

# The State of New Zealand's Environment 1997

## Our Biodiversity

Biodiversity (short for biological diversity) refers to the variety of life-forms that exist in a particular place. It is often referred to as species diversity (how many species in a particular area), but should also include genetic diversity (the genetic variation within a population), and ecosystem diversity (the number of different ecosystems or ecological processes in a given area).

Biodiversity is the biological wealth of New Zealand, and presents important opportunities for New Zealanders. A high value is now being placed on wild species for eco-tourism and in the war against disease. There is also growing acknowledgement of the immense values of ecosystem diversity's ecological services. Among the work done by ecosystems is the production of raw materials, purification of water, absorption and decomposition of wastes, creation of soils, pollination and pest control, and climate regulation. Naturally, New Zealanders expect these free and largely invisible services to keep working forever – and our economy is founded on the premise that they will.

Managing biodiversity means keeping the pressures we place on ecosystems and species within their ability to remain viable and productive. Effective management also involves remembering that biodiversity is an essential element of the ethical, aesthetic, spiritual and cultural values held by New Zealanders.

### The global perspective

Since humans expanded out of Africa 70,000 to 100,000 years ago, we have caused extinctions and ecological changes. Agriculture enabled humans to replace whole ecosystems with just a few plant and animal species. Towns and farms now cover 37 per cent of the earth's surface, and our activities have significantly disturbed natural habitat over 52 per cent of the total land area. It has been estimated that, for the first time since mammals became the dominant land animal, Earth's species are disappearing faster than evolution can replace them.

Globally, about 11 per cent of mammals and birds are considered to be threatened and about 3 per cent of reptiles and fish.

The order of mammals we belong to – primates – is one of the worst affected (66 per cent of its species are threatened).

**Pressures on New Zealand's biodiversity**  
New Zealand's biodiversity is still largely

unknown. Of a possible 80,000 species, only about 30,000 have been scientifically described. Most are insects, fungi and nematode worms. Larger animals such as birds are much scarcer and have become increasingly so since humans arrived here.

In only 700-800 years humans and accompanying pests have eliminated 32 per cent of our native land and freshwater birds, 18 per cent of our native seabirds, one of 29 species of freshwater fish, three of seven frogs, perhaps three of 64 reptiles, one of the three bats, possibly 11 of about 2300 higher plants, and at least 12 invertebrates such as snails and insects. Many of those that remain are threatened. In fact, about 1000 of our known animals, plants and fungi are now considered threatened. This is nearly double the previous estimates, and obviously cannot include the many species that are as yet undescribed.

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### Extract from The State of New Zealand's Environment

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The reasons for continuing pressure on our threatened species are partly perceptual and partly historical. The perceptual problem rests on the commonly-held belief that, providing we protect what we have left, all will be fine. However, large though our total protected areas are, at approximately 30 per cent of the country, the areas were not selected for biodiversity reasons, and what we have protected are 'skewed' towards high altitude and other extreme environments. New Zealand does not have the range of protected areas necessary to represent all our ecosystem types. For many threatened species, therefore, much of the habitat remaining is in the wrong place or too small. There have been three main historical pressures on our biodiversity:

#### Habitat destruction

For most species this is a graver threat than human predation. Unlike predation, which targets a few species in an area, habitat destruction hits everything. Recent overseas research has shown that once 60-80 per cent of an area's habitat is lost, a very slight increase in destruction leads to a sharp increase in the numbers of species lost. New Zealand's area of domesticated land stands at 63 per cent and the percentage of significantly disturbed habitat

is estimated at 73 per cent. This adds up to insufficient habitat to guarantee the survival of many of our unique plants and animals.

Habitat loss has occurred on three levels:

- Wholesale removal of ecosystems by conversion to farmland, exotic forests and settlements. That 63 per cent of New Zealand's land area is domesticated highlights how serious this problem is. Today, most of New Zealand's relatively undisturbed habitat is either at high altitudes, in small lowland forest areas, in shrunken wetlands, and on some offshore islands.
- Partial removal or fragmentation of ecosystems into 'islands' surrounded by farmlands. Although some land is better than no land, these 'islands' are usually quite small. This puts their animal and plant populations in danger of extinction: from chance events like fire and flood; from lack of replenishment by immigration; and from increased competition – as only a few species can co-exist in a small 'island' at the same time.
- Degrading ecosystems through loss of species and disruption of ecological processes. Examples of these kind of pressures include: sedimentation and pollution of rivers; recreational activities (e.g. buggies and beach houses on dunes); and industries such as farms, forestry, mining, and tourism.

#### Human predation

Human predation (e.g. hunting, fishing, plant collecting) wiped out the moa and many other species. Today it can still pressure species already declining or threatened. A new form of predation is collecting plants and marine organisms in the search for potentially useful genes and compounds. This particularly affects plants and some marine organisms.

#### Pests and Weeds

Human disturbance often comes on top of far more serious disturbances by other species. Of the 25,000 plant species introduced to New Zealand, about 2000 are now established in the wild. In urban Auckland alone, four new species go wild each year. Over 200 exotic species have the potential to displace native plant ecosystems. Pine trees and pasture grasses, the mainstays of our primary economy, are probably the most wide-

spread introduced species, in some places having altered ecosystems so drastically that we have lost any vestige of native New Zealand.

At the same time, our native plants are being grazed and browsed by a whole range of animals, especially possums, goats and deer. Without substantial pest control programmes, something like 1.8 million hectares of protected forests would suffer significant biodiversity losses from these browsing animals.

Meanwhile, birds, reptiles, frogs, and the larger invertebrates fall prey to predators like stoats, rats, cats and even possums. Several aquatic species appear to have been reduced by trout. Aggressive introduced birds like magpies and Asian mynas seem to out-compete native species. Introduced wasps may be compounding predatory pressures from stoats on threatened birds such as the yellow-head in parts of the northern South Island. The list goes on.

Because pest and weed control is such a large problem, much of New Zealand's species preservation effort is concentrated on island sanctuaries where it is easier to maintain pest-free habitats. Some heroic rescues have been made (the black robin, for example), but the main problem is

something we can do little about: the small size of most islands limits the number and variety of species that can be sustained on them. However, we have few other viable options.

Exotic biodiversity is vital to the New Zealand economy. Little genetic diversity among crops and livestock means that primary producers may only have limited ability to adapt to diseases, significant climate change or new market preferences. The potential consequences of a lack of genetic diversity in our crops and livestock may be worsened by the loss of many minor crop and livestock strains and varieties, some of which are specifically adapted to New Zealand conditions.

There is a need to better coordinate efforts by government agencies, primary industries and the research community to conserve valuable crop and livestock strains and varieties.

#### The task facing us

The flow-on effects of the actions of previous generations are still with us. With each succeeding generation, vulnerable populations shrink even further. If the damage is to be undone, habitats need to be restored.

Native forests need to be restored to at

least 10-20 per cent of the lowlands and the foothills, particularly along streams and rivers, and other native habitats like wetlands need expansion. Because native forests grow slowly, some habitat-deprived species will need intensive conservation programmes for several generations while their environment regrows.

The second major and ongoing problem is the army of predatory and browsing animals and aggressive weeds threatening our remaining natural habitats. Costly pest and weed control must continue if our biodiversity is to be retained.

Hard choices need to be made, not just by our decision-makers. As the final paragraph of the book's biodiversity chapter eloquently puts it ...

*Ultimately, the fate of New Zealand's biodiversity will depend on our ability to manage the exotic species we have brought here and on our willingness to share more of the nation's land and water resources with the depleted species which have nowhere to run. It may also depend on our willingness to accept a single ethical proposition: that the species which evolved here have a basic right to be here, whether we need them or not.*



## ONE HUNDRED YEARS OF PLANTATION FORESTRY



# The impact of human values on forest management

Chris Perley\*

### Abstract

*Forest management has changed dramatically over the last 1000 years, and even those foresters of a mere 100 years ago would not recognise the current management orthodoxies. This essay argues that one of the main drivers for this change in management is a change in human values: what we believe. Human values dictate what management is 'right' at the time. These human values will continue to change, and foresters ought to be aware of that reality, and of the reality that their current management orthodoxy will not last.*

### Do Values Change?

In 1949 Aldo Leopold started his famous essay "The Land Ethic" with the story of Odysseus returning from the Trojan war to string up his slave girls for some suspected misdemeanour – only suspected, mind you. Leopold's graphic point was to illustrate how human values change over time. In Ancient Greece slaves were property, and there was then no more moral right or wrong associated with destroying 'property' than there is now. Some, at the time, may have gossiped and tut-tutted about the waste, but any moral outrage was probably reserved for the actions of the slave-girls!

To assume that we, in our more 'enlightened' age, have

reached some plateau of values and perspectives is a mistake. Leopold lamented the attitudes and perspectives of his own age, and hankered for an ethical mood swing to acknowledge and value the whole ecology – less hubris and more humility. He would be happier now, but not that happy. He would want more change, the difference being that he would now have more confederates – and perhaps more enemies.

We need only look back to our childhood, short decades ago, to realise how perspectives change (remember corporal punishment?). When we reflect upon how our own personal history, changes in our ontology – how we view the world – may appear a self-evident truth, but so often the actions we see around us reflect an arrogance and belief in our own Rightness, for the Now, and for the Hereafter. Most people believe that they are right – as those in the past, or those from other cultures, or those with a different perspective are so obviously wrong: if only they could "come to their senses", and see as we do.

### What are Values and Why care?

Our values are the basis of what we believe, and make up our world view, whether concerning the existence of God, the workings of the cosmos, or the superiority of our social "betters"; all metaphysical questions whose answers are now quite different from the accepted view even 50 years ago. These metaphysical

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