

MANAGEMENT, CLASSIFICATION AND ZONING OF NEW ZEALAND INDIGENOUS FORESTS

A. KIRKLAND*

Abstract

Indigenous inventory data collected in 1974 are broadly reported and their implications analysed in terms of New Zealand's proposed new indigenous forest policy. An approach is presented to the task of translating the proposed broad policy into a series of detailed regional working plans.

INTRODUCTION

This paper deals briefly with the task of translating a general indigenous forest policy into a detailed regional working plan. As any policy is only as good as the manner in which it is implemented, this is a task worthy of closer consideration than is possible in the paper, which serves only as a pipe opener. A second part of the paper printed elsewhere (Kirkland and Trotman, 1974) provides regional area statistics, forest descriptions, and broad intentions for management of State forests.

THE PAST

Primitive New Zealand was largely a forested land. The price of economic development of this country has included the complete removal of much of the lowland forests. For the greater part of the period of European settlement the replacement of forest with grass has been actively encouraged, and the "bush" has been regarded by the majority as a source of timber and of land for development. Historically those who saw the need for conservation of indigenous forests have been a small but, fortunately, relatively influential minority. The past few years have witnessed a major change in traditional attitudes. The apathy which characterized public reaction to virtually all forest policies has been replaced with an intense interest in those policies which might have the effect of further

*Director of Forest Management, N.Z. Forest Service, Wellington. This paper is slightly modified from Indigenous Forests of New Zealand, Part I, an address to the 1974 meeting of the Forestry Development Conference, Wellington.

reducing the indigenous forest area. The main result will be a demand for even more detailed planning of the use of indigenous forests, particularly those of the Crown, than has been the case over the 50 years since a separate government department was created and soundly based forestry planning commenced.

The clearing of forests began with the Polynesian settlers, who deliberately or by accident reduced the primeval area by perhaps half. By the time European settlement commenced, about 11 million ha remained. Estimates of the subsequent rate of reduction are not particularly reliable because of changes in base mapping between successive inventories. It would appear that between the commencement of European settlement and the economic depression of the 1920s and 1930s the forest area was again halved. Simple figures do not tell the whole story. The forest removed has been almost all in the lowland and many of the forest types, particularly on alluvial or recent soils, have disappeared almost completely as a consequence.

POLICY, INVENTORY, AND PLANNING

The first requirement for sound planning of the use of the remaining indigenous forests is a clear forest policy. The policy for State forests, laid down in 1920, has served well but the need for a comprehensive restatement has become clearly evident and has been dealt with in the introductory paper by the Director-General of Forests. There has been no policy for indigenous forests outside of Crown ownership other than to encourage their removal for settlement or discourage clearfelling for soil and water conservation purposes.

Given a policy framework, the second requirement, which is needed for its proper implementation, is an adequate inventory of all elements that should contribute to forest planning.

The third stage is the synthesis of such inventory information, using all the professional skills and technical knowledge of the forester, into a plan. Planning is needed at both the national and the regional level.

Some reflection will reveal that in none of the three stages described can the indigenous forests be treated in isolation of the land resource generally. Indigenous forest policy should therefore be part of a general land-use policy, and regional forest planning should be part of regional land-use planning. The current inadequacies of general land-use inventory data will be dealt with elsewhere in the 1974 Forestry Development Conference. These limitations impose severe difficulties on integrated planning.

INVENTORY DATA

To date, the collection of inventory data for indigenous forests on a systematic New Zealand-wide basis has been con-

fined to the mensurational and ecological surveys of the N.Z. Forest Service. The monitoring of the effect of noxious animals, the assessment of recreational use, and the definition of areas of scientific interest are among the inventory tasks that the department has undertaken locally in priority areas.

Early surveys were concerned primarily with estimating available volumes of timber. Between 1920 and 1923, a national forest inventory largely employed the ocular estimates of men experienced in logging and sawmilling. Despite the deficiencies, which were fully appreciated, the inventory allowed planning guidelines which proved generally accurate.

Between 1946 and 1955 a national forest survey was undertaken using techniques similar to those employed for surveys in Scandinavia and North America. In the absence of base maps of the requisite standard, the Forest Service prepared its own for much of the intensively surveyed area. The assessment itself was made by line plot sampling, and although oriented towards timber volume estimates this and the associated forest type mapping provided better ecological descriptions than hitherto available.

It was a logical step to build upon the national forest survey a systematic ecological survey of the country's forests. From 1956 to the present, ecological surveys have covered most of the North Island and limited areas of the South Island. The ecological survey is concerned initially with describing the complex of indigenous forest types but provides data essential to the objective delineation of scientific reserves and to understanding the distribution and dynamics of the forests. The work is published in the form of maps and descriptive leaflets as follows:

- Forest Service Mapping Series No. 6 — Forest class maps, scale 1:250 000. Maps depicting a broad ecological grouping of forest types into 18 forest classes.
- Forest Service Mapping Series No. 5 — Forest type maps, scale 1:63 360. Maps depicting detailed forest types and providing, on the reverse side, a wide range of related information.
- Forest Service Mapping Series No. 15 will be a country-wide forest class map at a scale of 1:1 000 000. As an interim measure, a provisional map has been produced for the 1974 Forestry Development Conference depicting 8 "super-classes".

The detailed descriptive material in Part 2 of the paper (Kirkland and Trotman, 1974) is derived largely from the ecological survey and the details of forest types, classes, etc. are covered in that section.

UPDATING NATIONAL FOREST SURVEY DATA 1974

Almost 20 years have elapsed since national forest survey data were published. During this period both the base mapping and available inventory techniques have improved and the time is ripe for a new inventory. In the absence of a revised inventory, a major effort has been made over the past six months to provide updated area information on indigenous forests. Any revision of volume estimates was impracticable in the time available.

There are large differences between the 1955 national forest survey figures and the 1974 updating, which result from the improved base mapping and which largely obscure the real changes in area that have taken place in the interim. The 1955 survey estimated, for example, that the total forest area was 5.8 million ha, of which 0.9 million ha were considered merchantable by the standards of the time. The 1974 updating estimates the total area as 6.2 million ha, of which 1.3 million ha are now considered merchantable. Despite logging in the interim, the merchantable area has thus increased but the degree to which this is attributable to the steadily lowering minimum standards of merchantability or to better mapping cannot be easily determined. The 1923 estimate of total forest areas was 5.1 million ha, an obviously conservative estimate, so that the rate of land clearing from then until the present day is unknown. Such discrepancies merely illustrate the danger of making any comparisons between successive inventories which employ different methods and the need for other means (continuous updating) for recording change of any sort.

The 1974 updating uses, for presentation of statistics in Part 2 of this paper (Kirkland and Trotman, 1974), the same regions as the National Forest Survey, 1955, with some modification to separate the West Coast beech project and to group a few minor forest areas more logically.

The procedure used to determine area in the 1974 updating was as follows:

- (1) Establish the forest area from the most recent information and classify it by "superclasses" and tenures. Generally only major areas (50 ha and above) were assessed.
- (2) Delineate "upland" forests. For this exercise arbitrary altitudinal limits were chosen. The country was divided roughly into thirds with the lower bound of uplands being set at 3 000 ft, 2 500 ft, and 2 000 ft from north to south. (Contours were not metricated on the base mapping.)
- (3) Delineate lowland protection forest, defined as forests for which the prime requirement of maintaining soil stability and conserving water precluded utilization.

- (4) Classify forest as virgin or logged. Classify areas which appear virgin, because logging was early and light, as virgin.
- (5) Assess merchantability on the basis that merchantable forests include those stands of sufficient extent, quality, volume, and accessibility to permit economic exploitation under present techniques and the market conditions operating within the region.
- (6) For State forests only, make a preliminary estimate of the area likely to be zoned for environmental purposes (including sanctuaries, biological and amenity zones), for long-term timber reserves and as timber supply areas. Estimate the likely extent of indigenous management, conversion to exotics, release for farming, etc., of the production forest area.

SIGNIFICANCE OF THE 1974 AREA FIGURES

The detailed statistical data derived from the 1974 updating are presented, along with descriptive data, in Part 2 (Kirkland and Trotman, 1974). It is emphasized that all figures are *provisional* and that a further major inventory would be needed to confirm them. Nevertheless, they are of a sufficient order of accuracy to give perspective to policies and plans for the use of the resource. The broad findings are presented in Table 1 and are discussed below:

- (1) The total area of forest is approximately 6.2 million ha, of which 2.5 million ha are in the North Island and 3.7 million ha are in the South Island (including Stewart Island). Indigenous forests thus occupy somewhat less than one-quarter of the New Zealand land area.
- (2) There are significant differences in tenure, amount of exploitation, and physiography between the indigenous forest areas of the two islands.
- (3) In the South Island 74% of the area is classed as protection forest, compared with 60% in the North Island. Whereas the protection forests of the South Island are evenly distributed between upland and lowland, those of the North Island are predominantly in the lowland. There are large areas of finely dissected and steep lowland hill country in such regions as the Ureweras and Taranaki hinterlands.
- (4) Indigenous forests in the "other lowlands" (*i.e.*, non-protection forest) category are slightly more extensive in the North Island (1.01 million ha) than the South Island (0.92 million ha). However, whereas over half of the North Island forests in this category are in freehold or leasehold, this tenure group is of relatively minor (16%) importance in the South Island.
- (5) The privately owned or leased "other lowland" forest of the North Island has borne the brunt of past logging, and

TABLE 1: INDIGENOUS FOREST 1974

A. INDIGENOUS FOREST AREAS AND TENURES									
<i>Tenure</i>						<i>Area</i>		(<i>million (million acres) hectares</i>) (%)	
State forest (administered by N.Z. Forest Service)						7.38	2.99	48	
National Parks and reserves (administered by National Parks Authority and Dept of Lands and Survey)						3.83	1.55	25	
Unoccupied Crown land (administered by Dept of Lands and Survey)						0.89	0.36	6	
Other ownerships (land not administered by the Crown, i.e., freehold land, leasehold land, and Maori land)						3.31	1.34	21	
Total						15.41	6.24	100	

B. INDIGENOUS FOREST CLASSIFICATION									
<i>Classification</i>						<i>Area</i>		(<i>million (million acres) hectares</i>) (%)	
Upland forest (above arbitrary altitude limits)						4.15	1.68	27	
Lowland protection forest						6.47	2.62	42	
Other lowland forest						4.79	1.94	31	
Total						15.41	6.24	100	

C. LOWLAND INDIGENOUS FOREST CONDITION									
<i>Condition</i>						<i>Area</i>		(<i>million (million acres) hectares</i>) (%)	
Unlogged						2.99	1.21	62	
Logged						1.80	0.73	38	
Total						4.79	1.94	100	

almost 90% has now been cutover. As a result, if National Parks and Reserves are excluded, about 73% of the virgin merchantable forest that remains is now in State forests. The comparable figure for the South Island is 80%.

(6) The obvious conclusion is that for both islands the availability of indigenous timbers in the future is largely dependent on policies adopted for State forest. It follows that indigenous State forest with productive potential should not readily be made unavailable.

(7) About two-thirds of the indigenous State forest area (similar in both islands) is protection forest. The bulk of this will remain in a virgin condition and will satisfy a number of

values other than soil and water conservation — e.g., recreation, scientific reserves, preservation of flora and fauna.

(8) The remaining third of the indigenous State forests must meet some of the current and future requirements for production, either as managed indigenous forest or by conversion to exotic forest or farmland. These forests must also meet those current and future recreational, wildlife, and scientific needs which are incapable of satisfaction in the State protection forests or in other Crown-owned reserves. It is in planning the use of this third of the indigenous State forest area that conflict and controversy in land-use decisions is, and will continue to be, most acute. It is here, therefore, that carefully conceived policy and planning are of foremost importance.

(9) About 650 000 ha of virgin, merchantable indigenous State forest remain, three-quarters of which is in the South Island. To estimate the total production forest area in State forest it is necessary to deduct from this figure areas reserved for environmental purposes and to add areas of logged forest that are satisfactorily restocked or have the potential for restocking and need not be reserved.

(10) It has been tentatively estimated that, after deducting areas at present deemed to be required for environmental purposes and adding areas of logged forest, there may currently be 875 000 ha of State production forest, as defined above. In round figures and under present policy it is further estimated that this area could comprise:

			<i>ha</i>
Area to be regenerated	425 000
Area to be converted	250 000
Long-term timber reserve	200 000
			<hr/>
			875 000
			<hr/>

The area which might be converted includes possible exotic forests and farmland. The long-term timber reserves include forests for which there are no specific plans for utilization and for which future land management remains unclassified, although generally they are envisaged as permanent indigenous forest areas. These estimates have been made to give some indication of the consequences of pursuing the policies of recent years and might, of course, be modified by proposed changes thereto.

(11) The indigenous forests with highest recreational value are those of the upland and associated lowland protection forests. Over 90% of this group is in Crown ownership and the main requirement in planning is the co-ordination of activities between departments. In the North Island about one-quarter of the upland and associated lowland protection

forests are in private ownership and acquisition of key areas for public recreation is desirable.

(12) Relative to the South Island, the North Island has

- less virgin forest
- considerably more cutover forest
- more private ownership of forest
- fewer National Parks and Reserves
- less State forest
- more people

As a result there will be a greater conflict in the North Island in balancing the human needs which can be met by indigenous forests.

THE ROLE OF INDIGENOUS STATE FOREST LANDS IN MEETING PUBLIC NEEDS

It will be clear from the last section that the indigenous State forests are the key areas in attempting to secure a reasonable balance of the many demands placed upon our indigenous forests. The principal requirement of National Parks is preservation of indigenous plants and animals and land forms. There are few specific requirements imposed upon privately owned forests. Only in the State forests is there flexibility under present legislation to adjust to a variety of public needs in a controlled manner.

The role of indigenous State forests embraces timber supply, recreation, soil and water conservation, and maintenance of scenic, wildlife, and scientific values. By the clearing of the logged forests, land can be made available for farming, exotic forestry, highway construction, and urban development. A single forest may be called upon to simultaneously meet many of the above demands and it is obvious that, although multiple use presents few problems when demand is low, conflict between uses will increase as demand for each rises. Thus logging may conflict with soil and water conservation, recreation with scientific interest, and clearing with maintenance of scenic values.

The approach of the Forest Service to such conflict has been to delineate zones characterized by a dominant use together with compatible secondary uses. The end point of the planning process for any forest area should then be the development of zones in a manner which appears to achieve the highest social benefit.

The zones themselves are listed in an appendix to this paper. Broadly the major zones have as dominant uses:

- Protection (*i.e.*, soil and water conservation)
- Production
- Biological or Scientific Reservation
- Amenity (largely scenery preservation)
- Historical Reservation

Superimposed upon this may be sub-zones describing the degree of recreational development envisaged. Further work is required on defining the compatibility of various other secondary uses with the dominant use of each zone. The Production Zone has, as an initial broad breakdown, long-term timber reserves and timber supply areas, depending upon the degree of commitment to utilization. For timber supply areas for which there are specific plans for utilization it is necessary to define intended use after logging. The categories for this further subdivision are outlined in the paper by Conway in this issue, and a simplified version is given in the appendix to this paper.

Without some form of zoning it would be difficult to formulate a plan, to avoid or minimize conflict, and to convey intent to all interested parties. The first major attempt to define zones was undertaken for the South Island beech proposals and in the North Island for the Mamaku-Kaimai group of forests, both of which have been made public. It is intended to apply the approach to all indigenous State forests.

The definition of zones is the end point of the planning process. Although such definition gives a basis for describing the balance of uses, it does not in itself solve the problem of having to make value judgements about the nature of the balance needed to achieve the goal of highest social benefit. The problem was recognized in the report to the House on the beech forest proposals in which it was stated that: "The economic well-being of New Zealand and the preservation of its unique natural features both depend on wise use of the land. Neither may be accorded higher priority than the other as of right, nor is there any simple means of arriving at the optimum balance between development and growth on the one hand and the preservation of natural resources on the other." Two major questions which arise in translating policy into specific plans and associated zones are: What tools are available to reduce the subjectivity of decisions on optimum balance? Who is best equipped to plan for optimum balance?

THE ADEQUACY OF TOOLS FOR PLANNING INDIGENOUS FOREST USE

Long-term planning is by the very nature of forestry traditional to that calling. It has passed through various phases and influences in the relatively short history of forestry planning in New Zealand. Not the least of these has been the considerable influence of economists in the late 1950s and 1960s. It has become apparent, or perhaps re-emerged, that the tools the economist provides, for example, cost and benefit studies, while enabling comparison of alternative productive uses do not provide satisfactory yardsticks for assessing the non-revenue-earning values of publicly owned forests. Calcula-

tion of the opportunity costs or revenues forgone in pursuit of these values does not greatly assist in the final decisions. Economic analyses, despite considerable ingenuity to generalize their use, are therefore only one of a variety of tools that are needed.

In the dilemma of dealing with less tangible values the forester has in the recent past adopted a relatively simple approach. Those areas of indigenous forest not demonstrably more important for protection forest or preservation of scenery, wildlife habitat, scientific reserves, etc., have been zoned for production. Production forests have thus been defined as a residual. Implicit in this approach is the tenet that production is the prime purpose of lowland State forests unless other values are proven more important and this is consistent with s. 15 (b) of the Forests Act 1949. The principal difficulty encountered in this approach has been deriving the proof of the relative importance of values other than production forestry in lowland forest areas. Whereas the forester has had good basic mensurational and ecological inventory data as a result of Forest Service surveys and good research data on production forestry *per se*, the information on soils and geology, while available, has in some instances been rather general. Systematized local information on native wildlife and the hydrological consequences of a given management system has simply not existed. The absence of supporting data from disciplines outside of his own has forced the forester to rely more heavily on his personal experience and value judgments in planning, to build in safeguards which might accommodate changes shown to be desirable when the missing pieces come to hand, and has made it more difficult for him to be explicit in explaining the balance ultimately achieved. He has incidentally been subject to a great deal of criticism for failure to pay sufficient heed to intangible values, at least some of which emanates directly or indirectly from those who might have provided the missing pieces with a systematic approach and some support for their work.

RELATIONSHIP OF FOREST PLANNING TO ENVIRONMENTAL IMPACT REPORTING REQUIREMENTS

The Environmental Impact Audit for Mangatotara Forestry Development Proposals released early in November 1974 provides the first formal indication of the minimum requirements for planning the use of indigenous State forests, as envisaged by the Commission for the Environment. Some 3 300 ha of Mangatotara State Forest, most of it cutover, was planned to be converted to exotic forest as part of the proposals for the Mamaku-Kaimai State forests. Within the region covered by the Environmental Impact Report, 10 200 ha, in total, were planned for conversion out of a total forest area of 50 500 ha,

the remainder of which would largely be kept in indigenous forest.

The environmental audit found, *inter alia*:

- (1) That proposals were inadequately justified in terms of public need.
- (2) That the full implications of the proposals were inadequately described in a regional context.
- (3) That the educational and recreational potential of the area was inadequately assessed.
- (4) That an integrated ecological approach was required.
- (5) That the hydrological consequences needed more study.

In essence, it concluded that what is needed to give perspective to conversion in Mangatotara State Forest is a regional land-use plan with emphasis on forested lands, embracing all tenures, and fully supported by economic surveys of the existing indigenous timber industry, the future exotic timber industry; by detailed surveys of the needs of recreational and educational users of the region's forests; by ecological surveys of plant, bird, reptile, and insect populations; and by the results of hydrological research.

The demand for more data as a basis for decision on the use of indigenous State forests is to be welcomed rather than rejected, so long as it is kept within reasonable bounds and leads to increased planning staff and a relatively rapid response from those bodies charged with providing data for the forester to develop his regional management plans. Insistence on excessive fact-finding prior to decision-making would simply halt the planning process entirely and freeze any proposals indefinitely.

What constitutes a reasonable amount of data is of course in itself a value judgement, but it should be noted that the need for additional staff, generally public servants, and finance rises rapidly as more information is sought. The cost of additional data may become a significant part of the total cost of the proposal to the public.

REGIONAL FOREST PLANNING

Plans for State forests are required under s. 26 of the Forests Act 1949. Prior to 1972 these "working plans", as they are traditionally known, were drawn up for individual State forests. Since that time preparation of plans has been on a regional basis. The purpose of the change was, among other things, to enable forestry projects to be seen by the planner in the wider context of regional land use, social and environmental considerations. Whereas most regional planning for exotic afforestation is concerned mainly with a single *dominant* use — i.e., production — similar planning for indigenous

forests is concerned with a range of dominant uses — *e.g.*, production, recreation, protection of soil and water values, preservation of scenery, wildlife and forest ecosystems. Because of the diverse aims, the major changes to the indigenous landscape which are potentially involved, and the greater complexity of managing indigenous forests, regional planning for them will inevitably be more complex and controversial than it is for plantation forestry.

In the first instance the forester needs the guidance of a clear general policy. He then needs access to a highly varied array of basic information on the forest area. Finally he must interpret the policy in a regional context, having regard to both the basic information and regional demands generally.

Much of the basic information on the forests and data on likely levels of demand are necessarily supplied by specialists. The synthesis of the facts into a working plan is an exercise in economic development, recreational planning, production forest management, definition of scientific and biological reserves, and, not least, landscape planning on a major scale. It is not a job for specialists, and requires a broad basic training in the natural sciences, a balanced approach, and a good deal of flair if it is to be done well. It is of fundamental importance to keep the planning of forest areas in the hands of broad-based generalists, in the form of foresters, and resist the temptation to splinter it among specialists. It is equally important to recognize that planning should not be subjugated to day-to-day pressures but nevertheless involve those who are required to administer the plan.

The synthesizing of various facts into a plan requires techniques which are broad enough to encompass economic analyses as well as values which do not have a price in a monetary sense. Here the forester could well draw upon the planning techniques of the ecologically oriented schools of landscape architecture and regional planning which are described by McHarg (1969) or some similar approach. These may be described in a greatly oversimplified manner as comprising the following steps:

- Defining the uses or values for which the forest area should be considered in drawing up a plan or proposal.
- Ranking the entire forest area in terms of its relative importance for each of these uses or values. This ranking is in map form, with the relative suitability for each use (as determined from inventory data) depicted by degree of shading.
- Synthesizing the rankings into a composite picture by overlaying maps or by some other technique.
- From the composite, identifying areas clearly best suited to a particular use or value, areas where various uses are

co-dominant and to some degree compatible, and areas where there is unresolved conflict.

- Using (a) the composite map of rankings, (b) the demand or projected demand, to define zones, characterized by a dominant use, and where applicable, compatible, secondary uses.

The approach is not new to foresters but the synthesis is generally attempted simultaneously and to some degree intuitively, whereas the suggested stepwise procedure would make it explicit and would allow the planner's thought processes to be more clearly followed by others — a not unimportant consideration when explanations are increasingly in demand.

A ranking in map form of the entire forest area for various uses or values itself requires a composite approach drawing upon detailed mapping of physical features such as major land forms, slope, geology, and soils. A key map in planning for indigenous forests is that depicting ecological forest types, as it is basic to ranking most of the common uses. A summary of some of the main factors having a bearing on the ranking of various uses may at least help to clarify the complexity of planning for optimum balance:

- For *indigenous forest management* for wood production, rankings depend on the quality of the major timber species, on the potential for and costs of regeneration and subsequent silviculture, and on the economic accessibility of the forest in the first place. Each of these factors in turn may be composite. Thus economic accessibility depends on the species in the virgin forests, location, geology, topography, stand density, and suitability of various logging methods.
- For *conversion* to farmland or exotic plantation, rankings depend upon location, topography, soil fertility, soil stability, initial cover, and geology.
- For recreation, rankings may depend on passive features, such as unique land forms or particularly interesting or scenic streams, lakes, forests, wildlife areas, and historical landmarks, or active features such as quality of hunting, fishing, climbing, tramping, caving, boating, swimming, etc.
- For *biological or scientific* reservation, rankings are more complex, but obviously unusual geological forms, rarer eco-systems, rare plant or animal occurrences, geographical limits of species, type locations for plants, animals, soils, etc. are all of high ranking.
- For *soil and water conservation*, which is basic to defining "Protection Forest", the rankings depend on topography, soil stability, geology, and hydrology.

The ranking approach of the type described does not eliminate value judgements but if the inputs are well chosen it does:

- Minimize the degree of subjectivity.
- Make the reasoning more explicit and the result more reproducible.
- Identify areas where complementary uses are possible and may be effected perhaps with some adjustment of practices.
- By its comprehensive approach, ensure that the value of an area for a particular use is not inadvertently overlooked.
- Encompass economic criteria by considering these in the rankings where appropriate (e.g., the physical data described for "conversion" may be reduced to economic comparisons).
- Facilitate not only the tailoring of the initial plan to the major features of the forest and the landscape but also help modifications if necessary. If, for example, an increase is needed in the area zoned for a particular dominant use, it may be designed in a manner least costly to other uses.

CONCLUSION

The starting point for planning the future use of New Zealand's indigenous forests is the area described in Part 2 of this paper (Kirkland and Trotman, 1974). It cannot be regarded as axiomatic that its future should be planned. The alternative is a complete lack of planning, an amoeba-like response to the stimuli of the moment, and movement along whichever vector at the time resolves the forces being applied by the many, often opposing, pressure groups. This alternative has not been accepted in the past for State forest lands and it is no more acceptable for the future. The justification for planning for the indigenous forest area as a whole may be summarized in an adaptation of an urban planning proposition from McHarg (1969) as follows:

Indigenous forests are beautiful and vulnerable.

Development is inevitable and must be accommodated.

Uncontrolled development is inevitably destructive.

Development must conform to regional goals.

Observance of ecologically-based forest management principles can avert destruction and ensure enhancement.

The indigenous forest area can absorb all prospective development without despoliation.

Planned growth in all uses is more desirable than uncontrolled growth and more profitable.

Public and private powers can be joined in partnership to realize the plan.

REFERENCES

- Kirkland, A.; Trotman, I. G., 1974. Indigenous Forests of New Zealand, 1974. Part 2. Appendices containing forest descriptions and statistics.

- Proc. 1974 Mtg For. Dev. Conf.*, Forestry Development Council, Wellington.
- McHarg, I. L., 1969. *Design with Nature*. American Museum of Natural History.

APPENDIX

PROPOSED ZONING AND CLASSIFICATION OF STATE FOREST LAND*

Statutory Basis for Use Categories

In terms of section 15 (1) (b) of the Forests Act the Minister of Forests has the power to:

Acquire, use, and develop land (for the establishment, culture, growth, protection, maintenance, and management of trees and other plants; for the utilization of forest produce; for administrative, industrial, residential, or storage uses in connection with State forest land or forest produce; for quarantine grounds or quarantine depots); for providing access; for the carrying on of farming operations incidental to the management and operation of State forest land; for the conservation of water; for the protection of native wild life; for the stabilization of soil, including sand fixation; and for amenity purposes, including scientific purposes or such recreational purposes as are consistent with the proper use, management, and utilization of State forest land.

Zoning for Primary Use

In recent major proposals for use of indigenous forest (*e.g.*, proposed management and use of West Coast and Southland beech) it was considered necessary to zone specific areas *predominantly* for one of the authorized uses of State forest land. It is proposed to extend this practice to all indigenous State forests in order to clarify the management objectives of the Forest Service for the benefit of all interested parties.

Zoning is a breakdown of State forest land, mainly for describing intended use. It may, incidentally, also be a preliminary to possible dedication, in terms of section 2 of the Forests Amendment Act 1973.

Protection zones cover State forest lands where the *prime* requirement of maintenance of soil stability and conservation of water precludes the utilization of forest produce. Where the need makes it applicable in any indigenous forest, soil and water conservation measures take precedence over all other uses.

Production zones cover State forest lands acquired, used, and developed primarily for the utilization of forest produce. These zones may include minor areas of steepland or protection forest which are too small to be accurately defined on the scale of map used. This zones covers:

Long-term timber reserves, which include merchantable forests for which there are no specific plans for utilization in the short term. Future land management of such areas remains unclassified, although generally they are envisaged as permanent indigenous forest areas.

*N.Z. Forest Service, 1974: Proposed zoning and classification of State Forest land. *Proc. 1974 Mtg For. Dev. Conf.*, Forestry Development Council, Wellington. Reproduced in entirety in this appendix.

Timber supply areas, which include merchantable forest for which there are specific plans for utilization. These areas will be further classified to indicate whether they are to be retained as indigenous production forest or converted to farm land or exotic forest.

Unclassified areas, which include forests that are unmerchantable on land that may be required for production.

Biological zones cover State forest lands set aside primarily for scientific purposes, including the protection of natural ecosystems, but which are not of such unique character as to justify recognition as forest sanctuaries, or are ineligible for that status because of the need to manipulate the forest in furtherance of the primary objective.

Forest sanctuaries are State forest lands set apart under section 20 of the Forests Act for the purpose of preserving unique examples of indigenous flora and fauna in their natural state, and for scientific and other like purposes. In effect they are special zones recognized by statute.

Amenity zones cover State forest lands acquired, used, or developed primarily for amenity purposes such as preservation of scenery.

Historical zones cover State forest lands containing Maori burial grounds, other sacred sites, and areas of archaeological interest.

Classification for Recreational Use

To provide an indication of the type of public usage envisaged for forest areas, the following sub-zones will be recognized and superimposed where appropriate:

Wilderness will cover State forest lands where the forest will be maintained in as close to its natural condition as is practicable. Such areas will be large enough and so situated as to be unaffected except in minor ways by development which takes places around them.

Natural environment will cover State forest lands which are to be maintained predominantly in their natural state, but where tracks, bridges, and huts may be provided for public enjoyment and safety.

Recreational development will cover State forest lands where the development of facilities for intensive public use will be allowed or encouraged. Such areas will generally be relatively small and close to the edge of State forest, where they are readily accessible.

Restricted will cover those State forest lands where access is restricted for reasons of public safety or protection of plant or animal communities and wildlife habitat, archaeological or unique natural sites, and historic or sacred sites or protection of equipment, facilities, and developments. For example:

- Forest sanctuaries — generally no entry except for *bona fide* scientific purposes.
- Those parts of biological zones which may require some access restrictions.
- Water supply catchments in which unrestricted access would present contamination risks.
- Areas leased for mining.
- Areas used for military purpose.
- Maori burial grounds, other sacred sites, and archaeological sites.