Conclusions: Shaping the future—safe-guarding Australia's biodiversity heritage

According to Wilson (1995, p. 355):

> The one process ongoing in the 1980s that will take millions of years to correct is the loss of genetic and species diversity by the destruction of natural habitats. This is the folly that our descendants are least likely to forgive.

Overall, the condition of biodiversity in Australia today is poorer today than it was in 1996. Many serious pressures that undermine biodiversity conservation remain to be dealt with effectively. Many of these issues have been known for a decade or more and were explicitly identified in SoE (1996),

Based on the findings of the present Report, the prognosis for biodiversity in the immediate future is very serious. The destruction of habitat by human activities remains the major cause of biodiversity loss and threats such as weeds, feral animals, altered disturbance regimes, dryland salinity and diseases undermine the quality of the natural systems that remain. Failure to reverse these trends will not only guarantee further loss of biodiversity but also diminish the quality of life enjoyed by Australians and ultimately undermine the Australian economy.

The conservation of biodiversity can be expressed simply as saving biodiversity, studying it and using it sustainably and equitably. Saving biodiversity means taking steps to protect genes, species, habitats and ecosystems. The best way to maintain species is to maintain their habitats. However, since many of Australia's habitats have already been heavily modified for human purposes, steps to save biodiversity need to also include measures to maintain diversity on lands and in waters that have been disturbed. In addition, measures must be taken to restore lost species to their former habitats, and to preserve species held in *ex situ* facilities such as zoos and botanical gardens. Studying biodiversity means documenting its composition, distribution, structure and function; understanding the roles and functions of genes, species and ecosystems; and grasping the complex links between modified and natural systems as a basis to inform management. Using biodiversity sustainably and equitably means managing biological resources so that they last indefinitely, making sure that biodiversity is used to improve the human condition, and seeing that these resources are shared equitably.

This Report on biodiversity is concerned with the progress made in saving, studying and sustainably and equitably using Australia's biodiversity since SoE (1996). Since 1996, there have been several advances. For example, there is now much greater awareness of the importance of local governments in managing biodiversity, whereas previously the focus had largely been on state and Commonwealth governments. There is also now a much greater emphasis on participants other than government in biodiversity conservation and management (e.g. philanthropists, industry, and the broader community). Corporations and industry, more generally, are adopting ethical and environmental codes of practice that can support biodiversity conservation.

Today, Indigenous involvement in land management has a much higher profile, with repeated calls for Indigenous issues to be fully integrated into policy and program management. Increased attention is now paid to the integration of biodiversity conservation with production objectives across landscapes. This is consistent with greater recognition of the vital contribution that areas outside of the formal reserve system make for biodiversity conservation. The 'value' of biodiversity and the significance of ecosystem services to humans in Australia and globally is becoming more widely appreciated. Recently, for example, the Myer Foundation has provided $1 million to CSIRO for research on the value of ecosystem services to the Australia.

Until recently the focus on biodiversity conservation has been in the ILZ where broad-scale clearing for crops has occurred. However, there is a growing appreciation among government and the broader community of the potentially significant effects of altered fire, grazing and hydrological regimes, pests and weeds and mining on biodiversity in the ELZ in central, western and northern Australia. The message is that an area does not have to have been cleared for major changes in biodiversity to occur. Measures to improve the management of key regions such as the rangelands, the Lake Eyre Basin and Great Artesian Basin have been introduced. In addition, the CRC for the Sustainable

Management of Tropical Savannas has recently received approval for a further seven years of funding to enhance land management across northern Australia.

Altered fire regimes were not listed as one of the key threatening process for biodiversity in SoE (1996). Today, however, there is much greater awareness of the links between fire regimes and the conservation of biodiversity, which is reflected in the increasing development of management plans that directly address these issues. There is greater appreciation of the magnitude and importance of fires for biodiversity conservation in northern Australia. The ongoing mapping and monitoring of fire across northern Australia by the Western Australian Department of Land Administration is one example of an agency using smart geospatial technology to support improved land management and biodiversity conservation goals.

Although pests and weeds received considerable attention in the first report, the issue of sleeper weeds, which have the potential to cause major problems in future years was not mentioned in any detail. These weeds are now recognised to be of major concern, as are exotic organisms (e.g. sea stars, Crazy Ants, foot-and-mouth disease) that might find their way through Australia's quarantine barriers as a result of trade, tourism and other human activities.

The potential impact of GMOs on biodiversity is yet to be systematically and comprehensively investigated in Australia. Thus far, the focus of discussions of GMOs has been principally the potential impacts on human health and the organic farming industry. However, there would appear to be considerable potential for these organisms to threaten native biota and regional biodiversity.

There has been an increased emphasis on the need for active management of landscapes and aquatic and marine ecosystems, and that this be done at the regional level if effective natural resource management is to be achieved. This thinking has resulted in the development of a numerous regional processes and plans. At present, there has been only limited success in achieving active and integrated management at the regional level whereby different people and groups and the full range of land tenures are involved. The best way to incorporate biodiversity into the objectives, plans and strategies of regional organisations is an issue that has arisen out of these activities (see Dore and Woodhill 1999). One issue in this regard is the reconciliation of overlapping and maybe conflicting non-traditional scales of management (regions, catchments) with traditional scales (Commonwealth, State and local) and the treatment of biodiversity issues (management, but also information-related) in and across these.

Given the on-going emphasis on microeconomic reform and rationalisation of public institutions, the impact of these changes on the quality of long-term management and monitoring of biodiversity is of concern and requires greater attention. Have these reforms brought changes that undermine institutional capacity for biodiversity conservation? Have these changes, for example, resulted in a reduction in field staff responsible for weed control, and led to the closure of stream gauging stations and weather stations? A related emerging issue is how cross-sectoral issues such as biodiversity conservation can be incorporated into the objectives and decision making processes of corporatised or privatised public agencies? Linked to these changes and institutional trends is the increasingly important issue of the applicability of risk management approaches to biodiversity conservation (e.g. AS/NZS 4360, Revised Version 1999, and the forthcoming Standards Australia handbook *Environmental risk management: Principles and processes*). It is essential that microeconomic reform and other changes do not hinder moves towards greater interagency collaboration in support of biodiversity conservation.

The potential impacts of climate change on biodiversity was discussed in SoE (1996), and some predictions of the potential changes in species distribution were presented. Since then, the response of the Australian government to the Kyoto Protocol has significantly changed the way climate change is viewed and the amount of resources going into this area. In terms of climate change policy of the Australian government, emphasis has been placed on the mitigation of greenhouse gases emissions, with the direct and indirect impacts of climate change on biodiversity receiving relatively little attention. The vital role of native vegetation for biodiversity conservation and the role of native vegetation in the carbon cycle has effectively been ignored by governments due to their lack of preparedness to stop land clearing. In contrast, the impacts of the proposed planting of large areas with tree monocultures, and the practice of 'gaming' has government support despite the potential for serious negative impacts on biodiversity in the absence of prudent management including strong controls and enforcement.

Australian governments continue to have a fundamental and critical role in biodiversity conservation in Australia. However, the rhetoric and policies relating to biodiversity conservation are not commonly matched by effective policy implementation and good biodiversity outcomes. During the 1990s, many components of biodiversity have experienced continued degradation and decline. Land management issues such as the clearance of native vegetation, control of exotic weeds and pests, environmental flows in catchments, geographical expansion of dryland salinity, changed fire regimes and intensification of resource use in sectors such as forestry, fisheries and agriculture were well-known and widely reported, including in SoE (1996). Many attempts to address these issues have been lame or have stalled.

Overall, the prognosis for the immediate future is very serious. Informed groups such as the National Farmers Federation and ACF now say that billions of dollars will need to be invested to help redress land degradation in eastern and south-west Australia alone. The recently released *Coordinating catchment management* report, from the bipartisan House of Representatives Standing Committee on Environment and Heritage, recommended that a National Environment Levy be put in place for the next 25 years to help fund programs to address these issues.

At the same time, scientific knowledge of Australia's biodiversity and the ecosystem services it supports for the Australian human population and economy has not improved significantly. The Australian scientific community charged with the responsibility of advancing biodiversity conservation goals remains underutilised as a result of limited financial resources and other support.

In all, as a nation, over the past five years the available data suggest that we have done a relatively poor job at saving, studying and sustainably using biodiversity.

What is the likely fate of Australia's biodiversity over the next 50 years? What are some of the big issues that Australian governments, industry and the community need to address, or address more effectively and comprehensively to safeguard the nation's biodiversity heritage? Will the state of biodiversity have improved by the next national State of the Environment report in 2006? Will the importance of biodiversity to the Australian way of life and the Australian economy be better recognised and valued in 2006? Will the nation have put in place significantly improved measures to safeguard an important component of biodiversity? These are important questions of much concern to many Australians and many people.

Biodiversity conservation must be addressed within the context of sustainable development if it is to succeed. While important progress has been made in regional Australia, new and enhanced contacts and partnerships within communities are required. At the same time, international cooperation is essential, given the global nature of the biodiversity crisis and the lack of national resources in many countries. Climate change and resource degradation to support economic production and global trade are issues common to every nation. Liberalisation of international trade, commodity prices and the clearance of native vegetation in many parts of Australia are linked by economic drivers. As globalisation has a more significant effect on production sectors of the Australian economy, these linkages must be better understood and dealt with if biodiversity conservation and sustainable development goals are to be achieved.

Many essential elements of biodiversity conservation require sustained commitment that may not show immediate results. Policies, institutions, laws, and attitudes do not change suddenly; expanding human capacity, carrying out first-rate research and conducting biodiversity inventories take time and money and may have no immediate pay-off. They create, however, the larger context in which enduring change can take hold. Australian governments have a vital leadership role in this way, and their preparedness and ability to do so will strongly shape the future trajectory of Australia's environment and the quality of human life enjoyed in the 21st century.

Immediate action is still needed by Australian governments. No amount of rhetoric or government policy statements can overshadow that the annual rate of land clearance across the continent, the per capita use of water, or the per capita emission of greenhouse gases by Australians, which is extraordinarily high by world standards. Irreplaceable genes, species and ecosystems are disappearing or are being depleted at an alarming rate and immediate action is required by Australian governments to stem these trends. Immediate action can help retain options for the future management of biodiversity as well as safeguard those components threatened every day by destructive human activities.

Glossary

adaptation a particular part of the anatomy, a physiological process, or a behaviour pattern that improves an organism's chances to survive and reproduce

adequacy (in the context of the National Reserve System) the ability of the reserve to maintain the ecological viability and integrity of populations, species and communities

aerosol a suspension of particles, other than water or ice, in the atmosphere and ranging in size from approximately 10 to 13 µm to larger than 10 µm in radius; may be either natural or caused by human activity and most of the latter are usually considered to be pollutants

agricultural land any land on which crops or pastures are cultivated or domestic stock are grazed

algal blooms sudden proliferation of microscopic algae in water bodies, stimulated by the input of nutrients such as phosphates

allele a form of a gene, where multiple such forms occur

anthropogenic of human origin or human induced; can be used in the context of emissions that are produced as a result of human activities

aquaculture the commercial growing of marine (mariculture) or freshwater animals and plants in water

arid zone areas receiving less than 250 mm of annual rainfall in the south of Australia and 350 mm (or sometimes higher) in the north

atmosphere composite layer of colourless, odourless gases, known as air, surrounding the Earth; it shows distinct vertical zonation

ballast water water carried in tanks to maintain stability when a ship is lightly loaded; it is normally discharged to the sea when the ship is loaded with cargo

baseline behaviour of a system that has not been affected by human influence (for example river flow with no dams; pre-industrial levels of greenhouse gases). In most cases, the true baseline for natural systems cannot be defined or measured, so a particular condition at an agreed time is used as a substitute baseline, see *benchmark, targets*

baseline information information relating to a specific time or defined area of land or water, from which trends or changes can be assessed

benchmark the value for an indicator that has some defined environmental significance (or threshold) in the functioning of the natural system. An example is the concentration of pollutants that can be tolerated without damaging health. Whereas targets have a basis in policy and reflect human values, benchmarks are scientifically determined, see *targets*

benthic associated with aquatic or sea floor

biodiversity/biodiversity the variability among living organisms from all sources (including terrestrial, marine and other ecosystems and ecological complexes of which they are part) and includes: diversity within species and between species; and diversity of ecosystems

biogeochemical cycles the movement of chemical elements between organisms and non-living compartments of atmosphere, aquatic systems and soils

biological control controlling a pest by the use of its natural enemies

biodiversity see *biodiversity*

biological productivity the intensity of life form production in an ecosystem or part of an ecosystem

biomass the quantity of organic matter within an ecosystem (usually expressed as dry weight for unit area or volume)

bioregion a territory defined by a combination of biological, social and geographical criteria rather than by geopolitical considerations; generally, a system of related, interconnected ecosystems

biota all of the organisms at a particular locality

bushfire a term used to describe almost any form of fire burning out of control whether the fire was planned or unplanned

bycatch species taken incidentally in a fishery where other species are the target; may be of lesser value than the target species and are often discarded

catchment the area determined by topographic features within which rainfall will contribute to run-off at a particular point under consideration

clearing removing vegetation, particularly trees and shrubs, from a landscape, often with the intention of replacing it with plants regarded to be more directly useful to humans

climate the synthesis of the day-to-day weather conditions in a given area; the actual climate is characterised by long-term statistics of the state of the atmosphere in an area

climate change under the terms of the UNFCCC, the term means a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is, in addition to natural climate variability, observed over comparable time periods

climate variability the natural year-to-year and season-to-season variation of the climate system

community participation procedures whereby members of a community participate directly in decision-making about developments that may affect the community

comprehensiveness the degree to which the full range of ecological communities and their biodiversity are incorporated within reserves

Comprehensive, Adequate and Representative Reserve System (CAR) a reserve system to conserve all native forest types as well as the plants and animals that depend on them: comprehensive, the full range of forest communities recognised by an agreed national scientific classification at appropriate hierarchical levels; adequate, the maintenance of the ecological viability and integrity of populations, species and communities; representative, those sample areas of the forest that are selected for inclusion in reserves which should reasonably reflect the biodiversity of the communities

Comprehensive Regional Assessment (CRA) a joint assessment of all forest values by the Commonwealth and state—environmental, heritage, economic and social—leading to the establishment of a comprehensive, adequate and representative reserve system, agreements on forest management, and the signing of an RFA

condition indicator (otherwise referred to as an indicator of state); something that describes the quality of the environment and the quality and quantity of natural resources; highlights changes in environmental conditions over time

conservation the protection, maintenance, management, sustainable use, restoration and enhancement of the natural environment

cryptogram a plant that has no true flowers or seeds

discharge the volume of water that flows through a cross-section of a stream

domestic animals animals directly managed by humans, see *feral animal*

drainage the interception and/or removal of surface and/or ground water from a given area by natural or artificial means

dryland salinity areas where soil salinity levels are high enough to affect plant growth; occurs as a result of natural soil forming process (primary salinity) or in disturbed landscapes through clearing or other activities that interfere with the water and salinity balance and lead to shallow water tables; hydrological response to the replacement of deep-rooted perennial native vegetation with shallow rooted annuals which use less water. As a consequence, more rainfall enters the ground water, causing water tables to rise; where these rise to within 1 to 2 m of the soil surface, salinisation occurs as a result of evapotranspiration and direct evaporation. This can result in both stream and soil salinity

ecological footprint the ecological effect of cities, including the direct local effects and the indirect regional and global effects due to the resources they use and the wastes they produce

ecological processes processes that have an essential part in maintaining ecosystems; four fundamental ecological processes are the cycling of water, the cycling of nutrients, the flow of energy and biodiversity

ecological sustainability the capacity of ecosystems to maintain their essential processes and functions and to retain their biodiversity without impoverishment

ecologically sustainable development (ESD) using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained and the total quality of life—now and in the future—can be increased (for the ESD core objectives and guiding principles, see COAG 1992)

ecology the scientific study of living organisms and their relationships to one another and their environment

ecosystem a dynamic complex of plant, animal and microorganism communities and their non-living environment interacting as a functional unit

ecosystem integrity the degree to which the fundamental ecological processes (e.g. water and nutrient cycling, the flow of energy and biodiversity) are maintained

ecosystem services the role played by organisms in creating a healthy environment for human beings, from production of oxygen to soil formation and maintenance of water quality

ecotourism nature-based tourism that involves education and interpretation of the natural environment and is managed to be ecologically sustainable

El Niño an extensive warming of the central and eastern Pacific that leads to a major shift in weather patterns across the Pacific. In Australia (particularly eastern Australia), El Niño events are associated with an increased probability of drier conditions, see *ENSO*

emissions substances such as gases, or particles discharged into the atmosphere as a result of natural processes or human activities, including those from chimneys, elevated point sources and tailpipes of motor vehicles

endangered species a species which is in danger of extinction and whose survival is unlikely if the causal factors continue; included are species whose numbers have been reduced to a critical level or whose habitats have been so drastically reduced that the species are deemed to be in danger of extinction

endemic native to a particular area and found nowhere else

ENSO (El Niño–Southern Oscillation) a suite of events that occur at the time of an El Niño; at one extreme of the cycle, when the central Pacific Ocean is warm and the atmospheric pressure over Australia is relatively high, the ENSO causes drought conditions over eastern Australia

environment includes:

(a) ecosystems and their constituent parts, including people and communities;
(b) natural and physical resources;
(c) the qualities and characteristics of locations, places and areas; and
(d) the social, economic and cultural aspects mentioned in (a), (b) or (c)

environmental indicators measures of physical, chemical, biological, social, cultural or economic factors which best represent the key elements of complex ecosystems or environmental issues

environmental management effective and active measures taken for the protection, conservation and presentation of the environment, heritage and natural resources for which a government, organisation or individual is responsible

environmental stress the damaging influence of human activities on the environment (e.g. through pollution or consumption of natural resources) or that generated by natural events such as storms or droughts

ephemeral organisms that have a short life-span, or a watercourse that does not flow all the time

estuary area of an inlet or river mouth that is influenced by the tides and also by fresh water from the land; area where fresh and salt waters mix

eutrophication process by which waters become enriched with nutrients, primarily nitrogen and phosphorus, which stimulate the growth of aquatic flora and/or fauna

***ex situ* conservation** conservation of species outside their natural habitat (e.g. in zoos, botanical gardens and seed banks)

Exclusive Economic Zone (EEZ) a concept recognised under the United Nations Law of the Sea, whereby coastal states assume jurisdiction over the exploration and exploitation of marine resources extending 200 nautical miles (about 370 km) from the shore or baseline

exotic species a species occurring in an area outside its historically known natural range as a result of intentional or accidental dispersal by human activities (including exotic organisms, GMOs and translocated species)

family in the hierarchical classification of organisms, a group of species of common descent higher than the genus and lower than the order, hence a group of genera

fauna the entire animal life of a site or region, see *flora*

feral animal an animal that has reverted to a wild state from domestication (e.g. feral cats, pigs, donkeys)

fire regime the pattern of fires at a location; includes the frequency, intensity and seasonality of the fires

flora the entire plant life of a site or region, see *fauna*

forest estate all forests growing on public or private lands

freehold tenure land owned privately, see *leasehold*

gaming where landowners and land managers may remove or thin vegetation on their property in a manner that allows the vegetation to remain within a certain vegetation class, as broadly defined at a regional level. For example, individual trees, small stands of trees and associated understorey vegetation may be logged and removed from a forest without changing the structure of the overstorey vegetation such that it would fail to meet the agreed definition of 'forest'

gene the functional unit of heredity; that part of the DNA molecule that encodes a single enzyme or structural protein unit

genetic material any material of plant, animal, microbial or other origin that contains functional units of heredity

genetically modified organisms (GMOs) organisms whose genetic make up has been altered by the insertion or deletion of small fragments of DNA in order to create or enhance desirable characteristics from the same or another species

genome all the genes of a particular organism or species

geographic information system (GIS) a package of computer programs specifically designed to deal with data that are spatially related; a set of tools for collecting, storing, retrieving, manipulating, analysing and displaying mapped data from the real world

globalisation the economic and social process whereby local markets and cultures are increasingly dominated by global markets and culture

Gondwana the southern supercontinent that started to break up about 150 million years ago, consisting of what are now South America, Africa, Antarctica, Arabia, Australia, India, Madagascar and New Zealand

grassland areas dominated by grasses and with few or no trees

Great Artesian Basin an enormous store of ground water underlying much of the drier regions of eastern Australia

ground water water occurring below the ground surface

habitat The biophysical medium or media (a) occupied (continuously, periodically or occasionally) by an organism or group of organisms; or (b) once occupied (continuously, periodially or occasionally) by an organism, or group of organisms, and into which organisms of that kind have the potential to be reintroduced

heathland vegetation dominated by small shrubs with small hard leaves

hectare (ha) 10 000 square metres

herbivore an animal that consumes plants

heritage those places, objects and Indigenous languages that have aesthetic, historic, scientific or social significance or other special value for future generations as well as for the community today

hummock grass spinifex grasses usually growing together as large rounded 'hummocks' which can be several metres across, often forming rings with a central dead or decaying patch; hummock grasslands are largely confined to the arid interior and to infertile soils

hybrid the offspring of two animals or plants of different varieties, species or genera

hydrocarbon an organic molecule containing hydrogen and carbon; the major components of petroleum

indicator species a species whose presence or absence is indicative of a particular habitat, community or set of environmental conditions

Indigenous people the Aboriginal and Torres Strait Islander peoples of Australia

in situ the location of biological, physical or material culture objects in their original physical and cultural context

***in situ* conservation** conserving species within their natural habitat

intellectual property intellectual property represents the property of your mind or intellect. This includes information people have as part of their cultural heritage (e.g. knowledge about bush foods or oral history)

intertidal between the levels of low and high tide; the intertidal zone is often called the littoral zone in Australia

introduced species see *exotic species*

invertebrate an animal without a backbone composed of vertebrae; examples include insects, worms, snails, mussels, prawns and cuttlefish, see *vertebrate*

land cover the physical state of the land surface, including vegetation, soil, rock and human-made structures

Landcare any policy, strategy or practice furthering sustainable land management. Landcare is practised by community groups, formal support services, advisers, land managers and

individuals. The community component of Landcare aims to encourage community groups and landholders to identify and solve the soil, water, vegetation, management and nature conservation problems in their area. Grants help groups with planning, education and training, resource inventories and monitoring

leasehold land owned by governments on behalf of the people they represent but leased to specified people or organisations for a specific purpose; about 50% of Australia, mostly in the drier regions, comes under some form of leasehold; governments retain a variety of controls over how leasehold land is used

littoral of, or pertaining to, a shore, especially a sea shore; littoral zone—the specific zone of the sea floor lying between high and low tide levels (intertidal)

mallee small multi-stemmed eucalypts that often dominate semi-arid and arid areas

mangrove a plant (belonging to any of a wide range of species, mainly trees and shrubs) that grows in sediment regularly inundated by seawater; a community (forest, woodland, shrubland) of such plants

monitoring routine counting, testing or measuring of environmental factors or biota to determine their status or condition

monoculture the cultivation of a single species, usually a single crop on land

National Forest Policy Statement (NFPS) a joint Commonwealth, state and territory government response which outlines agreed objectives and policies for Australia's public and private forests

native forest any local indigenous forest community containing the full complement of native species and habitats normally associated with that community, or having the potential to develop these characteristics

native (indigenous species) species that are native to (i.e. occur naturally) in a region, see *exotic species*

native vegetation any local indigenous plant community containing throughout its growth the complement of native species and habitats normally associated with that vegetation type or having the potential to develop these characteristics. It includes vegetation with these characteristics that has been regenerated with human assistance following disturbance. It excludes plantations and vegetation that has been established for commercial purposes

natural environment an environment that is not the result of human activity or intervention

objectives broad policy goals, which are not precisely quantified (e.g. sustainable resource management)

old growth ecologically mature vegetation that has been subject to negligible levels of disturbance such as logging, roading and clearing

organochlorine a hydrocarbon compound containing chlorine. Includes many pesticides and industrial chemicals

ozone a gas with molecules comprising three atoms of oxygen; in the stratosphere it occurs naturally and provides a protective layer shielding the earth from ultraviolet radiation; in the troposphere, it is usually formed from anthropogenic emissions and is a major component of photochemical smog; ozone is also a greenhouse gas

pathogen a disease-causing agent

perennial plants that live for more than one year

periurban low density housing and road development on the periphery of urban areas, still retaining small areas of rural land within networks of suburban building

pest an animal, or sometimes a plant, occurring where it is not wanted by humans, see *weed*

phytoplankton small plants that are suspended in water and free-drifting

plantations intensively managed stands of either native or exotic trees species, created by the regular placement of seedlings or seed

point source pollution pollution from an easily discernible, single source such as a factory

pollution the direct or indirect alteration of the physical, thermal, biological or radioactive properties of any part of the environment in such a way as to create a hazard or potential hazard to the health, safety or welfare of any living species

polychlorinated biphenyls (PCBs) a group of chlorinated organic compounds that are non-corroding and resistant to heat and biological degradation; used as insulation in electrical equipment; can accumulate in some species and disrupt reproduction

population a group of individuals of the same species, forming a breeding unit and sharing a habitat

precautionary principle where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation

precipitation any form or all forms of liquid or solid water particles that fall from the atmosphere and reach the earth's surface; includes drizzle, rain, snow, snow pellets, ice crystals, ice pellets and hail

preservation maintaining the physical material of places or objects in their existing state and retarding deterioration

pressure indicators measures that can be used to describe both positive and negative pressures on the environment, including the quality and quantity of natural resources; such pressures can be caused by human inaction as well as action

productivity (biological) the rate of accumulation of organic material in an ecosystem

protected area a protected area is defined in Article 2 of the International Convention on biodiversity as a 'geographically defined area which is designated or regulated and managed to achieve specific conservation objectives'

protocol a formal arrangement defining procedures

rainforest a closed forest in areas of high precipitation with a large diversity of species forming a deep, densely interlacing canopy in which vines and ferns are often present

rangelands areas of native grasslands, shrublands and woodlands that cover a large proportion of the arid and semi-arid regions, and also include tropical savanna woodlands; regular cropping is not practised and the predominant agricultural use, if any, is grazing of sheep and cattle on native vegetation

recharge the action by which water is added to a rock layer either naturally or artificially

Regional Forest Agreement (RFA) an agreement about the long-term management and use of forests in a particular region between the Commonwealth and a state government. Its purpose is to reduce uncertainty, duplication and fragmentation in government decision-making by producing a durable agreement on the management and use of forests

regrowth native vegetation containing a substantial proportion of individuals that are in the younger growth phase and are actively growing in height and diameter. Regrowth vegetation may contain scattered individuals or small occurrences of ecologically mature, or old growth vegetation

representativeness the extent to which areas selected are capable of reflecting the known biodiversity and ecological patterns and processes of the ecological community or ecosystem concerned (in the context of the National Reserves System)

reserves areas such as National Parks and nature reserves which are subject to an established degree of protection from disturbance

response indicator an indicator that shows the extent to which society is responding to environmental changes and concerns; includes changes in attitude and individual and collective actions aimed at mitigating, adapting to or reversing negative effects on the environment and reversing environmental damage already caused; also includes actions to improve the preservation and conservation of the environment

run-off the portion of precipitation not immediately absorbed into or detained upon the soil and which thus becomes a surface flow

saltmarsh saltwater wetland occupied mainly by herbs and dwarf shrubs, characteristically able to tolerate extremes of environmental conditions, notably waterlogging and salinity

savanna a vegetation type with scattered trees over a grassland, usually found in subtropical areas

seagrass flowering plant adapted to living wholly submerged in sea water; not true grasses, but many have a grass-like form

seaweed macroalgae (not flowering plants) occurring in the sea; typical examples are kelps, Neptune's necklace and sea lettuce

sediment solid material settled from suspension in the water; solid material, both mineral and organic, that is in suspension, is being transported, or has been moved from its site of origin by water, air or ice and has come to rest on the land or sea floor

seed banks the seed naturally available at a site; most of it is stored in the soil, but some may be in protective fruits such as banksia 'cones'

semi-arid lands lands where rainfall is so low and unreliable that crops cannot be grown with any reliability, see *arid zone*

shrubland an area dominated by short, multi-stemmed plants; a typical example is the chenopod shrublands but sometimes the 'mallee' is classified as a shrubland

siltation deposition of sediments from water in channels and harbours etc.

sinks Processes or places that remove or store gases, sollutes or solids in accumulating parts of the environment

species a group of plants, animals or microorganisms that have a high degree of similarity and generally can interbreed only among themselves to produce fertile offspring, so that they maintain their 'separateness' from other such groups

stakeholders groups, individuals or organisations who may be affected by a development proposal, whether or not their stake in the outcome is explicit

State of the Environment reporting a process that provides a scientific assessment of environmental conditions, focusing on the effects of human activities, their significance for the environment and societal responses to the identified trends

stock (in fisheries) a group of individuals of a species that can be regarded as an entity for management or assessment purposes; commonly a distinct local population; some species form a single stock, others several distinct stocks

suspended solids any solid substance present in water in an undissolved state, usually contributing directly to turbidity, see *sediment*

sustainability indicators selected and/or aggregated indicators for evaluating specific ESD (ecologically sustainable development) goals

sustainable referring to an activity that is able to be carried out without damaging the long-term health and integrity of natural and cultural environments

targets specified levels or ranges of measurable parameters that decision-makers have agreed they will try to achieve; targets are policy tools, but they may have a scientific base (e.g. Australia's commitment at Kyoto to restrict greenhouse gas emissions to 108% of 1990 levels by 2014); targets may be associated with one or many indicators, see *benchmark*

taxon (pl. taxa) the named classification unit to which individuals or sets of species are assigned, such as species, genus and order

threatened a species or community that is vulnerable, endangered or presumed extinct

threatening process a process that threatens, or may threaten, the survival, abundance or evolutionary development of a native species or ecological community

trend a general direction or tendency; an indication of change (or its absence) in a property or condition

ultraviolet (UV) radiation electromagnetic radiation of higher frequencies and shorter wavelengths than visible light; ultraviolet radiation is divided into three ranges: UV-A (320–400 nm), UV-B (280–320 nm) and UV-C (40–290 nm)

vagrant a migratory bird found outside the normal range of its species, sometimes as a result of being lost during a storm

value adding an economic term which describes how a raw product is processed into a product which is of more value than the material in its raw state; in the forest and wood industry context, examples of this include the kiln-drying of sawn timber, and the manufacturing of wood veneers

vascular plants a grouping of plants that includes ferns, the gymnosperms (e.g. pines) and flowering plants

vertebrate an animal with a backbone composed of vertebrae (e.g. mammals, fishes, frogs, amphibians, reptiles and birds), see *invertebrate*

vulnerable species species which may soon move into the 'endangered' category if causal factors affecting their numbers continue. Included are species of which all, or most, populations are decreasing because of overexploitation, extensive destruction of habitat; species which are seriously depleted; under threat from severe adverse factors throughout their range; and species with low or localised populations and dependent upon a limited habitat which would be vulnerable to further threats

waterlogging the saturation of soils with water; often associated with insufficient oxygen for good plant growth

weather the day-to-day changing atmospheric conditions, which in synthesis constitute the climate of a region

weed a plant species growing where it is not wanted by humans

wet sclerophyll a type of eucalypt forest found in high rainfall (more than 1000 mm per year) areas; sometimes called 'tall-open forests'

wetland areas 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

woodchips forest product created by processing timber and residues; most commonly used in wood panels, pulp and paper making

woodland an area with scattered trees where the portion of the land surface covered by the crowns is more than 30% (open woodland) but less than 60% (forest)

woody weeds shrubby plants (both native and exotic) that have increased in numbers to be a problem for pastoralists in parts of the arid and semi-arid zones

World Heritage a term applied to sites of outstanding universal natural or cultural significance which are included on the World Heritage List

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