity and natural icons – including weed and feral animal control, threatened species;
3. Coastal environments and critical aquatic habitats;
4. Sustainable farm practices – including Landcare;
5. Natural resource management in remote and northern Australia; and
6. Community skills, knowledge and engagement.

The program is designed to increase opportunity for non-government organisations, regional bodies, local, state, territory and Australian government agencies to access a greater proportion of the program's funds to help achieve our national priorities. Caring for our Country delivers four government programs under the one banner:

⁶⁶ Forestry SA (2008) *Policy for Sustainable Policy Management*, Government of South Australia, Adelaide

⁶⁷ Department of Agriculture Fisheries and Forestry and Department of Environment, Water, Heritage and the Arts (2008) *Caring for Our Country*, Accessed online 3rd October 2008 <<http://www.nrm.gov.au/>>

- Natural Heritage Trust,
- National Landcare Program,
- Environmental Stewardship Program and
- Working on Country Indigenous land and environmental program

Draft South Australian Biosecurity Strategy 2008-2013

The purpose of the South Australian Biosecurity Strategy 2008–2013 is to provide an overarching policy framework for investment in biosecurity in South Australia. It links initiatives in pest and disease management at local, regional, state and national levels, which cover natural resources management, specific biosecurity sectors, industry development, biodiversity and climate change. The draft Biosecurity Strategy has four key goals⁶⁸:

1. *Preparedness: Pest and disease threats in SA are managed through a coordinated effective biosecurity system.*
2. *Prevention: New pests and diseases are prevented from arriving in SA.*
3. *Incursion response: Incursions of new pests and diseases are detected early and eradicated.*
4. *Ongoing management- Established pests and diseases are managed to reduce economic, environmental and social impacts.*

Effective biosecurity, like biodiversity conservation, requires collaboration between governments, industries, communities and individuals, with a clear understanding of specific roles and responsibilities. To ensure all participants meet their agreed responsibilities and see milestones are achieved the State Biosecurity Committee is responsible for monitoring and evaluating the effectiveness of the strategy.

Heritage Agreement Grant Scheme

The Heritage Agreement Grant Scheme provides financial assistance to landholders for the conservation and management of their heritage agreement areas. Preferred projects to receive grants include those which⁶⁹:

- Are part of a long term management program;
- Are part of a management planning process;
- Minimise disturbance to native vegetation and wildlife habitat;
- Include other landholders where this is appropriate, for example as part of a coordinated pest control or wildlife corridor protection program;
- Are the most cost effective;
- Link the Heritage Agreement area to other high value conservation areas; and/or
- Are unable to be funded from other sources.

⁶⁸ Government of South Australia (2008) *Draft South Australian Biosecurity Strategy 2008- 2013*, Government of South Australia, Adelaide

⁶⁹ Department for Environment and Heritage (2008) *The Heritage Agreement Grant Scheme*, Government of South Australia, Adelaide.

To receive a grant applicants must contribute an amount approximately equal to the grant, for example, in labour, materials, equipment or funds. A maximum of \$2000 is available for most projects, with up to \$3500 available for management plans.

The Native Vegetation Council decides which projects will be funded. The Council is constituted under the Native Vegetation Act, 1991, and members are chosen for their expertise in native vegetation management and/or farming. Advice on grant applications is provided to the Native Vegetation Council by Private Land Conservation.

Recommendations

- 27) The Heritage Agreement Scheme needs to be amended to accommodate biodiversity management stewardship incentives to help progress biodiversity corridors between protected reserves.

Protected Areas

Protected areas are one of the world's most important and effective tools in biodiversity conservation because they protect species from the key threat of habitat loss⁷⁰. A protected area is defined as "an area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means"⁷¹. Nature reserves can and do legitimately fulfil a variety of purposes (e.g. conservation, scientific investigation, recreation), but their primary purpose should be nature conservation.

The reserve system in South Australia already contains a wide range of many of our unique ecosystems, from the sandy and stony desert areas to mallee, coastal systems and off-shore islands⁷². Yet, despite having an extensive reserve system, the coverage of biodiversity by protected areas requires greater monitoring and modification. Reported management priorities and actual monitoring programmes often do not match, with the effectiveness of management responses rarely being monitored⁷³. Protected area systems must be managed and expanded strategically to address the distribution of and threats to biodiversity.

Recommendations

- 28) There needs to be an increase in the amount/area of the reserve system protected from the impacts of mining exploration and production.

⁷⁰ World Conservation Union (2007) *Identification and Gap Analysis of Key Biodiversity Areas: Targets for Comprehensive Protected Area Systems*, IUCN, Switzerland

⁷¹ World Conservation Union (1994) *Guidelines for Protected Areas Management Categories*, IUCN, Cambridge

⁷² Department for Environment and Heritage (2008) *South Australian National Parks and Reserves Management*, Accessed online 12th October 2008 <<http://www.environment.sa.gov.au/parks/management/index.html>>

⁷³ Buckley, R., Robinson, J., Carmody, J. and King, N. (2008) 'Monitoring for Management of Conservation and Recreation in Australian Protected Areas', in *Biodiversity Conservation*, August 2008

- 29) We need to increase investment for protected areas/reserves acquisition to achieve CARRS (20% of terrestrial and marine ecosystems) and management and subsequently increase the health of habitat in reserves and management and subsequently increase the health of habitat in reserves
- 30) The Classification Review for Protected Areas needs to be completed with appropriate public consultation.
- 31) The NPW Act needs review in the context of a State Biodiversity Act and to refocus on protected area management as habitat for native species.

Wildlife Corridors

Wildlife corridors are important in linking both urban and rural ecosystems allowing species to move between habitats. These networks of corridors are increasingly being advocated as a key component of strategies for the conservation of biodiversity⁷⁴. The Wilderness Society's WildCountry vision is a step forward in creating wildlife corridors across the Australian landscape. WildCountry involves *protecting* and *restoring* important areas, focusing on maintaining and/or restoring ecological connections in the landscape⁷⁵.

Establishing wildlife corridors as a key component of biodiversity conservation and management allows species populations to access a sufficient area of habitat; to continue seasonal migration; to permit genetic exchange between different local populations; to allow for local populations to move away from a degrading habitat, an increasing issue with climate change; and to secure the integrity of vital environmental processes such as water flows⁷⁶. Areas such as roadways, train lines and watercourses, together with open space and property borders, may be utilised to create wildlife corridors helping ensure the future of our native species in a changing climate.

Wildlife corridors can link both rural and urban ecosystems. Urban areas provide unique challenges as native vegetation is often cleared for housing and development, with only small patches of remnant vegetation remaining. In Adelaide removal of concrete from drainage streams such as the Sturt River and revegetation of these areas can assist in creating urban wildlife corridors. Another essential space that can be used to create urban wildlife corridors is backyards. The Urban Forest Biodiversity Program's 'Backyards for Wildlife' initiative aims to promote the planting of local native species in urban gardens as a way of increasing the connectivity and amount of Adelaide's bushland habitat, from the coast to the hills⁷⁷. Educating community about the value of planting native flora and creating a multi-layered garden for biodiversity is a way that each person or household can contribute to biodiversity conservation and the establishment of functional wildlife corridors.

⁷⁴ Lindenmayer, D. and Nix, H. (2002) 'Ecological Principles for the Design of Wildlife Corridors', in *Conservation Biology*, Vol 7: 3, January 2002

⁷⁵ The Wilderness Society (2005) *WildCountry: A New Vision for Nature*, The Wilderness Society, Canberra

⁷⁶ Bennett, G. (2004) *Integrating Biodiversity Conservation and Sustainable Use: Lessons Learned From Ecological Networks*, IUCN, Switzerland

⁷⁷ Urban Biodiversity Program (2008) *Backyards for Wildlife Initiative*, Accessed online 22nd October 2008 <<http://www.backyards4wildlife.com.au/>>

Recommendations

- 32) The State and Federal Governments need to invest strategically in the concept of 'stewardship' and other forms of incentives for farmers/landholders in particular to participate in biodiversity conservation. As well as contributing to biodiversity management in wildlife corridors in landscape scale land planning, it offers an option for a struggling farmer to stay on the land.

Natural Resource Management

South Australia's Natural Resource Management (NRM) Plan 2006 was the first of its type in Australia, with a vision to manage resources for a good quality of life within the capacity of our government. As already highlighted in this report, many ecosystems and their biodiversity in South Australia are already degraded. They also face risk of further decline from many existing threats, such as pest species, fragmentation and loss of ecological connectivity⁷⁸. NRM is based on principles of working together to overcome existing and future threats; to invest in a landscape scale approach to management that aims to incorporate all the various ecosystems that support our state's natural resources.

For NRM to be successful in achieving its goals funding and resources must be available to invest in long term management decisions. Increased administration currently limits the success of landscape scale NRM projects which cross regional boundaries. This needs to be addressed as NRM is aimed at achieving landscape scale management. A landscape scale approach also requires all stakeholders to be capable, committed and connected to protecting biodiversity and to working together. To implement this approach effectively in South Australia we need to place effort on establishing an integrated legislation and policy structure that supports and removes impediments to long term, landscape scale approaches. Regional NRM boards, commonwealth, state and local governments must work with private and public landholders to develop a structure which best supports stakeholder interests within the overarching focus of preserving and protecting our natural environment. This includes working with Indigenous people to better incorporate their interests and knowledge into NRM planning.

Recommendations

- 33) The State Government needs to better incorporate local government into the NRM process. They deliver many of the on-ground services that can enhance biodiversity conservation.
- 34) Greater priority needs to be placed on biodiversity outcomes in NRM Regional plans. This would require greater detail of data, targets and priorities, supported by increased resourcing.

⁷⁸ Department of Water, Land and Biodiversity Conservation (2006) *State NRM Plan 2006*, Government of South Australia, Adelaide

What Tools Do We Need in the Future for Biodiversity Conservation?

Integration Beyond NRM

While NRM is a useful tool in reducing biodiversity threats and enhancing biodiversity conservation, it does not have the resources to resolve all biodiversity issues. Processes and tools that already exist, and those being developed, at local, regional, state and federal levels must be utilised and shared amongst stakeholders to help manage biodiversity. Integration of the conservation of biodiversity should be implemented into all relevant sectors, and consider biodiversity in relation to ecosystem diversity, species diversity and genetic diversity.

Integration of biodiversity into different government departments may involve the development of specific sectoral action plans. These action plans must encourage processes that allow for open discussion and cooperation between departments and outside bodies to allow for informed management decisions to be made with commonality of purpose. There is currently no legislative basis for protecting threatened communities, critical habitat, general biodiversity, ecosystem or landscapes. Successful integration of biodiversity beyond NRM should aid in developing financial and legal mechanisms (such as inter-governmental agreements, trust funds, etc.) that are self-sufficient and self-financing to overcome current issues of impairment as a result of a change in leadership. This may involve a statutory duty that requires everyone to conserve biodiversity and in turn provide a basis for achieving biodiversity conservation outcomes.

Recommendations

35) South Australia needs a comprehensive Biodiversity Act.

Research and Data

In South Australia gaps remain in native vegetation, threatened species, and other core biodiversity research and data. Research to fill existing vast biodiversity data gaps, and data networks to openly share key information between stakeholders is vital to inform state policy and legislative changes to protect South Australia's biodiversity. Sharing of biodiversity information across and within government agencies, non government organisations, industry and the community is poor and is a key issue which needs to be addressed. Furthermore, monitoring networks to assess changes in biodiversity now that combine output available for ongoing initiatives must be established, integrating information for different schemes⁷⁹. Further development of meta-analysis methods, interpolation models, models mixing different data sources,

⁷⁹ Henry, P., Lengyel, S., Nowicki, P., Julliard, R., Colbert, J., Celik, T., Gruber, B., Schmeller, D., Babij, V. and Henle, K. (2008) 'Integrating Ongoing Biodiversity Monitoring: Potential Benefits and Methods', in *Biodiversity Conservation*, June 2008

and cross-validation would assist in creating an effective, functional biodiversity data network for South Australia.

Recommendations

- 36) The current scientific and baseline data on biodiversity is poor, particularly in the marine environment. Resources need to be significantly increased to provide:
- a greater understanding of what elements of the landscape are critical to provide ecosystem services
 - a better understanding of the management activities that need to be made available, including ecological restoration and implementing disturbance regimes
 - long-term ecological research and strategic monitoring of key biodiversity indicators.
- 37) There needs to be consistency of access to information between government agencies, as well as cooperative agreements of information sharing between government, NGOs and industry.
- 38) GIS technology provides the opportunity to record quality data on key areas of biodiversity that we have not had until recently. This area of government research needs to be significantly resourced.
- 39) The State Government needs to complete SA's biological survey program, in both the terrestrial and marine sectors.

Offsets and Incentives

The Department of Industry Tourism and Resources explain biodiversity offsets as the “conservation actions intended to compensate for the residual, unavoidable harm to biodiversity caused by development projects, so as to ensure no net loss of biodiversity”⁸⁰. Biodiversity offsets are a relatively new solution to overcoming biodiversity problems, and issues such as how to measure biodiversity loss mean offsets still require ongoing development to effectively work as functional and supportive tools in biodiversity conservation. A number of key references emphasise it is advisable that developers and industry people first seek to avoid and minimise harm to biodiversity by addressing impacts through the following sequence⁸¹:

1. Assess;
2. Avoid;
3. Minimise; and
4. Mitigate (Rehabilitate or restore).

⁸⁰ Department of Industry Tourism and Resources (2007) *Biodiversity Management: Leading Practice Sustainable Development Program for the Mining Industry*, Commonwealth of Australia, Canberra

⁸¹ Ibid.

There are two types of environmental offsets: 1) no net loss; and 2) net benefit. No net loss offsets aim to balance biodiversity loss with biodiversity gain, creating no overall significant environmental difference. Net benefit offsets aim to ensure more biodiversity gains occur than biodiversity losses with an overall improvement in ecological integrity. Offset options may include:

- Rehabilitation of existing degraded ecosystems;
- Re-establishing biodiversity corridors;
- Implementation of agreed recovery plans for species;
- Acquisition and inclusion of land into the conservation estate;
- Contribution to knowledge through monitoring and research;
- Preparation of management plans; and/or
- Provision of resources for local conservation groups.

Australia's economy, and particularly South Australia's economy, has benefited from an increase in the international demand for resources such as coal, iron ore, bauxite, alumina, and uranium. Economic growth has seen an increase in domestic living standards and consumption, and an increase in energy consumption and environmental impact. With the risks that climate change poses to our state we need to form a response that acts in the best interests of our natural environment together with a safe society, a strong economy, high living standards and growing job opportunities into the future⁸². This response may be creating biodiversity policy which supports the governments integrated economic policy framework; investing in emissions trading; providing offset credits as rewards for reductions in emissions; or investing in a conservation banking system.

Conservation banking restores, enhances, conserves and/or creates habitat through the establishment of 'banks', the sites of which are chosen and managed for their natural resource values to earn 'credits'⁸³. One benefit of conservation banking over other offset schemes is that it "can offer a wider range of offset options for regulations and stakeholders to consider while offering landowners incentives to conserve and restore degraded habitats on their land"⁸⁴. To be a true biodiversity offset, very strict requirements must be met, and currently in Australia there is no model operating which satisfies these requirements.

Biodiversity offset schemes are growing in popularity as an avenue through which to address threats to biodiversity, however it is important that we first attempt to avoid, minimise and mitigate biodiversity problems as offset schemes continue to develop into a more reliable tool.

⁸² Mackey, B., Keith, H., Berry, S. and Lindenmayer, D (2008) *Green Carbon: The Role of Natural Forests in Carbon Storage*, Australian National University E Press, Canberra

⁸³ Department of Industry Tourism and Resources (2007) *Biodiversity Management: Leading Practice Sustainable Development Program for the Mining Industry*, Commonwealth of Australia, Canberra

⁸⁴ Ibid.

Recommendations

- 40) The State Government needs to review the existing frameworks being implemented and discussed for biodiversity offsets, to deliver consistent biodiversity conservation outcomes. These could include using income from voluntary offsets to fund the expansion of WildCountry/NatureLinks corridors.
- 41) Bio-carbon- bio-planting and credits for biodiversity need to be explored for accreditation.

Engaging Stakeholders

Community

Environmental action at both the individual and societal level is needed to usher in change in the overall environmental situation⁸⁵. An interconnected whole of community approach is required so issues such as health, culture, community development and governance are adequately reflected in biodiversity conservation. Community may have an active role in lobbying government to reflect their environmental values, or a role as volunteers to get involved in the hands-on or research work. CCSA has over 50 member groups which depend on community awareness and action to make a difference to South Australia's biodiversity. Lateral learning, exposure, sharing and interactions between community and biodiversity are crucial for the function of NGOs and civil society organisations⁸⁶.

Aboriginal People

In Australia we are fortunate to have an aboriginal community with a historical connection to country and knowledge of environmental processes which have been passed down through generations. Aboriginal people also have a significant investment in land, owning and/or managing a significant portion of the state. Yet despite an increase in the engagement of aboriginal communities in biodiversity conservation such as co-management of protected areas, there is still an important lack of provision for community influence or power⁸⁷. Traditional owners need legal or administrative mechanisms to either negotiate or control the implementation of their aspirations with those of other stakeholders. Without this mechanism of power, Indigenous aspirations can be lost in the many other influences placed on decision-makers.

⁸⁵ World Conservation Union (2007) *Learning to Live on Planet Earth: National Conference on Education or Sustainable Development*, March 20-21, 2007, IUCN, Switzerland

⁸⁶ Ibid.

⁸⁷ Lloyd, D., Van Nimwegen, P. and Boyd, W. (2005) 'Letting Indigenous People Talk About Their Country: a Case Study of Cross-Cultural (Mis)communication in an Environmental Management Planning Process', *Geographical Research*, Vol 43: 4, December 2005

Recommendation

- 42) Given the extent of indigenous managed land within SA, and the largely high quality of its vegetation, communities there need to be more involved and better equipped in habitat and species protection. The State Government must expand the co-operative management program with Aboriginal communities for protected areas.

Industry

Industry has historically had opposed values to those of biodiversity conservation. These historical views are inconsistent with reality, as many of our state's industries rely upon ecosystem services for the long term viability of their business. By engaging industry in biodiversity conservation business professionals can make valuable contributions to planning and management, bringing financial acumen and consumer orientation that natural scientists often lack. Environmental managers can in turn educate business on how to manage biodiversity in their operations. Working together will help to overcome some of the difficulties of integrating conservation and development agendas.

Recommendations

- 43) Businesses, particularly corporate workers, need to be targeted in a biodiversity awareness campaign, to help them understand how to minimise risk to biodiversity and how to make a more positive contribution.
- 44) The environment sector needs to view business engagement as an opportunity to source investment in biodiversity.

State Government

South Australia's state government has interest in the management and regulation of both biodiversity (Department of Environment and Heritage, Department of Water Land and Biodiversity Conservation) and industrial development (Department of Planning and Local Government, Department of Primary Industries and Resources SA). It is critical in biodiversity conservation to harness the enormous power of private sector investment via multi-stakeholder partnerships between businesses, NGOs, communities and governments to develop collaborative sustainable business models that are ecologically responsible, socially just and inclusive for all⁸⁸. Integrated visions of conservation and economic development must be shared across the political spectrum and by successive governments⁸⁹. The short term visions of governments to the next election present a key threat to the implementation of effective biodiversity conservation programs which require long term investment without guarantee of results within a short time frame.

⁸⁸ Sharma, S. and Rudd, A. (2003) 'On the Path to Sustainability: Integrating Social Dimensions into the Research and Practice of Environmental Management', *Business Strategy and the Environment*, Vol 12

⁸⁹ Bennett, G. (2004) *Integrating Biodiversity Conservation and Sustainable Use: Lessons Learned From Ecological Networks*, IUCN, Switzerland

Recommendations

45) The State Government needs to work with local government to:

- address the lack of urban environmental corridors. These could deliver increased biodiversity benefits, and help engage an urban populace as to the value of increased native vegetation in an urban environment
- use the opportunity to link South Australian waterways as biodiversity corridors.

Local Government

South Australia's local governments are generally the first point of contact by the community on environmental issues, however they are often limited to the extent of the statutory roles they can undertake in the regulation and enforcement of issues such as the depletion of native vegetation as a result of firewood collection⁹⁰. Local Agenda 21, an initiative from the 1992 United Nations Conference on Environment and Development, has given international recognition to the role of local authorities in working toward sustainable development through local planning, policy, and regulations, and educating, mobilizing, and responding to the public⁹¹. Local governments in South Australia are undertaking a diversity of actions in bushland management and protection, and have the potential to play a vital role in community education. However, they are constrained by low budgets for environmental management, a lack of staff employed to specifically address environmental issues, minimal support from the state governments, and limited coordination within and among regions⁹². Engaging with councils and providing them with resources is essential to build their capacity for biodiversity conservation.

Biodiversity Education

Environmental education is an essential component of biodiversity conservation. Stakeholders must understand the impact their activities have on biodiversity, in addition to the role they can play to address threats that may arise from these activities. As we learn more about biodiversity threats, effective management and rehabilitation educational resources must be updated to ensure stakeholders have a current understanding⁹³. Educationists, environmentalists and others from related fields should be asked to spread awareness of biodiversity among community and industry⁹⁴.

⁹⁰ Manthorpe, R. (2002) 'Local Government: Does it have a role?', Paper presented at the conference *No Smoke Without Fire*, Hosted by the Conservation Council of South Australia, June 2002

⁹¹ Stenhouse, R. (2004) 'Local Government Conservation and Management of Native Vegetation in Urban Australia', *Environmental Management*, Vol 34: 2, July 2004

⁹² Ibid.

⁹³ Stokking, H., Van Aert, L., Meijberg, W., and Kaskens, A. (1999) *Evaluating Environmental Education*, IUCN Commission on Education and Communication, Switzerland

⁹⁴ World Conservation Union (2007) *Learning to Live on Planet Earth: National Conference on Education or Sustainable Development*, March 20-21, 2007, IUCN, Switzerland

Recommendations

- 46) Education needs to extend beyond single aspects of biodiversity such as trees, to incorporate projects such as NatureLinks, which can demonstrate how those single aspects contribute to the bigger picture.
- 47) We need to mandate the knowledge, education and requirements of biodiversity conservation in school curricula. Currently it is up to individual schools or passionate teachers to educate children about our local biodiversity.

Strengthening Capacity to Act

Capacity building relates to a range of activities by which individuals, groups and organisations improve their capacity to achieve sustainable natural resource management. It aims to increase awareness, skills, knowledge, motivation, commitment and confidence in biodiversity conservation. In developing capacity building initiatives the Australian government NRM team highlight that it is important to develop actions that will⁹⁵:

- Ensure that the key stakeholders and priority issues are targeted to meet the priority NRM outcomes of the region;*
- Encourage partnerships between stakeholders;*
- Value and build on existing capacity involving local expertise and knowledge;*
- Be based on learning from each other through sharing resources, experience and expertise;*
- Be based on principles of trust, mutual reciprocity and norms of action;*
- Encompass 'learning by doing' and other appropriate learning styles*
- Value and utilise indigenous expertise and knowledge;*
- Be accessible to the entire community, including people of non-English speaking backgrounds;*
- Be based on access to accurate, scientific and technical information; and*
- Contribute to social capital.*

Capacity building provides an opportunity for NGOs to utilise their expertise in community engagement, increasing ability of the community to engage in biodiversity conservation, while also fostering social cohesion within communities,

⁹⁵ Natural Resource Management Ministerial Council (2002) *National Natural Resource Management Capacity Building Framework*, Commonwealth of Australia, Canberra

building human and social capital⁹⁶. NGOs have an important role to play in facilitating and supporting the engagement and motivation of the community and to increase their capacity to exercise ownership within biodiversity conservation decision making and management.

Recommendations

- 48) Public liability can be prohibitive for community groups engaging volunteers in their work. Government resourcing would make a big difference in this capacity.

⁹⁶ Natural Resource Management Ministerial Council (2002) *National Natural Resource Management Capacity Building Framework*, Commonwealth of Australia, Canberra

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Appendix 1- Extended Summary of Legislation

National Parks and Wildlife Act 1972

The NP&W Act is the 'mainline' legislation relating to protection of biodiversity in S.A. The Act is in two main parts, one dealing with creation of reserves; the other relating to provisions which deal directly with the conservation of native plants and animals. At a statutory level, the latter part is recognised as being very much out of date compared with biodiversity legislation in other jurisdictions, although administrative initiatives make up for this to some extent.

Reserves: There are 5 types of public-land 'reserves' - national parks, conservation parks, game reserves, recreation parks and regional reserves – all except most recreation parks have heightened protection against abolition or alteration by virtue of the fact that there must be a proclamation by the Governor and a resolution of each House of Parliament. (In addition, section 44 allows for the creation of sanctuaries for the protection of plants and animals, which may be over private land but which do not have the same guarantee of protection of most reserves.)

Management of reserves is crucial to their efficacy in protecting biodiversity. Section 37 sets out the principles of management, including

- the preservation and management of wildlife,
- the destruction of dangerous weeds and the eradication or control of noxious weeds and exotic plants,
- the control of vermin and exotic animals,
- the control and eradication of disease of animals and vegetation and
- the prevention and suppression of bush fires and other hazards

Section 38 requires that all reserves be managed under a management plan, requiring a degree of consultation and coordination with other interested authorities and parties. Section 39 specifically provides that special zones (for instance, for biodiversity protection) may be set up in reserves.

Conservation of native plants: Part Four of the Act deals with conservation of native plants. Native plants are defined in the Act as any plant that is indigenous to Australia and includes any plant of a species declared by regulation to be a native plant. Section 47 forbids the taking without statutory authority (e.g., permit) of native plants from reserves (including those for forestry or dedicated for public purposes) or Crown land or, in the case of prescribed plants, even from private land. (In the case of non-prescribed plants, permission from the owner of private land must be obtained first.) Similarly, disposal or possession of native plants where illegally acquired is prohibited (sections 48 & 48A). Section 49 allows the Minister to grant permits for the taking or sale or gift of native plants. It is also possible to obtain a permit for commercial purposes although this is heavily restricted. The penalty for non-compliance with the rules varies depending on the status of the plant involved as endangered, rare or threatened. The current highest possible penalty is \$10,000 or 2 years' imprisonment for taking, possessing or selling endangered plants. Schedule

7, 8 and 9 list plants and animals within those categories.

Export & import: Section 59 prohibits the export (interpreted widely to mean to remove for any reason) or import (meaning to bring in for any reason) any native plant of a species prescribed by regulation, unless with a permit from the Minister.

Conservation & management of protected animals & birds: This is dealt with under Part Five of the Act. The Act provides protected animals status to all native birds and animals unless excluded by the Act or any associated regulations. Of note is Schedule 10 that lists native birds and animals that are not given protected status. Section 51 expressly prohibits the taking of a protected animal or its eggs, unless a permit has been obtained in accordance with the requirements of section 53, namely that it is for scientific research or conservation. Similarly the release of protected animals or so-called unprotected animals in Schedule 10, the keeping and sale of protected animals (prescribed animals or their eggs being subject to slightly less restriction) and the farming of protected animals are subject to a permit granted by the Minister. The hunting of protected animals is subject to a permit unless the exemptions in section 68A and B apply. The Act also provides that it is not illegal for Aboriginal persons to contravene certain sections of the act because of the cultural origins of their practices.

In addition to these sections the Minister may under section 80 create any necessary regulations to enhance protection of the natural features of the reserves, or the objects of the Act.

Wilderness Protection Act 1992

The Act was established in 1992 for the protection of the wilderness and to aid in the restoration of land to its pre-colonial state in terms of biodiversity. Wilderness unlike a national park is an area of land in a state that has had a relatively little intrusion by humans, human activity or exotic plants and animals.

The Act allows for the establishment wilderness protection areas and wilderness protection zones. Under section 22 the Governor can proclaim a reserve, part of a reserve or any other Crown land or piece of land a wilderness protection area or a wilderness protection zone, on recommendation of the Minister and with the consent of the owner. Wilderness protection areas or zones are a special classification of protected area as a result of their relatively natural state and low level of human interference. The difference between a wilderness protection area and a wilderness protection zone is that mining activity may take place in a wilderness protection zone, but not in a wilderness protection area. Section 25(3) - (5) limits the operation of mining in wilderness protection zones basically to those parties who held a mining permit, licence or lease before the constitution of the land as a wilderness protection zone. Pursuant to a resolution passed by both Houses of Parliament, the Governor may make a proclamation for the party to continue mining operations under the strict conditions set out in section 25. Section 25(10) ensures the protection of the zones and areas by ensuring that the Minister at no more than five year intervals assess the effects of mining on the wilderness protection zones and prepare a report to be laid before Parliament to ensure that the areas

are not irreversibly affected. Other activities which are prohibited in the zones or areas are the grazing of stock and all other forms of primary production and the construction or erection of roads, tracks, buildings or structures, unless specifically authorised by the plan of management (section 26).

The Governor's proclamations can only be made upon a recommendation of the Minister for the Environment. Section 22(5) contains four principles that can be used to justify a recommendation that an area be considered as a wilderness protection area or zone. The first consideration is that the protection of the land is justified on the grounds that it sufficiently meets the wilderness criteria, as set down in s 3(2). The two wilderness criteria listed in section 3(2) are

- That the land and its associated ecosystem must not have been or marginally affected by modern technology; and
- That the land and its associated ecosystem has not been seriously affected by exotic animals, organisms and plants.

The second requirement for the minister's recommendation is a finding that the land can be restored to a condition that justifies its protection as wilderness. A third possible option for obtaining the Minister's recommendation is that the land should provide a buffer zone to other land protected as wilderness; or fourthly that the proclamation will enable convenient boundaries for wilderness protection to be adopted.

It is also possible for the Minister to declare any part of a wilderness protection area or zone a prohibited area (section 33). The entry of any person into such a prohibited area without a permit from the Minister allowing it is an offence.

There are other requirements listed in section 22(6) that the Minister must comply with before making a recommendation including consultation with any appropriate Aboriginal organisations, provide a public notice regarding the recommendation and invite interested persons to make submissions and provide copies of the report to the Environment, Resources and Development Committee, the South Australian National Parks and Wildlife Council and to the holder of a mining tenement (if any) in force in respect of the land.

Native Vegetation Act

The Act applies to the whole State, except most of metropolitan Adelaide other than those areas that are within the zone designated as the Metropolitan Open Space System and some outer areas including the Hills Face Zone.

Native Vegetation is defined in section 3 of the Act as: "a plant or plants of a species indigenous to South Australia (i.e. naturally occurring local native plants) including a plant or plants growing in or under waters of the sea but does not include: (a) plant or part of a plant that is dead or (b) plant intentionally sown or planted. In addition section 9 of the regulations under the Act advance the definition to include

indigenous dead trees that are of a certain size or can provide habitat for endangered species.

Clearance of native vegetation may be undertaken only with the consent of the Native Vegetation Council under sections 26 and 27. Clearing is defined in section 3 of the act rather broadly and includes the destruction and removal of vegetation, burning and severing of branches and limbs, removal of vegetation, the draining or flooding of land with the purpose of killing native vegetation and any other substantial damage to native vegetation. In determining consent the Native Vegetation Council must consider the principles of native vegetation clearance listed in schedule 1 of the Act. These principles include broad objectives aimed at preserving biological diversity. The Native Vegetation Regulations 2003 provide for a number of exceptions to the need for consent from the Native Vegetation Council for clearance of native vegetation. The exceptions listed in regulation 6 cover a broad range of activities including road building, firewood collection (solely for the purpose of heating or cooking), and the in the course of an undertaking by an electricity entity. Penalties for clearance of vegetation not in accordance with part 5 of the act are severe with the maximum penalty being a sum calculated at the prescribed rate for each hectare (or part of a hectare) of the land in relation to which the offence was committed or \$100 000, whichever is greater (section 26).

In addition to obtaining consent for the clearance of native vegetation the Act also provides under section 23F that a party wishing to revegetate an area with indigenous plants must also apply to the council for approval.

The Act provides in section 23 for the creation of Heritage Agreements between landowners and the relevant Minister. These are legally binding contracts in which the owner of the land agrees to manage the land for conservation. The agreement does not alter or affect the ownership status of the land but it does bind subsequent owners as the agreement is noted on the instrument of title to the land under section 23B. The effect of the Heritage Agreement is to enhance the preservation of native vegetation (section 23A). This can be achieved in a number of ways including restricting the use of the land in question, providing for the management of the land, native vegetation on the land or any animals living on or visiting the land in accordance with a particular management plan or providing for a reduction of rates and taxes payable on the land to ensure conservation. The Act currently has no provision for compensation, although financial assistance is available to help parties to a heritage agreement fence or otherwise manage native vegetation on their properties.

The Act also contains provisions for civil enforcement to remedy or restrain a breach of the Act. An application for civil enforcement may be made by the NV Council or anyone with a legal or equitable interest in land which may be affected by the breach or any party to a heritage agreement under the Act.

Environment Protection and Biodiversity Conservation Act 1999 (Cwth)

While this is Commonwealth legislation, this law is central to the operation of biodiversity conservation in South Australia and therefore needs some discussion. One of its main purposes is conservation of biodiversity by enforcing a listing process for extinct, threatened and vulnerable species and communities to ensure their survival.

Threatened species: This classification applies to native species in the following manner.

- Under section 179(1) a native species is eligible to be included in the extinct species list when there is no reasonable doubt that the last member has died.
- Section 179 (2) A native species is eligible to be included in the extinct in the wild category at a particular time if, at that time: (a) it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or b) it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
- Section 179(3), a native species is eligible to be included in the critically endangered category at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
- Section 179(4), a native species is eligible to be included in the endangered category at a particular time if, at that time: (a) it is not critically endangered; and (b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
- Section 179(5), a native species is eligible to be included in the vulnerable category at a particular time if, at that time: (a) it is not critically endangered or endangered; and (b) it is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
- Section 179(6), a native species is eligible to be included in the conservation dependent category at a particular time if, at that time: (a) the species is the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered; or (b) the following subparagraphs are satisfied:
 - (i) The species is a species of fish;
 - (ii) The species is the focus of a plan of management that provides for management actions necessary to stop the decline of, and support the recovery of, the species so that its chances of long term survival in nature are maximised;
 - (iii) The plan of management is in force under a law of the Commonwealth or of a State or Territory;

Cessation of the plan of management would adversely affect the conservation status of the species.

Threatened ecological communities: Similarly under section 181 of the Act provides that the Minister must establish a list of threatened ecological communities divided into the following three categories:

4. Critically endangered;
5. Endangered;
6. Vulnerable.

The criterion for inclusion in these categories is the same as for the equivalent threatened species discussed above.

Key threatening processes. Under section 183, the Minister must establish a list of key threatening processes. Threatening process is defined in section 188(3) as a process that may threaten, the survival, abundance or evolutionary development of a native species or ecological community. A threatening process becomes a key threatening process if it enables a native species or ecological community to be eligible for listing in any category, *other than conservation dependent*; or cause a listed threatened species or a listed ecological community to become eligible to be listed in another category representing a higher degree of endangerment; or adversely affects 2 or more listed threatened species (*other than conservation dependent species*) or 2 or more listed threatened ecological communities.

Permits: A series of offences in relation to threatened species and ecological communities is created in sections 196-196E and 207B (including killing, injuring trading in, etc.) Section 197 provides that actions otherwise caught by these offence provisions will not be offences if the Minister has provided a permit to undertake the action under section 201 or is justified in other ways under the Act.

Recovery plans and threat abatement plans. A *recovery plan* under section 270 consists of any research and management actions necessary to stop the decline of, and support the recovery of, the listed threatened species or listed threatened ecological community concerned so that its chances of long-term survival in nature are maximised. Section 270(2) (b) sets out what must be included in a recovery plan including the objectives, the actions needed to achieve the objectives, and meet any other prescribed criteria. The Minister must decide within 90 days after the listing of a threatened species or community whether it requires a recovery plan. Furthermore the Minister may at any time decide that the species or community warrants a recovery plan (section 269AA) and, when making a recovery plan, must consult with the relevant State and Territory ministers with a view to joint implementation of the plan when it applies outside of a Commonwealth area (section 269A).

A *threat abatement plan* provides for the research, management and other actions necessary for the reduction of key threatening processes to an acceptable level to ensure the long-term survival in nature of a native species or ecological community that has been affected by the key threatening process (section 271). It must have regard to the objects of the Act, the most efficient and effective resource that could

be used to conserve the threatened species and may include the duration and cost of the threat abatement, the organisations involved and any supplementary ecological matter that will be affected by the plan. As with the recovery plan, the Minister must decide within 90 days whether a threat abatement plan is necessary. However the Minister must also decide whether a threat abatement plan is necessary within the last five years of the last decision if that last decision was not to implement a threat abatement process. A threat abatement plan may be revoked if not regarded as necessary (section 282A).

The Threatened Species Scientific Committee advises on both types of plans (section 274). State plans may be adopted (section 277), but only if they meet the requirements of the Act.

Wildlife conservation plans. Section 287(1) stipulates that a wildlife conservation plan must provide for the research and management actions necessary to support the survival of the species concerned. Subsection (2) sets out particulars of what must be included and is similar to section 270(2) above in relation to recovery plans, but shorter. Commonwealth agencies must take all reasonable steps to act in accordance with wildlife conservation plans (section 286), but there may be an issue whether this provision is justiciable (that is, whether a court can make a binding decision in relation to it) or merely administrative.

Other measures: *Non-native species threatened in their native country:* a number of provisions (for instance sections 272 and 288) provide that the Commonwealth must provide stock of non-native species which are threatened in their native country to those countries before actions such as eradication are undertaken.

Protection of critical habitat: There is provision for the listing of habitat which is critical to the survival of a listed threatened species or ecological community (section 207A). Thereafter, under section 207B it is an offence to take an action knowing that it will damage such a habitat if it is in a Commonwealth area (section 525 – basically, any area over which the commonwealth has power, including everyday legislative power). Section 207C requires that a covenant protecting the habitat be included in any sale or lease of Commonwealth land and that it bind successors in title as far as is possible.

Migratory species provisions: Sections 209-223 create a regime for the protection of migratory species. A list under section 209 must include all species listed under any international agreement relevant to the conservation of a migratory species (such as the Bonn Convention 1979, the JAMBA Convention 1974 [Japan-Australia] and the CAMBA Convention 1986 [Australia-China]). A regime of offences similar to those under the threatened species provisions (above) is then created, with a similar provision for exemption for actions taken under the Act, particularly under permits.

Bioregional plans: The Minister may make bioregional plans for bioregions (not defined) within a Commonwealth area. Section 176 sets out what such a plan may contain.

Section 171 contains power for the Commonwealth to undertake general identification and monitoring of biodiversity.

Reserves in Resources Legislation

Acts such as the *Forestry Act 1950* contain provisions for reserves ('forestry reserves', section 3) the primary purpose of which is to preserve the resource for expected future exploitation but incidentally operates as a reserve to maintain plant and animal biodiversity. [Cf. Regulation 16.] The *Crown Lands Act 1929* effectively also allows for the creation of miscellaneous reserves through the notion of dedicated lands, although specialised Acts (such as the national Parks & Wildlife Act and the Forestry Act) have taken over provision for most established types of reserves.

The *Fisheries Management Act 2007* (and the *Marine Parks Act 2007*, most of which is still, however, not in force) provide for aquatic reserves and marine parks. While these will generally not be important for the issue of terrestrial biodiversity, they may extend to land abutting on the waters of a reserve (Fisheries Management Act, sections 3, 4 and 40).

Natural Resources Management Act 2004

The functions of this Act were discussed in our paper on water legislation. Briefly, the Act sets up a system of Natural Resource Management Council, boards, plans etc. These are created to deal with the management of various resources, one of which is water, across the State and in regions.

Chapter 8 of the Act (sections 174-192) deals with the prevention of introduction and spread of pest animals and plants. It does this by providing that it is an offence to move, possess, sell, or release certain classes of animals and plants into a control area, which can be part of or the whole state. The Act also provides for permits to be obtained to sell, possess and move animals and plants of a specified class.

Environment Protection Act 1993

The principles of environmentally sustainable development under section 10(1) (a) of the Act clearly cover without mentioning explicitly the notion of biodiversity conservation. These principles are to inform the administration of the Act, for instance in the granting of authorisations to pollute.

References to avoiding environmental harm elsewhere in the Act (for instance in the general environmental duty, section 25) should also be interpreted as including a duty to maintain biodiversity.

The quinquennial State of the Environment Report is required to assess the condition of the State's major environmental resources and identify significant trends in environmental quality (section 112(3) (a) and (b)). This would clearly include observation on the state of biodiversity.

Development Act 1993

The usual, everyday function of the Act involves the assessment of proposed development (development applications) against the development plan for the area concerned. The development plans therefore encapsulate the development criteria on the basis of which a proposed development will be approved or not.

Section 23(3) of the Act directs that, in addition to promoting the State Planning Strategy, development plans may include

- (a) planning or development objectives or principles relating to-
 - (i) the natural or constructed environment and ecologically sustainable development;
 - (iv) the management or conservation of land, buildings, heritage places and heritage areas;
 - (v) management, conservation and use of natural and other resources

This allows local councils to include provisions that require development to be assessed against the threat it poses to biodiversity. *It would be appropriate, however, to review all development plans to incorporate biodiversity protection measures, as well as ensuring that developments with potential negative impacts on biodiversity are identified and made subject to public notification and 3rd party appeal rights and to amend the Development Regulations to require that all development applications that may have negative impact on biodiversity must be referred to relevant government agencies (DEH, NPWS) for advice or direction.*

The Planning Strategy too includes many provisions relating to biodiversity to guide the formulation of development plans, though mostly of a general nature.

The less usual aspect of the Act is the major development provisions. Under section 46(9), the Development Assessment Commission Panel must take into account criteria prescribed by regulation when determining what level of environmental impact assessment (EIA) should take place. The criteria include:

- (a) the character of the receiving environment;
- (b) the potential social, economic and environmental impacts of the development or project;
- (c) the resilience of the environment to cope with change;
- (e) the extent to which undesirable impacts which may occur are likely to be irreversible Reg. 63(1).

When taking into account these criteria, the DAC must also consider, amongst other things,

(b) the nature of impacts by an analysis of -

(i) the degree to which the impacts are predictable;

(ii) the resilience of the environment to cope with change;

(iii) the degree to which the impacts can be reversed; ... and

(c) the significance of impacts by an analysis of -

(i) the degree to which the impacts adversely affect environmentally sensitive areas; ... and

(d) other factors determined to be relevant by the Major Developments Panel (Reg. 63(2)).

These requirements clearly allow for issues of biodiversity protection to be taken into account when deciding on the proper level of EIA for a proposed major development.

Once the DAC has decided what level of assessment is appropriate, the Act requires in the case of an environmental impact statement (EIS, the highest level of EIA) that it include a statement of

(a) the expected environmental, social and economic effects of the development or project;

(b) the extent to which the expected effects of the development or project are consistent with the provisions of-

(i) any relevant Development Plan; and

(ii) the Planning Strategy;

(d) the proponent's commitments to meet conditions (if any) that should be observed in order to avoid, mitigate or satisfactorily manage and control any potentially adverse effects of the development or project on the environment (s46B(4)).

and the provisions for the lesser levels of EIA (public environment reports and development reports) are similar.

The Environment Resources and Development Court has said on a number of occasions that where serious questions in relation to environmental impacts remain unanswered, then the onus of proof is on the proponent to show that the proposed development is consistent with the local planning scheme (including any objectives or principles aimed at preserving biodiversity). [See for example: The Louth Bay tuna feedlot case - CCSA v. DAC & TBOA (No. 2)]

Limiting issues which apply to the Development Act are:

- Only activities defined as development are covered, so existing use cannot be controlled
- Only the Planning Minister has power to call for EIA, not local councils who process the vast majority of development applications
- The trigger for EIA is the Minister's opinion that a matter of major social, environmental or economic importance exists, unlike in other jurisdictions which refer to lists of different types of development (e.g., N.S.W.)
- An EIA process allows ongoing monitoring of the effect of the development, but not common practice in the case of ordinary development approvals
- There are shortcomings in the production of an EIS, not least that it is usually produced by the developer
- Cumulative impacts on biodiversity are not generally considered
- No consideration as a matter of course of global impact or precautionary principle
- No provision for strategic environmental assessment, that is, assessment of the environmental implications of decisions to enact legislation, implement policies or plans that can provide biodiversity protection earlier and at a higher level than project level assessment
- A consideration of modifications to, or alternative models of, a proposed development need not be demonstrated in an EIA. A "do nothing" scenario is rarely evaluated
- The decision-making process for major projects is protected from legal challenge. Judicial review is specifically disallowed (48E); hence if proper administrative process is not followed there is no recourse.

Pastoral Land Management and Conservation Act 1989

The "Pastoral Act" covers around 40% of South Australia in the North and West of the State. Although the Act's focus is on the pasturing of stock, one of its purposes is to provide for the "the prevention of degradation of the land and its indigenous plant and animal life", as well as "the rehabilitation of the land in cases of damage" (s4(b)). Lessees are under a general duty to prevent degradation of the land (s7(b)). Further, a lessee must comply with several other Acts:

(A) The Natural Resources Management Act 2004

(B) The Dog Fence Act, 1946;

(C) The Mining Act, 1971;

(D) The Petroleum Act, 2000;

(E) The Soil Conservation and Land Care Act 1989; and

(F) Any other prescribed Act (s22(1)(a)(v))

The Act establishes a Pastoral Board. If the Board thinks that pastoral land is damaged, or is likely to suffer damage, the Board can require the lessee to submit a

property plan to the Board detailing the proposed management of the land (s41(1)). The Act does not define "damage", but defines "degradation" to mean "a decline in the quality of the natural resources of the land resulting from human activities on the land" (s3). Further, if the Board thinks that it is necessary to rehabilitate the land, it may require a lessee to, among other things, de-stock or adopt specified land management practices (s43(1)). Section 22(6) allows the Board, at the request or with the consent of the lessee, to approve the use of the pastoral land set aside for the primary purpose of traditional Aboriginal pursuits, conservation or other purposes.

Also, one of the functions of the Board is to advise the Minister on the policies that should govern the administration of pastoral land (s17(2)).

Mining Act 1971

Under the Mining Act before the Minister grants an exploration license, he or she must give proper consideration to the protection of "flora and fauna that may be endangered or disturbed by those operations" (s30(2)(b)). In this context, however, "endangered" refers to the species in a particular area, and not the overall endangered status of a species. Similarly, before a Minister grants a mining lease, he or she shall, "in determining the terms and conditions subject to which a lease is to be granted under this Part, give proper consideration to the protection of ... flora and fauna that may be endangered or disturbed by those operations" (s34(6)(b)).

Mining tenements (e.g., leases) do regularly have environmental protection conditions attached to them in the nature of the requirements under the Petroleum Act (below).

Petroleum Act 2000

The Petroleum Act contains a detailed procedure for the production of an environmental impact report (EIR) in relation to 'regulated activities', which appear to include most major activities under the Act. This then leads to their being classified as low, medium or high impact activities by the Minister for Mineral Resources. (Cumulative effect of recurrent activities must be taken into account in this process: section 98(4).) Regulation 11 of the Petroleum Regulations sets out the criteria for making the decision:

- the reasonably foreseeable events associated with the activities that could pose a threat to the environment;
- the potential consequences of those events on the environment;
- the degree of confidence in the accuracy of any assessment of—
 - i. the occurrence of the events and their consequences;
 - ii. the size and scope of the consequences;
 - iii. the frequency of the events;
 - iv. the duration of the consequences;

- v. the extent to which the consequences can be managed;
- vi. the cumulative effects (if any) of these consequences when considered in conjunction with the consequences of other events that may occur on the relevant land;
 - the action or measures proposed to be taken to reduce or avoid these consequences;
 - the interests and views (if any) of any interested person or party; and
 - other relevant issues.

The Minister must also review the criteria under section 98 of the Act at least once in every 5 years.

The consequences of classification are that statements of environmental objectives (SEO) must be formulated, at EIS level for high impact activities, on the basis of the EIR for lower levels. An SEO then becomes a mandatory condition to any licence under the Act.