

THE CONSERVATION OF NATURAL FOREST IN NEW ZEALAND

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ABSTRACT

Conservation is concerned with perpetuating functioning ecosystems from which society is supplied with a sustained yield of resources.

An awareness of natural land values is now widely evident. Publicly owned indigenous forests are recognised as important ecosystems. This view is accommodated in recently evolved management policies and procedures.

It is extremely difficult to assess the worth of non-material commodities in a manner which enables the benefit of the natural condition to be weighed against the advantages of resource development.

The maintenance of soil stability and water quality, the provision of recreational opportunities and tourist revenue, a reservoir of genetic material, the establishment of biological benchmarks and the yield of animals are some of the products and values of natural forest. Timber production needs to be based on the principle of continual supply. While timber management shows promise in some areas, elsewhere difficulties have been encountered. An appreciation of all the interactions between the forest ecosystem components is needed to permit the yield of commodities to be matched with renewal rates.

Natural forest should be accorded full protection consistent with retaining the opportunity for future generations to participate in the management decision-making process.

CONSERVATION — A DEFINITION

Conservation is a word that has gathered emotive overtones in recent years. It has been used as a passionate catch-cry by divergent groups in society. Many perceive it to be synonymous with preservation. Thus, the conservation of native forest has meant to make it sacrosanct from the hand of man. Others, perhaps with a commercial bias, consider that the conservation requirement is met if at least some fragment of the resource is excluded from any exploitation, or is not totally exploited.

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A biologist's view of conservation is usually enunciated in terms of permanent, healthy functioning of all the integral parts of an ecosystem. Further, if any action has a deleterious impact upon a part of the ecosystem to a point where permanent damage is incurred, the whole ecosystem will suffer damage with possible serious impoverishment or death (Poore, 1982).

Conservation is, therefore, aimed at keeping actions harmful to the ecosystem to a level where a balance can be maintained between its various components so permitting the system to sustain and renew itself. It will then be able to continue to provide society with a perpetual yield of natural resources.

The proposed New Zealand conservation strategy (Nature Conservation Council, 1981) considers conservation to be "... the management of human use of the biosphere to yield the greatest sustainable benefits to present generations while maintaining potential to meet the needs and aspirations of future generations." The Conservation Strategy further describes conservation as "... positive, embracing preservation, maintenance, sustainable utilisation, restoration, and enhancement of the natural environment."

Just how to control the activities of man to ensure the survival of any ecosystem is the task of conservationists. Although King (1978) points out that, for centuries, man has been able to live in harmony with his environment recent decades have witnessed an exponential growth of populations. This, coupled with greater affluence and higher expectations, has resulted in an increased rate of consumption of natural resources. King remarks that the rate of forest exploitation has quickened "... to such an extent that forests in many places have become degraded if they have not been razed to the ground."

Much as man might manipulate his environment, his prime concern must be to sustain the quality of those components essential for life; fresh air, clean water, food and shelter. Conservation is thus an exercise in the maintenance, perpetuation and utilisation of natural resources for the long-term benefit of the human family, which Richardson (1983), citing a Nigerian credo, defines as embracing "... many are dead, a few are living and countless numbers are still unborn."

It is clear that conservation does not mean placing a ban on the use of resources. A parallel can be drawn with the use of interest accruing from a fixed deposit account or the affections of a sweetheart (given that banks are secure and love is eternal).

ANCIENT, DISTINCTIVE NEW ZEALAND

The New Zealand land mass, with its primitive biological cargo, was set adrift from the other fragments of the ancient Gondwanaland supercontinent about 80 million years ago (Fleming, 1977). Subsequent isolation in the South Pacific has put a unique stamp on present-day flora and fauna. Some species, such as kauri, the podocarps and beeches, have ancestors which extend back 250 million years. Their early prototypes were widely established before the disintegration of Gondwanaland and, although their descendants still exist on portions of the dismembered former land mass, in New Zealand they continue to dominate the forest cover. A similar inheritance of antiquity is evident amongst present-day wildlife species such as the tuatara, native frogs and wattle-birds. Elsewhere in the world such ancient creatures have been eliminated by more recently evolved, better adapted, competitors. These ancient links led David Bellamy to enthusiastically proclaim that New Zealand's primeval forests "are a workshop of evolution . . . an immensely exciting place!"¹

The distinctiveness of New Zealand's natural forests is assigned special significance in the global conservation strategy prepared by the International Union for the Conservation of Nature and Natural Resources (IUCN).

FOREST DESTRUCTION

Before the appearance of Polynesian man in New Zealand, the country was, with the exception of alpine regions, essentially forest covered. Large tracts, particularly in the drier eastern regions, were burnt and destroyed. The arrival of Europeans accelerated the rate of forest destruction. Much was logged, burnt and cleared to make way for settlement and pastoral farming. It has been said of native timber that it was used to build the cradle that nurtured fledgling New Zealand. Between 1860 and 1900, kauri timber was the major export that provided essential overseas funds for national development. By 1915 much of the North Island's lowland indigenous forest had been cleared. Of the 1.5 million ha of mature kauri forest that was present before colonisation only a few thousand hectares remained (Lloyd and Guild, 1976). Despite a growing concern about the

¹ "Wanted Alive." Spectrum documentary, Radio N.Z., 1982.

rate of forest destruction no effective action was taken to reduce the level of cut. Production actually increased following World War 2. Finally, the penalty for overcutting was exacted and timber production declined dramatically.

Historical parallels can be drawn around the world. Wholesale forest exploitation now threatens the survival of vast areas of tropical forests. One of the globe's "last frontiers", the seven million square kilometres of forest in the Amazon Basin, is now under seige. "The Amazon is not the lungs of humanity. We have the same right to destroy our wilderness as the Americans had in the Far West," said Adeilda Martins de Lucena, editor of *Correio do Sul*.² The luxurious, diverse vegetation of tropical forests belies the fact that they are a "counterfeit paradise". Their soils are generally not sufficiently fertile to support sustained agricultural activity once the forest mantle is removed. Despite this widespread knowledge, forest destruction continues to accelerate.

THE "ENVIRONMENTAL ERA"

The dawning of the "environmental era" or "conservation movement" in New Zealand, in relatively recent years, has aroused a general awareness of natural land values. The long-held view that indigenous forests were an encumbrance on the land and were disposable and unmanageable has now well passed. Publicly owned forests in particular are recognised as nationally important ecosystems which are becoming increasingly more valuable for high quality timber production and for providing a myriad of values and needs of society.

The diverse nature of the many demands now placed on natural forests has necessitated the development of new management policies and procedures which reflect and respond to changing public philosophies. A pendulum-like phenomenon of shifting public attitudes towards native forests is patently evident. Gleason (1977) commented: "While this may seem reasonable in today's light, many fail to appreciate the mood of yesteryears when an endorsement of *bona fide* production indigenous forestry was an invitation to be recognised as feeble-minded."

A shifting scene of public values is also apparent in other fields of natural resource management. A. H. Wall, writing in the *Dominion* (11 February 1983), following the Wheao canal

² *Time*, No. 42, October 18, 1982, p. 100.

collapse, said "... in the 40's and 50's the engineers and dam constructors were hailed as heroes but now they are increasingly being portrayed as monsters hellbent on raping and despoiling the natural beauties of the countryside." Molloy (1980) expresses this phenomenon more philosophically: "Conflicts come and go, and values evolve, so that the problems and solutions we face today are not the same as those of our forebears and will not be the same for our successors."

NATURAL ENVIRONMENT VALUES

Whilst exotic production forestry or grassland farming can be couched in well understood monetary terms, it is extremely difficult, if not impossible, to assess the value of wilderness, recreational opportunity, scenery or wildlife habitat. Westman (1977) comments further: "And yet, in the inexorable quest to rationalise the activities of the civilisation, policymakers in Western societies have increasingly asked the monetary value of items and qualities formerly regarded as priceless: clean air and water, untamed wildlife, wilderness itself." Westman suggests that the goal of this is to permit the benefits of nature in the undeveloped state to be weighed against the benefits of resource development, thus achieving an objective basis for decision-making (whereby selection will be made by choosing the alternative whose costs in terms of damage to the ecosystem are exceeded most by the benefits to be obtained from resource use).

A more sensitive approach to natural resource management is now apparent. There has been a significant shift from the era when undeveloped areas were regarded as worthless. There is no substitute for many natural land values. Only wilderness is wilderness and once it is developed it can never be recreated.

New Zealand's landscape has undergone dramatic change during the relatively short period of man's occupation. A sense of uneasiness and insecurity is now detectable because of this rapid modification of the pristine environment. Some fear that New Zealand is losing its distinctive natural character. The proposed New Zealand conservation strategy (Nature Conservation Council, 1981) comments that we do not possess ancient buildings and other artifacts that are the basis of cultural heritage of many countries. Because of this "... the natural heritage of unique flora and fauna is very important for providing visual symbols of a national identity, particularly as traditional ties

with British heritage and tradition are becoming weaker. The kiwi and silver fern, for example, are well known symbols in the sporting and commercial worlds". Natural environments fulfil important needs of society. They contribute towards spiritual well-being, personal satisfaction and a distinctive New Zealand identity.

THE MANY USES OF INDIGENOUS FOREST

The prediction of demand for the use of natural areas is hazardous. Much will depend upon future trends such as technology development, energy sources, consumption patterns, and the ratio between work and leisure time. It does therefore seem prudent to allow future generations the widest possible range of options for managing, utilising and enjoying natural ecosystems.

Genetic Material

The maintenance of the genetic diversity of the indigenous flora is an important management consideration. Tapping this gene pool is one of the non-wood benefits that can often be realised in monetary terms. The loss of endemic genetic information potentially useful in identifying new chemicals and pharmaceuticals and in invigorating agricultural plants through cross-breeding is irreversible. It has only been in the past two decades that the seemingly insignificant plant poroporo (*Solanum aviculare*) has been discovered. It is cultivated as a source of the pharmaceutical chemical solasodine which now assists with birth control from Britain to Bangladesh.

Soil and Water Protection

The role of indigenous forests in the maintenance of soil stability and water quality is well appreciated. The folly of forest abuse in mountain regions and its consequences for lowland urban dwellers has been stressed by Holloway (1960) and Morris (1974). Although soil and water conservation is primarily a function of upland forests, it is a necessary consideration in lowland areas which are adjacent to areas of substantial investment. Forest deterioration has a real cost. Disturbance of the water regime and increased sediment loading of waterways can be quantified in terms of hydro dam and reservoir siltation or the requirement for increased water treatment.

Recreational Opportunities and Tourism

The recreational opportunities afforded by natural forests are widely acknowledged. The diverse beauty of forests offers mental refreshment and inspiration for jaded city dwellers as well as physical exercise.

Tourist revenue generated by well-patronised natural areas containing extensive tracts of forest, such as National Parks and State Forest Parks, may make a worthwhile contribution to the regional economy. Pearce (1982) estimated that 126 000 people visited Westland National Park in the year ended 31 May 1980.

Expenditure in the Westland County associated with these visitors totalled \$5.7 million.

Animal Production

The retention or extermination of "noxious" animals inhabiting native forests has been a vexed question over the years. The compromise outlined by Chavasse (1978) now has wide acceptance, "... the introduced animals which have become established in this country must be accounted an asset (both for export of meat and for hunters, including tourists) albeit in need of strict control in order to protect other forest values. It would seem that, in many areas, a reasonable degree of control has now been achieved and can be maintained."

Biological Benchmarks

About 10% of New Zealand's land surface (*ca* 2.7 million hectares) is set aside in various reserves where the prime concern is the preservation of flora and fauna. Although the extent of reservation is usually considered commendable, a high proportion of this reserved area is in upland forest or alpine regions for which it is difficult to envisage any use involving site domestication. Molloy (1980) considers that the area in reserves that could readily be converted to agriculture or exotic forest is about 4.5%. Because this constitutes only 0.5% of New Zealand's land area, he suggests that the land designated for reserve in preference to a use forgone represents a very small real sacrifice.

Reserves are considered to have a role as "biological controls" on land use. Proponents of this view consider that an appreciation of natural ecological processes permits more knowledgeable and responsible ecosystem manipulation and a means of measuring the efficiency and impact of commercial undertakings. However, Gleason (1977) is sceptical of this need. He retorts, "Practically all of the country gets along without these controls, however,

especially the highly developed regions most modified by agricultural industries, and presumably the areas where one day they might be of some use. Ironically, the relatively undeveloped West Coast possesses, by its very nature, marvellous opportunities for reserving the extensive lowland forest ecosystems so essential to a region of intensive land-based production — precisely what won't happen to the area."

There is a strong case to support the view that, provided adequate reserves of unmodified ecosystems are set aside, the remaining area should be considered to have a management option for a range of products and benefits, including wood production. Holloway (1982) is of the opinion that the addition of South Okarito and Waiukupa forests and all the remaining unmodified podocarp forest in Pureora to adjacent reserves has removed the desirable flexibility of later management choice. He suggests that this decision was an over-reaction by government and points to the fact that the area now in reserve is far in excess of that for which reserve status was recommended by an independent scientific advisory body. Gleason (1977), in more vociferous terms, suggests that government has yielded to orchestrated pressure: "From the heart of our urban-dwelling middle-class intelligentsia an array of biological scientists and environmentalists have emerged to trumpet the call for preservation of undisturbed 'lowland ecosystems' as ecological areas."

A thorough evaluation of reserve needs should precede the irrevocable declaration of reserve status. Some past decisions could well be viewed as lasting and ill-conceived. Reserves fill a valuable function but equally valid uses should be given comparable consideration.

Timber Yield

Timber production from indigenous forests needs to be based upon the principle of perpetual supply. This in essence is the intent of the Management Policy for New Zealand's Indigenous State Forests (N.Z. Forest Service, 1977) but before this can be achieved more research is necessary. Although forest management in some areas is showing promise other areas have encountered major difficulties. Because the podocarp terrace forests of central and south Westland are likely to yield significant quantities of timber, it is vital that sustained yield management techniques for this forest type be developed. Many setbacks have been experienced to date.

The chronology of research interest and commitment to silviculture and management of indigenous forests has not been

entirely satisfactory. Projects requiring long-term study have received discontinuous effort. These fluctuations have been attributable, to a large degree, to the changing perceived potential of indigenous forest management. Factors such as the spectacular growth of exotic plantation forestry have caused major shifts in research priorities and resource and manpower allocation.

Many studies conducted in indigenous forest, even some recently undertaken, have not examined aspects relevant to the goal of determining appropriate silvicultural and harvesting methodologies for sustained yield timber production. Botanists with a taxonomic inclination have contributed significantly towards an understanding of the composition and distribution of the flora whilst work on resource inventory, forest productivity and stand dynamics has been neglected. A parallel can be drawn with the car owner who, while knowing the condenser from the coil and the big-end from the brake lining, had not learnt to drive it. We still have some way to go before we are capable of propelling New Zealand's natural forests along the road of sustained yield management. As well as an appreciation of the ecological status of timber species, detailed knowledge of the growing stock, stand structures, productivity, regeneration requirements and suitable harvesting techniques is required.

Because the conflict between the level and manner of timber extraction and other forest uses will remain, it is necessary to endeavour to evaluate, using acceptable criteria, the various trade-offs involved.

A synopsis of the current timber management "state of the art" for the major indigenous forest types is:

- (1) **Kauri:** The prospects for continued management are encouraging. Substantial areas of regenerating forest have followed in the wake of early exploitation (Barton, 1975). The 1973 Kauri Policy recognises the need to perpetuate kauri for biological reasons, public enjoyment, and as managed stands for a limited yield of special-purpose timber. The utilisation of kauri forests for timber is centred on second-crop stands. This shift in production emphasis from selective logging in old crop kauri has taken place over the past 3-4 years as techniques for the continued management of second crop forest have been developed (Halkett, 1980).³

³ "Kauri Forest Management Review," containing a proposed revision of the 1973 policy, was published by the N.Z. Forest Service in December 1983.

- (2) **Podocarp:** The instigation of sustained yield management for podocarps has been frustrated by factors such as advanced stand age, soil drainage peculiarities, and long-term sale commitments. Often harvesting techniques employed have severely disturbed the forest structure and resulted in a high incidence of post-logging mortality. Patch clearfelling with natural regeneration and supplementary planting may offer some silvicultural opportunities for future management.
- (3) **Beech:** Silvicultural techniques are well understood and effective in western Southland. Both red and silver beech show potential elsewhere with adequate regeneration and rapid growth following clearfelling. A considerable obstacle confronting beech forest management is the large amount of below sawlog specification material present in stands. Gleason (1982) comments that responsible management will necessitate developing an outlet for "... the massive amounts of waste from current operations ..." and the substantial volume of low grade produce available from stands not yet harvested.

NATURAL FOREST MANAGEMENT

Individuals and groups involved or interested in natural forests still often hold widely divergent views despite recent policy revision, legislative amendments and modified forest management practice. Conflicts occur because polarised opinion results in incompatible demands being made upon areas of forest. Antagonistic forest use must be reconciled objectively by responsive policy-making, multiple-use zoning, and respect and tolerance of all views and needs.

The production of a range of commodities, benefits and non-material values from forests must be matched to the rate of renewal and maintenance of all resources. This presupposes a detailed appreciation of the intricate interactions between the components of the forest ecosystem so that environmental calamities which may have serious ecological and social consequences can be avoided.

Research examining the nature of forest ecosystems is not the only necessary ingredient required for responsible management. A balanced decision-making process must involve a consideration of social and other issues. We need to ask and attempt to answer questions such as: What is the cost to society of replacing a diverse natural landscape with a simplified domesticated one? What is the future market for chemicals and pharmaceuticals as yet undis-

covered? Can the value of an endangered species be compared to the value of a work of art? What is the value of wilderness against which to evaluate the progress of civilisation? An attempt to answer these and similar questions would facilitate a more rational approach to the management decision-making process. Until such time as a broadly based public and government acceptance of this balanced approach is achieved it will be exceedingly difficult to plan for continuity of indigenous forest products and values.

While it may be said that a range of social and economic benefits are accommodated in present forest policies and management practice it is still necessary to adopt an "options open" stance in planning. It will be unwise to set aside further significant areas of forest for specialist single use without a very thorough consideration of the future implications of such actions. All types of natural forest should be accorded the fullest possible protection consistent with the maintenance of opportunities for future generations with advanced technologies to participate in the management decision-making process. To remove this flexibility, which would, for instance, permit the harvesting of high value timber with special use attributes without detracting from other forest values, would be a retrograde step.

In every case the philosophy expounded by Baumgart (1979) should influence decisions; "how to *use* resources rather than *use them up*; how to *manage* resources rather than *expend* them, how to *sustain* them rather than *consume* them."

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