

The role of the Forest Service in conservation of native state forests

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Abstract

The New Zealand Forest Service's contribution to the conservation of native forests has not been widely acknowledged. The department has introduced policies for less wasteful utilization, better management systems, the replacement of native timbers with plantation-grown wood, and the reservation of a comprehensive network of representative ecosystem reserves. Nearly 400,000 ha of native forest had been, or was in the process of being, reserved as Ecological Areas as at April 30, 1986.

Introduction

The Forest Service has received little recognition for its achievements in the conservation of indigenous forests. This paper is an attempt to redress this imbalance. It deals with the subject under six main headings: the replacement of native timbers by introduced species; marketing policies; advances in logging methods; wildlife issues; the Indigenous Forest Policy; and the selection and dedication of reserved areas.

Replacement of native timbers with introduced species

There have been various estimates of the extent of the forests at the time of European settlement in the mid 19th century. A generally accepted figure appears to be about 14 million ha or 56% of the land area. Settlement produced an overwhelming drive towards the achievement of a viable agricultural economy, and the forests were an obstacle to that goal. An indication of the rate of forest destruction is given by Wynn (1979) as perhaps 1½ million hectares between 1864 and 1874.

A Royal Commission on Forestry in 1913 (Anon. 1912) concluded that the native forests would be unable to supply sufficient timber in the long term and recommended that large-scale exotic plantations be established.

The Forest Service was established in 1919 and by the end of the 1925-35 planting boom over 300,000 ha of exotic plantation forest had been established, by both the State and private sectors. From then until the mid-1950s the utilization of plantation-grown trees for tim-

ber and pulp and paper-making was developed. Standards were also formulated for drying, preservation, grading and for specific end uses.

The reports of the Director of Forestry over that period exhibit a strong faith in the ultimate capacity of plantation-grown wood to displace, and thereby conserve, the wood from the native forests. When the cut of timber from the plantations first exceeded that from native forests, in 1955, that was regarded as a significant landmark, both in the development of an industry based on the introduced species as well as in the conservation of native forest resources. The amount of timber provided from exotic forests represents a saving of much of the lowland native forest remaining today, and has provided the opportunity for reserving representative indigenous forest ecosystems in ecological areas, sanctuaries and other forms of reservation.

Marketing Policies

A brief historical review has been published by Thomson (1974). He noted that, immediately prior to the formation of the Forest Service, most Crown timber was sold "almost entirely without competition, on output, and with crude rule-of-thumb valuation procedures". The 1921 Forest Act introduced policies that were less wasteful but still left much to be desired.

From the early 1950s the Director of Forests, A.R. Entrican, was a strong advocate of the conservation of the native forests and introduced further policies aimed at less wasteful timber usage.

From about that time the Forest Service consistently sought Government approval for the abolition of price control on native timbers. Price control was removed from kauri in 1965 and it then became a very high value species able to bear the costs of very sensitive logging, in particular the thinning of second growth stands using helicopters for log removal. However, it was not until 1979 that price control was removed from other native timbers. If that had been done sooner, the consequent adjustments in market values should have allowed the use of more sensitive logging methods for podocarp forest.

Logging Methods

In the mid-1950s, new logging methods

were introduced in South Westland. As a first step in the evolution towards better management systems strip felling was introduced whereby 80-100 metre strips were alternately felled or left, in the expectation that the standing strips would be a source of seed to regenerate the felled areas.

In the 1960s this technique was replaced by a form of selective logging in which only a proportion of the trees were removed. Later research by James and Franklin (1977) showed that these methods had some undesirable side effects. For example, in almost flat terrace country, logging often resulted in the ponding of water, and the logging machinery caused physical damage to the root systems of retained trees. Both effects resulted in some tree deaths and windthrow, so that several years after logging many stands exhibited a net decrement of wood. However a modified forest structure had been maintained with many of the forest values remaining intact. Those who persuaded the Government of the day that these selectively logged forests should be subsequently clear-felled have done conservation a disservice.

The Forest Research Institute established selective logging trials at Pureora and Whirinaki in 1961 and 1979 and at Tihoi in 1975. The 1979 Whirinaki trial, which tested three different treatments and removed low timber volumes, was the most advanced of the methods used and has every appearance of success. It was, however, followed by a Government decision to stop native forest logging in Whirinaki State Forest.

The Forest Research Institute, having developed a successful approach, must now decide whether, considering the inevitable continuation of logging in non-State-owned native forest, it should continue this line of research or opt for the complete abandonment of all research into logging native forests.

Wildlife Issues

When the first Director of Forestry, Leon MacIntosh Ellis, presented to Parliament in 1920 a report entitled "Forest conditions in New Zealand and the proposals for a New Zealand forest policy", he recommended that the Forest Service should have responsibility for the protection and administration of wildlife and game. This proposition was not

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accepted. Avifauna became the responsibility of the Department of Internal Affairs under the Animals and Game Act (1921-22).

Nevertheless, the early reports of the Director of Forestry refer to the department's recognition that the native forests and native birds are interdependent. For example, the 1929 report said: "The conservation of bird life throughout forested areas is regarded as an important duty of the Forest Service, but this protection and propagation in some districts are contingent upon the vast numbers of deer, stoats, weasels and rats being dramatically reduced."

With hindsight it seems to have been illogical to tell the Forest Service, back in 1920: "You are responsible for the trees but the birds that live in them are nothing to do with you." It is little wonder that the department was later to come under criticism for not having a specific policy for wildlife conservation.

There is insufficient knowledge of some rare birds to enable informed management decisions to be taken on specific issues. It is no credit to New Zealand that funds to study endangered bird species have at times had to be raised by charitable donations. Little is known of the habitat requirements of some bird species and the reasons for their dwindling numbers are still a matter for speculation. For example, Williams (1976) stated that habitat destruction has been responsible for the disappearance of wattle birds (kokako and saddleback) over much of the North Island and limited parts of the South Island, but he pointed out that it does not explain their disappearance over most of the South Island. Atkinson (1973) considers that the probable spread of ship rats through the North Island after 1860 and the South Island after 1890 may be "directly responsible for major declines in the numbers of several species of native forest birds". Until more light is thrown on habitat requirements and population dynamics of individual species, and the reasons for their decline, it is difficult to adopt a scientifically rational policy to provide for broad requirements in native forests. The information required includes the effects of forest modifications on bird life, as these affect such questions as the adequacy of selectively logged forest as a link between Ecological Areas.

Because of the lack of adequate knowledge of forest wildlife, and despite the absence of direct statutory responsibility in this area, the Forest Service has itself undertaken some wildlife research over the last ten years. It has monitored the effects of selective logging on birds in South Westland, the effect of beech management on birds in Southland and Westland, monitored the effects on birds of poison control operations against pos-



The proposed Ohinemaka Ecological Area just south of Bruce Bay in South Westland. The area runs from out of the left of the picture across and out at the right-hand side. It does not include the valley in the centre background.

Photo: Ian Platt.

sums, studied introduced predators, and participated in a joint study of the kokako. However, it has not been able to divert enough resources to study many important questions, such as the effects of forest management practices on bird movements and the importance of 'wildlife corridors'.

Forest Service forest reservation policies

As a result of the Waipoua forest controversy in the 1940s, the 1949 Forests Act provided for the setting aside of sanctuaries to preserve indigenous flora and fauna in its natural state for scientific and similar purposes. Fourteen Forest Sanctuaries have been gazetted to date, totalling 16,288 ha. The largest is Waipoua Sanctuary of 9105 ha which was gazetted in 1952 to preserve outstanding kauri forest. The status of forest sanctuaries can be revoked only by an Act of Parliament.

There has been a tendency to interpret the term sanctuary to mean that public entry is prohibited, but in fact this is not so. The Act provides only that the purposes for which the sanctuary has been established will be maintained and protected.

The beginning of the present era of ecosystem conservation in State forests is marked by a paper by Thomson and Nicholls (1973). They considered that the Scenic Reserves did not provide a good sample of the indigenous forest types and that many important forest types were absent from National Parks. They therefore concluded: "If we are to have good representative examples of all forest types contained in reserves for scientific purposes, as indeed we should have, most by far will have to be established in State forests."

They expressed a holistic policy of

conserving distinct ecosystems incorporating vegetation type sequences, land forms, soil types, bird and other wildlife habitats and particular hydrological regimes. They conclude that "implementation of this basic philosophy of ecosystem conservation will result in a New Zealand network of scientific reserves in State forests".

This philosophy was incorporated in the Indigenous Forest Policy (Anon., 1977) which was developed at the two-stage Forestry Development Conference in 1974 and 1975. The policy was developed with the active participation of public interest groups, approved by the Labour Government in 1975 and the National Government in 1977, and given a statutory basis by the Forests Amendment Act 1976. The policy included a prescription for the reservation of forest for scientific purposes. It also made provision for a multi-disciplinary panel of scientists to be established to set criteria for reservation, identify areas meeting those criteria and make recommendations accordingly.

Conservation in South Island beech forest areas

In the meantime a multi-disciplinary panel called the Scientific Co-ordinating Committee for Beech Research (SCC) had already been established in 1974 to advise the Minister of Forests on scientific aspects (including reserves) of proposals for the utilization and management of South Island beech forests. The committee was composed entirely of scientists: from the Forest Service (2), DSIR (2), the Royal Society of New Zealand (2), the Wildlife Service (1), Ministry of Agriculture and Fisheries (1) and Ministry of Works and Development (1).

In 1977 the SCC's responsibilities were extended to advise on proposals for Ecological Areas in all indigenous State forests in New Zealand.

Early in its existence the committee developed guidelines for the ideal Ecological Area (Anon. 1974 and 1983), some of them based on the work of Diamond (1976), others aimed at facilitating management. They are:

1. It should represent the full range of land-forms, soil sequences, animal communities, and unmodified vegetation of the ecological district. The inclusion of some modified vegetation may sometimes add to the value of an Ecological Area.
2. It should be large with, say, a minimum of 1000 ha; a single large reserve is preferable to two or more smaller reserves of the same total area. This is particularly true for preserving the greatest diversity of bird populations.
3. It is considered legitimate to create small reserves to preserve unique features or special values, although these could present special problems in protection.
4. It should include at least one complete undisturbed catchment of a permanent waterway.
5. It should have a compact shape, with the minimum perimeter for the area involved.
6. Wherever possible, its boundaries should be clearly defined by natural features.
7. It should be unroaded, at least within the main catchment.

The committee recognized that not all Ecological Areas would satisfy all of these criteria.

The Ecological district concept

The concept of dividing geographic regions into ecological districts, based



The proposed Burmeister Ecological Area. Mt McLean is centre left. The area runs from the coastline to the main alps where it abuts Mt Aspiring National Park. Photo: Ian Platt.

mainly on the unifying features of vegetation pattern, local climate, geomorphology and soils, was introduced to the SCC by J.L. Nicholls of the Forest Research Institute. In the simplest application of this concept to the committee's work, a major representative ecological area would be reserved in each ecological district. However, in practice, the SCC found that sometimes not all representative features could be found within a single reserve, nor could some outstanding or unique features. It was therefore common for the SSC to recommend several ecological areas in a single ecological district.

As a direct consequence of this work, the wider scientific community has adopted the concept of ecological districts and has divided up the whole country on this basis (Simpson, 1982). This will inevitably provide a valuable framework for many types of planning, particularly conservation planning.

The Ecological Area Network

The SCC began its work in the beech project areas in 1974, was given a national mandate in 1977, and was later renamed the State Forests Scientific Reserves Advisory Committee (SFSRAC) with revised terms of reference and a widened membership. Its functions were:

1. To advise the Director-General of Forests on selection of representative examples of ecosystems in State forest which are of considerable scientific interest for:
 - (a) studying, understanding and explaining natural processes;
 - (b) maintaining benchmarks to measure changes;
 - (c) maintaining the genetic diversity of plants and animals;
 - (d) preserving rare native plants and animals in their natural com-

munities and habitats;

- (e) preserving notable examples of the natural landscape, such as geological and soil sites, streams and topographical features.
2. To advise on national guidelines for reserve management and research in indigenous State forest reserves and, where warranted, to comment on specific aspects of the management of individual reserves.

This statement of functions formalized the rationale that the SSC had used from its inception.

The result of the work of these advisory committees has been as follows:

Ecological Areas in Indigenous State Forests as at 30 April 1986

	Number	Area (ha)
Gazetted	83	194,036
Approved but not yet gazetted	47	130,574
Recommended	21	61,284
	151	385,894

The individual ecological areas range from 0.5 ha to 26,000 ha. The distribution of sizes is:

More than 20,000 ha	1
15-20,000 ha	0
10-15,000 ha	6
5-10,000 ha	15
4-5000 ha	4
3-4000 ha	13
2-3000 ha	21
1-2000 ha	36
500-1000 ha	15
100-500 ha	29
Less than 100 ha	11
	151

Critics of the SSC have said that the area of 1000 ha was more often used as a maximum than a minimum. These figures show that assertion to be incorrect. Moreover many of those Ecological Areas that are less than 1000 ha are "special purpose" areas to preserve unusual features as distinct from the larger representative areas. Also the smaller ones are sometimes remnant areas: the alternative was to reserve nothing of that type in that district.

For the most part Ecological Areas do not stand alone as "islands": they are usually surrounded by large tracts of forest zoned in management plans for other compatible uses such as amenity, historical, recreational or protection.

Although it may seem heretical to say so, I consider that, hectare for hectare, the Ecological Areas have greater intrinsic scientific value than the national parks. National parks are predominantly at high altitudes, isolated and of broken topography. At the time they were set

aside they were probably perceived as having few production values. In contrast, Ecological Areas have been selected to cover the range of scientific values irrespective of locale, within the constraint of having a limited amount of lowland forest to choose from. I hope that in the future they will retain their identity and continue to be accorded high scientific value.

Protected Areas Scientific Advisory Committee (PASAC)

From mid-1984 the SFSRAC was replaced by PASAC, which may be seen to have evolved from the SCC and SFSRAC. The new committee, which also has a widely representative scientific composition, has the wider mandate to advise on the reservation of all Crown-owned land.

Consideration of Other Values

Most Ecological Areas were located to sample complete vegetation sequences, so that many extended from the lowest to the highest altitude over which State forest was available. Inevitably, much merchantable lowland forest was includ-

ed and there was a considerable impact upon utilization possibilities. Despite the fact that timber undoubtedly worth tens of millions of dollars was rendered unavailable for utilization, the Forest Service, with few exceptions, accepted the recommendations of the Committees.

In North Westland, the Government of the day required that the reserve recommendations be considered by a committee of officials to assess the socio-economic implications of the reservation of the areas that had been recommended. That committee's report (Anon., 1979) recommended reduction of the area of two of the reserves, but the majority of the reserve recommendations were sustained.

That is the only occasion on which there has been any formal examination of the socio-economic impact of the Ecological Area recommendations.

Summary

This paper demonstrates that the Forest Service has been responsible for:

- evolving more conservation-oriented marketing policies and logging methods for native timber;

- conserving native forest by converting to a plantation-based timber economy;
- accumulating a large body of knowledge on native forest ecology;
- pioneering the concept of Ecological Areas in New Zealand and establishing a scientifically-based body for their selection, *which*
 - established criteria for reserve selection;
 - adopted the ecological district concept which has subsequently been applied nationwide;
 - identified and set aside a reserve network highly representative of forest ecosystems in indigenous State forests;
 - evolved into a scientific committee to integrate the reservation of all lands of the Crown on a scientific basis.

References

- Anon., 1913. Royal Commission Report on Forestry. N.Z. Government Printer, LXXVII - 87PP.
- Anon., 1974. Beech Research News 2 : 9.
- Anon., 1977. Management Policy for New Zealand's Indigenous State Forests. Government Printer, Wellington.
- Anon., 1979. Report to the Minister of Forests. Officials Committee on the West Coast Reserve Proposals, NZ Forest Service, Wellington.
- Anon., 1983. Guidelines for selection of Ecological Areas. Beech Research News 8 : 10.
- Atkinson, I.E.A., 1973. Journal of the Royal Society of New Zealand 3 : 457-472.
- Bassett, C. 1979. The Reservation of New Zealand's Indigenous State Forests for Scientific Reasons. FAO Forest Genetic Resources Information 9 : 1-5.
- Bassett, C. and Miers, K.H., 1984. Scientific Reserves in State Forests. Journals of the Royal Society of New Zealand 14 : 29-35. (NZFS Reprint 1656).
- Diamond, J.M., 1976. Relaxation and Differential Extinction on Land-bridge Islands: Applications to National Reserves. Proceedings International Ornithological Congress 16 : 616-628.
- James, I.L.B. and Franklin D.A., 1977. Preliminary results on the effects of selection management of terrace rimu forest. New Zealand Journal of Forestry Science 7 : 349-358.
- Simpson, P. (Comp.) 1982. Ecological regions and districts: a natural subdivision of New Zealand. Biological Resources Centre Publication 1 : 1-63.
- Thomson, A.P., 1974. Marketing of Forest Products. New Zealand Journal of Forestry 19 : 75-83. (NZFS Reprint 156).
- Thomson, A.P. and Nicholls, J.L., 1973. Scientific Reserves in New Zealand Indigenous Forests. New Zealand Journal of Forestry 18 : 17-22.
- Williams, G.R. 1976. The New Zealand Wattlebirds (*Callaeatidae*). Proceedings of the 16th International Ornithological Congress.
- Wynn G. 1979. Pioneers, politicians and the Conservation of forests in early New Zealand. Journal of Historical Geography 5 : 171-188.

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