BIODIVERSITY

BACKGROUND

Biodiversity (biological diversity) is the variety of all life forms; plants, animals, micro-organisms, their genes and their ecosystems. The 1992 United Nations Convention on Biological Diversity (UNCBD) defines 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, between species and of ecosystems".

Biodiversity is considered at three interrelated and interdependent levels.

❖ Genetic diversity is the variety of genetic information occurring within all organisms, which occurs both within and between individuals of a species as well as among different species.

❖ Species diversity is the variety of species on Earth.

❖ Ecosystem diversity is the variety of habitats, communities and ecological processes and is the highest level of biological organisation.

In ecosystems, dynamic and complex relationships between communities interacting as a functional unit provide essential processes such as water and nutrient cycle maintenance, photosynthesis, soil production and carbon flux regulation. Biodiversity loss affects ecosystem function, stability and productivity, creating a feedback loop leading to further species loss and potentially, ecosystem collapse. Ecosystem interdependence means destabilised ecosystems can have cumulative and long term impacts on other ecosystems. Beyond regulation and stabilisation of ecosystem processes, direct economic and social consequences result from losing biodiversity, including loss of potential foods, medicines and industrial products and ecotourism opportunities.

Australia

Australia has developed a unique and diverse flora and fauna, making it one of 17 mega-diverse countries (others include Brazil, Papua New Guinea and Indonesia). It is mega-diverse due to its high total number of species and high level of endemic species[1], with over 80% of Australia's mammals, flowering plants, reptiles, frogs, fungi, molluscs and insects known to exist only in Australia. As the custodian of a mega-diverse biota, Australia is responsible for ensuring the continued survival of this unique biodiversity.

Biodiversity loss is a serious environmental problem in Australia and globally. In the decade to 2005, Australian terrestrial fauna species listed as extinct, threatened or rare rose by 41% to a total of 169. Extinctions now total 116 species with Australia accounting for 40% of the world's mammalian extinctions since 1800.

Major threats to terrestrial biodiversity include habitat loss and degradation, invasive species, pathogens, pests, salinity, pollution, nutrient loading and sedimentation of waterways and coastal areas, altered hydrological and fire regimes, and climate change. These factors make the sustainable management of ecosystems difficult and affect the wider environmental, social and economic values arising from biodiversity. The failure to manage the ecology, both natural and modified, of the Murray-Darling basin illustrates many of these problems and outcomes. Marine biodiversity's key threats are peak fish harvest, unsustainable exploitation, pollution, introduced species, rising sea temperature and carbon dioxide acidification. Even highly managed marine ecosystems such as significant proportions of the Great Barrier Reef are showing signs of stress.

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[1] Exclusively native to a place or region

Position Statement on Biodiversity

Native vegetation is a key element of Australia's biodiversity and protecting it is vital to the goal of reversing biodiversity loss. Broad scale land clearing destroys local ecosystems and removes native species' habitat. Clearing may cause weeds and invasive animals to spread, release greenhouse gases emissions and often results in soil degradation, erosion and salinity problems, which consequently degrade water quality. The resultant ecosystem fragmentation may set in train a process of ecosystem simplification, leading to continuing decline in species and ecosystem services over decades, even after clearing has ceased. Overall, 13% of Australia's native vegetation has been cleared although this has been concentrated in more fertile areas with higher rainfall. For example, in some agricultural regions, over 90% of native vegetation has been removed. In contrast, protected areas in Australia occupy some 10% of the total land area.

Having ratified the UNCBD, Australia has subsequently increased its focus on biodiversity conservation resulting in a National Strategy, a group of policies, and the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). As the legal instrument for biodiversity protection in Australia at the highest level, the EPBC Act aims to conserve biodiversity by:

- identifying key threatening mechanisms;

- creating threatened species inventories;

- controlling environmental assessment and approval processes relating to threatened and migratory species;

- commissioning and managing threat abatement and recovery programs; and

- integrating the international policies and agreements into Australia's policies.

At the state level, there are a range of legal/regulatory instruments which aim to control vegetation clearance, and protect threatened species, communities and their habitats.

In 2002, the 'National Framework for Natural Resource Management Standards and Targets' established natural resource management (NRM) principles and requirements to guide national funding of programs, particularly via the Caring for Our Country program. The 2002 Framework sets out consistent national approaches to guide Australian catchment management bodies in NRM planning, target-setting, implementation, and performance measurement.

New Zealand
New Zealand is recognised for its varied landscapes and unique native plants and animals. Internationally, New Zealand is regarded as a significant contributor to global biodiversity, with an estimated 80,000 species of native animals, plants and fungi. A comparatively large proportion of these are endemic – they do not occur naturally anywhere else on earth.

Since humans arrived in New Zealand, the country has experienced one of the highest extinction rates in the world, due to the loss of habitats and the introduction of pest plants and animals. Today, almost 2,500 native land-based and freshwater species are listed as threatened. The effects of climate change may further exacerbate pressures on our most endangered species.

Freshwater biodiversity is affected by surrounding land use and water quality. Invasive freshwater species such as the alga didymo *(Didymosphenia geminata)* pose risks for freshwater biodiversity.

About 44 per cent of New Zealand's land area is covered by native vegetation, most of which is in hill country and alpine areas. Less native vegetation remains in lowland areas; this has implications for species that need this type of habitat to survive. Between 1997 and 2001, an estimated 16,500 hectares (0.12 per cent) of native land cover have been either converted to other uses or changed as the result of natural processes.

Position Statement on Biodiversity

It is estimated that wetland areas have reduced by 90 per cent from their original area. New Zealand has designated six wetlands as having global importance under the Ramsar Convention on Wetlands (an inter-government treaty signed in 1971). Together, these Ramsar wetlands cover a surface area of 39,068 hectares

By international comparison, a large proportion (just over 32 per cent) of New Zealand's land area is legally protected for conservation purposes, either as public conservation land (8.43 million hectares) or through conservation initiatives on private land (221,473 hectares). The area of public conservation land has increased by about 4.56 per cent between 2004 and 2007. Private land under legal protection has increased by just over 51 per cent between 2004 and 2006. However, some of the land environments and the ecosystems they contain, for example wetland and lowland ecosystems, are not well represented among the legally protected areas.

The distribution of some selected native species (for example the lesser short-tailed bat, kiwi, kōkako, kākā, mōhua, wrybill and dactylanthus) has decreased over time on a national scale. Some of our more common native birds have shown an increase in distribution in recent years (27 out of 96 observed species). The same percentage (28 percent) reduced in distribution between 1985 and 2004. Ninety-three per cent of these were endemic species. Decreases in distribution since the 1970s are largely due to the impacts of introduced pest species, rather than habitat loss.

Pest management efforts have intensified over the last decade, and areas receiving ongoing management have increased for all major targeted pests. For instance, areas targeted for possum management by the Department of Conservation and the Animal Health Board equate to around 37 per cent of New Zealand's land area.

Introduced animal pest and weed species remain a serious threat to New Zealand's endangered native plants and animals. Over the last decade, increasing priority has been given to controlling pests in the habitats of the most threatened native species and to stop unwanted species coming into the country.

While offshore island reserves continue to protect many of our rarest species, sanctuaries on the mainland are increasingly aiming to match the level of protection. Attention has also turned to the protection of endangered native species and ecosystems on private land. In the future, conservation priorities are likely to continue to focus on improved pest control and bio-security, and on increasing legal protection for the land environments and ecosystems that are currently under-represented.

POSITION STATEMENT

Biodiversity loss is a critical environmental issue facing Australia and New Zealand which involves significant challenges and constraints for both countries. Many people and communities recognise a loss of value accompanying declining biodiversity. It often causes unforeseen consequences in related parts of ecological systems and losses in potentially valuable biological resources for future generations. Loss of biodiversity limits the planet's ability to sequester the carbon we produce, and to provide enough water to support a growing population. Technological fixes alone are not sufficient to address water and climate change problems; biodiversity loss needs to be reversed in addition to these measures.

Biodiversity management is not just about protecting particular species of flora and fauna (e.g. threatened species). It is about maintaining functioning ecosystems that support all species.

The sustainable management of biodiversity should have the goal of reversing the decline of biodiversity so that a net gain in the extent and quality of ecological communities, and the populations of flora and fauna they support, is achieved. Although biodiversity is inherently complex, and consequently difficult to measure, it is critical that this goal be benchmarked, monitored, and reported against.

Position Statement on Biodiversity

The sustainable management of biodiversity is reliant on the implementation of the following principles:

- that biodiversity is conserved, in situ, across all levels and scales - structure, function and composition are conserved at site, regional, state and national scales;

- that examples of all ecological communities are adequately managed for conservation; and

- that ecological communities are managed to support and enhance viable populations of flora and fauna and ecological functions.

EIANZ recommends the adoption of the *precautionary principle* along with other principles of *sustainable development* in decisions affecting biodiversity. This acknowledges the complexity inherent in ecological systems and the possibility of unforseen outcomes due to incomplete knowledge. Where practical, existing biodiversity resources can be preserved and enhanced through:

- appropriate recognition and valuation;

- setting of appropriate goals and targets;

- creation of biodiversity corridors and diverse landscapes;

- preservation of ecological communities;

- requirements for compensatory habitat creation or protection, and restoration of damage; and

- application of adaptive management principles.

EIANZ considers that in implementing planning and regulatory decision-making, 'net gain' outcomes are required to assist in reversing biodiversity loss.

There are a number of information gaps and a critical need to accelerate taxonomic studies on micro-organisms, fungi and lower organisms, which are very diverse and numerous. Other challenges are the lack of availability of professional resources in biodiversity in industry and government to enable effective decision making.

EIANZ considers that **leadership, education and awareness** regarding biodiversity are priority responsibilities for all levels of Government and industry. Particular roles include:

- building adequate capacity and resources through development of professional recognition, best practice guidelines and competency frameworks, and encouraging young scientists to enter careers related to biodiversity;

- providing assistance to land owners with active land management techniques, and incentives and schemes promoting enhancements;

- improving community and socio-economic understanding of biodiversity issues, including the importance of site level biodiversity in a regional context;

- improving and coordinating reporting on protected areas and off-reserve areas, distinguishing between habitats and species of different levels of exposure, outlining threatening processes, and timelines for completion of actions;

- co-ordinating with policy and regulating agencies related to emerging priorities, including climate change and sustainable development; and

- ensuring that regional NRM and catchment bodies recognise the importance of biodiversity management in both time and space in their plans, strategies, program implementation, and management.

Position Statement on Biodiversity

EIANZ considers that ongoing *research* is required to:

- identify data gaps that are currently restricting effective protected area planning and management;

- further assess threatening processes, in particular the impact of climate change on habitats, communities, populations and their distribution, and natural processes;

- develop the taxonomic knowledge necessary for the conservation and sustainable use of biodiversity;

- continually improve understanding of ecological processes, systems and species at the macro and micro levels, and the origins, evolution and interrelationships of Australia's and New Zealand's unique biota;

- develop, continually monitor, report and revise national biodiversity standards, objectives and targets (including enhanced development of indicators and metrics, and biodiversity protection targets for competing land uses);

- estimate and describe the benefits, including economic and social, associated with maintaining and enhancing protected areas; and

- improve the uptake and consistency of digital mapping to present and coordinate sets of related data.

EIANZ considers that *planning and regulatory decision-making* is required to*:*

- consider biodiversity in all environmental planning and impact assessment. This includes modified landscapes and urban areas, not just relatively intact ecological or reserve systems;

- ensure biodiversity values are an integral consideration of environmental assessment undertaken as part of triple bottom line decision making (i.e. taking account of environmental, social and economic considerations);

- foster the development and adoption of strategic approaches and frameworks to biodiversity conservation, which provide a national or regional context for decision making at local, project, or site scales.

- ensure that in environmental impact assessment (EIA), biodiversity is always considered early in the process. This will lead to more robust development outcomes and mitigation, less conflict in the later stages of the EIA process and more consistent decision making;

- use the principles of avoid-minimise-offset of biodiversity to deliver 'net gain' outcomes in planning and development assessment;

- develop consistent but appropriately flexible ways of measuring and evaluating biodiversity loss and gain (e.g. NSW Biometrics and Biobanking, Victorian Habitat Hectares, or the Business and Biodiversity Offsets Program) in planning and regulatory decisions, including ultimately nationally consistent schemes;

- evaluate the full economic impact of biodiversity loss, including species loss, loss of landscape function, and loss or degradation of environmental services, and take this into account in decision-making;

- recognise that there will always be insufficient information where biodiversity is concerned. Risk and uncertainty are inherent in all decision-making for biodiversity and precautionary approaches should be adopted; and

- favour the development of consistent decision-making processes at al levels of government.

Position Statement on Biodiversity

EIANZ considers that *monitoring, evaluation and reporting* of biodiversity are required to:

- improve performance by learning from past successes and failures, and to implement adaptive management;

- consider effects at a range of spatial and temporal scales; and

- use a range of measures and performance indicators over a variety of geographic and temporal scales. Single quantitative measures may be useful but other measures are needed with a range of complexity/sophistication. The role of qualitative assessment (including well documented 'ecological intuition') should also be recognized as valid.

EIANZ considers *coordination, networking and information sharing* at all levels of Government, as well as the public, is required to:

- foster and develop international relationships with other agencies;

- enhance the effectiveness of existing information sharing networks and identify and address data gaps;

- develop consistent baseline data through networks and partnerships;

- maximise available resources and knowledge from non-government organisations and other capabilities; and

- recognise the importance of using geographic boundaries (such as catchment or bio-regional boundaries) in preference to political boundaries for environmental management, environmental planning and impact assessment.