

PROBLEMS OF FORESTRY AS THEY AFFECT LAND-USE FOR AGRICULTURE IN WESTLAND

Part 1 : The Production Forests

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Introduction

WESTLAND CONSERVANCY, which conforms to the Westland Land District boundaries, being bounded in the north by the Porarari, Otututu and Grey rivers, to the east by the main divide, and to the south by the Awarua River, contains the most important merchantable indigenous forests remaining in New Zealand. These forests are important from both the national and regional viewpoints, as with controlled cutting they will be capable of producing a major contribution to New Zealand's requirements of high quality timber and veneers for nearly one hundred years. Their value will be further enhanced in the future, as the now limited indigenous forests in other regions are depleted, and this premium will be maintained until, and even after, such time as comparable grades can be produced in sufficient quantity from well-tended exotic forests. As a strategic reserve, should any disaster befall the exotic forests, the indigenous forests of Westland also fill a valuable role. From the regional viewpoint, these production forests will provide the raw material for a locally based industry, which is now being expanded to help give stability to a regional economy where the resources available for industrial development are limited.

Effective forest management of this indigenous resource is confronted with many problems — the shy seeding and slow growth rate of commercially valuable species; the wet, leached and infertile soils; the noxious animals; the fast growth rate of competing weed species and non-valuable secondary hardwoods. With some 5,000 acres being logged annually, it is vital that these forests be under sound management. From experimental work and research, a pattern of management has been developed on which Westland's forest policy will be based, namely: _____

- (1) All land suitable for agriculture will be released for farm development.
- (2) All land not suited to agriculture, but on which podocarp forest or beech forest will regenerate and develop successfully, will be managed for that purpose - e.g.,

the rimu terrace forests of South Westland, and the beech forests of North Westland.

- (3) All land unsuited to agriculture, but on which exotic trees will successfully establish, will be converted to exotics.
- (4) Experimental work — e.g., species, drainage, and fertilizer trials — will be continued in cutover degraded land to determine its best form of rehabilitation.

The Indigenous Resource

A national inventory of New Zealand's indigenous forests was carried out during the period 1946 to 1955, and the results were published in 1957. Table 1 shows the volume remaining as at April 1, 1964. These figures were derived by reducing the volume at April 1, 1955, by the cut from that date to April 1, 1964.

TABLE 1: INDIGENOUS RESOURCE AS AT APRIL 1, 1964
(Volumes in million cubic feet)

| <i>Description</i> | <i>State Forest and Crown</i> | <i>Maori and Private</i> | <i>Totals</i> |
|---|-------------------------------|--------------------------|---------------|
| <i>Westland</i> | | | |
| Volume at April 1, 1964 | 858.8 | 78.3 | 937.1* |
| Mean annual removal (Apr. 1, 1959, to Mar 31, 1964) | 6.6 | 2.4 | 9.0 |

* Includes half the volume of beech species of doubtful merchantable quality.

The volumes stated refer to merchantable sawlogs and peeler logs from accessible stands. Timber located on national parks, scenic reserves, and similar reserve areas has been excluded in the table. Hardwoods are not generally significant, except in the northern part of the conservancy where pure and mixed stands of beech are important. Overall, softwoods would comprise approximately 95% of the total volume. Of the softwoods, rimu is the most important, with about 75% of the softwood volume, with kahikatea 13%, and miro 8% comprising most of the softwood balance.

An annual cut of 10 million cubic feet of roundwood is forecast from Westland's forests for the period 1965 to 1985,

but it is anticipated that this will include an increasing proportion of beech species.

Table 2 lists New Zealand's indigenous resources. By comparison with Table 1, it can be seen that Westland contains approximately one-third of the remaining commercially valuable indigenous forests in New Zealand.

TABLE 2: NEW ZEALAND'S INDIGENOUS RESOURCE AS AT
APRIL 1, 1964
(Volumes in million cubic feet — softwoods and hardwoods)

| <i>Description</i> | <i>State Forest and Crown</i> | <i>Maori and Private</i> | <i>Totals</i> |
|--------------------|-------------------------------|--------------------------|---------------|
| North Island | 765 | 372 | 1,137 |
| South Island | 1,434 | 419 | 1,853 |
| New Zealand | 2,199 | 791 | 2,990 |

Land Classification

| | <i>acres</i> |
|--|------------------|
| Mountainous country and protection forest land | 2,300,000 |
| Production forest land (including poorer and doubtful marginal land) | 800,000 |
| Agricultural land (including the best of marginal farming land) | 540,000 |
| Unproductive (lakes, river' beds, bogs, etc.) | 223,000 |
| | <u>3,863,000</u> |

Excluding the poorer and doubtful marginal land, production forest land totals 759,000 acres. Some 250,000 acres of this land have been cutover, leaving a balance at April 1, 1964, of 509,000 acres of forest under all tenure including reserves.

Climate

The climate--is--wet; humid, and mild, with a well-distributed rainfall, which increases from north to south — 100 in. per annum at Greymouth to 200 in. at Jackson's Bay. Rainfall also increases from the coast inland to the main divide — Oira 200 in. per annum. There is a fairly small range of temperatures and humidities from season to season.

Soils

Soils range from the recent alluvial soils of the flood plains, to the mature, ground-water podzols on the extensive terrace areas of morainic, marine or old alluvial sediments. Skeletal soils cover all the steep hill land ; these are shallow soils, consisting mainly of freshly weathered soil, distintegrating rock fragments and organic matter. Parent material is mainly schist, greywacke, granite, mudstones, sandstones and conglomerates.

Forest Types

The forest types of the area are predominately podocarp. Beech — red, hard, mountain, and silver — is present north of the Taramakau River. Thereafter, beech is absent until south of the Mahitahi River, where it again appears, becoming most common in the area between the Paringa and Waita rivers, where the land is of a rolling to steep terrain right to the coast. High volume stands occur on the gravel hills, terraces, and ancient moraines of the coastal lowland, which varies from 7 to 20 miles in width. Dissecting the hills and terraces are the rivers which flow from east to west. Flanking these rivers are the relatively fertile flood plains, where recent soils are free-draining, and fertile. These alluviums support good pasture. Under forest, these soils where well-drained carried totara with a transition through matai and rimu to kahikatea-dominated stands on the wetter sites.

On hill country and the lower foothills of the main divide, where drainage is not impeded, rimu is dominant over a dense hardwood understorey of rata, kamahi and quintinia.

Broadly the production forests can be grouped as follows:

HILL FORESTS

National Forest Survey Type P.4

These are generally found on moderate to gentle, sometimes very steep, topography, with Arahura or Runaga soils. Podocarp-broadleaved forest of lower altitudes, with an average of 28 merchantable trees and a mean volume of 15,000 board feet per acre ; 65% rimu, 28% miro, 5% Hall's totara by number of stems, with matai and kahikatea rarely present. Large rata is found scattered as a sub-

dominant, with dense understoreys of small to medium-sized kamahi, small quintinia and occasional toro and hinau, rare pokaka, and mountain toatoa; south of the Waita River there is infrequent and local silver beech.

TERRACE FORESTS

National Forest Survey Type P.1

The topography is flat or gently rolling with Kumara, Okarito, and Kini soils. Forest is a dense podocarp mosaic sometimes in even-aged groups, or in all-aged stands. Merchantable trees are generally tall and of small to medium diameter with an average of 78 merchantable stems and 28,500 bd. ft per acre; 85% rimu, 13% miro, 1% silver pine by number of trees, with Hall's totara, kahikatea and kaikawa sometimes present.

Sub-dominant medium-sized rata are scattered throughout with small understoreys of small kamahi and quintinia, rare pokaka, and hinau. This type contains a significant amount of rimu advance growth. Silver beech and yellow silver pine occur as minor constituents in the south.

FLOOD-PLAIN FORESTS

National Forest Survey Type P.8

The topography is flat with Karangarua loam or Harihari fine sandy loam soils. Heavy stands of kahikatea predominate with small to medium diameters, and an average of 81 merchantable trees and 35,000 bd. ft per acre; 82% kahikatea, 5% rimu, 1% miro and 1% matai and Hall's totara by number of stems.

The understoreys are light, consisting of scattered small kamahi, occasional pokaka, quintinia and broadleaf. Frequent small silver beech occur in understoreys of this type south of the Waita River.

The Sawmilling Industry

During 1963-64 there were 53 sawmills operating in Westland, which produced 5.5 million bd. ft of sawn timber. Peeler log production of 450,000 cu. ft for the year is additional to this figure. With the exception of two sawmills which cut 4 to 5 million bd. ft annually, units are generally small, with an average annual cut of slightly less than 1 million bd. ft. Statistics for the industry are as follows:

| | | | | | |
|--|-------|-------|-------|-------|-----------|
| No. of persons employed as at April 1.5, 1964: | | | | | |
| Logging | ..... | ..... | ..... | ..... | 279 |
| Sawmilling | ..... | ..... | ..... | ..... | 443 |
| Forestry | ..... | ..... | ..... | ..... | 138 |
| Total | | | | | 860 |

(Source : Department of Labour)

Gross value of products: £1,962,000 (60 units ; 1960-61)
(Source : N.Z. Official Yearbook 1963)

The Management Potential

INDIGENOUS

Of the 85,000 acres of virgin terrace forest remaining in Westland, at least 50% of this acreage is sited in compact accessible areas which would be amenable to management. These are the natural rimu forests, self-regenerating but unsuited for either agriculture or exotic tree establishment, and for which the only feasible land-use is indigenous timber production. A strip felling system of logging was introduced in 1955 whereby unfelled strips four chains in width were retained and alternated with felled strips of the same width. A selection logging system, whereby only mature trees are removed with the minimum of damage to the remaining crop, was commenced early in 1963. Under this system a forest environment favourable to regeneration is retained, advance growth is preserved, regeneration gaps are opened in the canopy, and the forest can be managed under sustained yield.

In the northern part of the conservancy some 20,000 acres of red and hard beech forest, in pure stands and in mixture with podocarps, are potentially manageable as adequate regeneration is obtained in these optimum range sites for these species. The first silvicultural requirement for the management of these beech stands is efficient bush utilization, and this in turn is dependent on the market demand for beech species. Recent market developments in beech utilization are encouraging, and should stimulate better forest management of these species.

EXOTIC

The area of State exotic forests in Westland at April 1, 1964, was 4,900 acres. Establishment has been in two phases. First, during the late 1920s and early 1930s at

Mahinapua Forest, a wide range of species were established on poor and marginal terrace type soils. Because of the subsequent slow growth rate, planting then lapsed. In the early 1950s, trial plantings were made on hill country cutover, and demonstrated that good growth rates could be obtained, particularly with radiata pine on well-drained hillside sites. Arahura sandy loam, which is derived from parent sandstones, mudstones and gravels, will support good exotic tree growth. Large-scale felling of residual standing unmerchantable trees on cutover hillside areas commenced in 1958. In 1963, the clearing rate was stepped up to enable an annual target of 1,000 acres to be established. Radiata pine will be the major species planted. Douglas fir and spruce will also be established on suitable sites. The potential area of hill country available for exotic establishment within a 25 mile radius of Greymouth is 50,000 acres.

GLOSSARY OF BOTANICAL NAMES

| | | |
|---------------------|-------|---|
| Beech | ..... | <i>Nothofagus</i> spp. |
| Broadleaf | ..... | <i>Griselinia littoralis</i> |
| Douglas fir | ..... | <i>Pseudotsuga taxifolia</i> |
| Hall's totara | ..... | Podocarpus hallii |
| Hard beech | ..... | <i>Nothofagus truncata</i> |
| Hinau | ..... | Elaeocarpus dentatus |
| Kahikatea | ..... | <i>Podocarpus dactyloides</i> |
| Kai kawaka | ..... | <i>Libocedrus bidwillii</i> |
| Kamahi | ..... | <i>Weinmannia racemosa</i> |
| Matai | ..... | Podocarpus spicatus |
| Miro | ..... | <i>Podocarpus ferrugineus</i> |
| Mountain toatoa | ..... | <i>Phyllocladus alpinus</i> |
| Mountain ribbonwood | ..... | Hoheria glabrata |
| Pokaka | ..... | <i>Elacocarpus hookerianus</i> |
| Podocarps | ..... | Podocarpus and Dacrydium spp. |
| Quintinia | ..... | <i>Quintinia acutifolia</i> |
| Radiata pine | ..... | <i>Pinus radiata</i> |
| Rata | ..... | <i>Metrosideros umbellata</i> |
| Red beech | ..... | <i>Nothofagus fusca</i> |
| Rimu | ..... | <i>Dacrydium cupressinum</i> |
| Silver beech | ..... | <i>Nothofagus menziesii</i> |
| Silver pine | ..... | <i>Dacrydium colensoi</i> |
| Spruce | ..... | <i>Picea sitchensis</i> |
| Toro | ..... | <i>Suttonia salicina</i> |
| Yellow silver pine | ..... | Dacrydium intermedium |