LAND USE PROBLEMS AND PROGRESS IN SOUTHLAND

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OVER the last twelve years major progress in Southland has been achieved in pastoral land occupying 557,000 ha which is predominantly above the 460 m contour. This area was defined in 1960 by G. J. Watt, then Commissioner of Crown Lands.

Mr Watt projected stock numbers to 1970, including the area of pastoral land. These projections may have seemed optimistic at the time but the following table shows how far actual stock numbers have exceeded Mr Watt's estimates.

STOCK NUMBERS FOR PASTORAL LAND IN NORTHERN SOUTHLAND — *557,000* ha

	Total Sheep	*Total Cattle*
Actual 1960	**312,000**	**11,000**
Projected 1970	*354,000*	**15,000**
Actual 1970-1	**600,000**	*45,000*

This represents a 6.6% compounded rate of increase for sheep numbers over the 10 years and a 15% compounded rate of increase for cattle numbers.

One marked effect that these massive total stock increases and especially cattle numbers have produced is a large decrease in the annual area burnt for rank growth and scrub control. This reduction in burning becomes more apparent on properties carrying more than 600 cattle. In the Southland Catchment Board's area there are 16 tussock properties with more than 600 total cattle and 6 with more than 1,000.

The average area of 12 tussock properties in this high cattle bracket is 17,000 ha carrying 15,700 sheep and 1,400 cattle. In the last seven years the annual burning application has been for 400 ha per property, with the area actually burnt about 140 ha. Of the 12 properties, 5 have done no burning in the last two years and one, carrying 700 head of cattle, has done none in the last seven years. The increased income from cattle and increased sheep numbers has enabled far more subdivision to take place but increases in sheep alone would probably not have had the same effect in reducing burning.

With stock increases of t-his order in the last decade one may well wonder if any problems exist at all. However, there are two

problems associated with large-scale development in the Te Anau basin and the Southland Catchment Board, and it is proposed to discuss these and then look at two dissimilar tussock properties.

PROBLEMS OF DRAINAGE AND RIVER CONTROL

In 1953 the Lands and Survey Department bought the 25,500 ha Lynwood run for development, which in the early stages involved the ploughing of large areas of scrub and tussock and converting it to pasture, generally through swedes. For the first ten years, little thought was given to drainage and only that drainage necessary for the immediate outfall of problem areas was done. No major channels were attempted and, as the decision on appropriate size of settled units was not made for several years, problems with flooding and stock access were not readily apparent.

When the first settlers were installed in 1964 on the Whitestone River flats, the units were limited to under 160 ha and it was only then that the deficiencies of the drainage and flood protection were seen. Farmers attempted to do drainage work without outfall and the first large flood in December 1964 caused bank erosion, the dropping in of fences, and widespread flooding over all the settled units.

Lands and Survey Department then called the Board in to effect repairs to the river and do protection work, and prepare an overall scheme for the district to cover land drainage and flood protection.

At this time much of the earlier developed country, which was in its second or third year in grass, showed a disturbing trend to reversion with large areas of relatively steep country reverting to rushes. This was corrected only after very extensive tile draining, following attempts with mole ploughing, perforated drain tubes, and open ditches. The effect of all this work was to make tremendous increases in the run-off from the catchments, practically all of which discharged into the Whitestone River.

It is well known that drainage and liming have been the cornerstone of Southland's farming progress and in the private sector this has been going on for more than 100 years and has not yet been completed. Development by the Lands and Survey Department has virtually telescoped this century of work into less than two decades. The Soil Council agreed to treat the Lands and Survey Department as a private owner and subsidize them at normal drainage and flood protection rates in order that all works be completed before the settlement of new farmers.

Over the last seven years, the Board has improved all the major watercourses to a standard which will cope with likely flood and drainage requirements and most of this work has been completed before settlement. A rating district is being completed for the whole of the Whitestwe catchment to cover maintenance of both drainage channels and river works and rates are paid by the Department until settlement of a unit when the liability is transferred to the new owner.

A high standard of work has been achieved and problems of a drainage and flood protection nature solved. It is felt that considerable savings have been made not only in capital costs but also in administration costs to the Board and the Department,

Since the Lynwood run was resumed by the Crown, several other large properties have been taken over for development and in the Te Anau and Mossburn region this area is about 100,000 ha. All of these blocks are being treated similarly by the Board and lately several of the schemes have been modified to include provision for reserves, wildlife areas and sportsmen's access.

PROBLEMS OF WIND EROSION

The problem of wind erosion appeared on the generally weakly structured soils of the Te Anau basin in the early stages of development. In November 1959, a serious nor'west windblow occurred when large areas were being cultivated and about 440 ha were windblown to a moderate or serious extent both in the Te Anau basin and the adjacent Five Rivers Plain. Two years later, in November 1961, another gale force nor'wester affected 730 ha (about 182 in the Te Anau basin) and considerable areas were stripped of topsoil and had to be resown.

Windbreak tree planting on a large scale was the long-term answer to this problem and this work started in 1961-2, but for a variety of reasons only 28 km were planted in the next three years. In 1964, the Soil Council approved the first of a series of five-year schemes and the following table shows progress to date:

Years	*Windbreak planted km*
Prior to 1964	28
1964-67: Stage I	89
1968-71: Stage II	151
1972: Part of Stage III	22
Total to date	290

The main species planted are Douglas fir, poplar varieties, *Pinus* ***nigra, P. radiata, Eucalyptus delegatensis, Thuya plicata*** and *Chamaecyparis* ***lawsoniana.*** Time of planting is the latter half of August-mid September. Survival rates are normally high, up to 97%, although a September snowfall in 1970 (0.46 m on Mt Hamilton flats, followed by several heavy frosts of up to 14" C) coupled with a summer drought in 19'71 caused severe losses.

Planning for this work has been on the basis of windbreaks 800m apart, with the concept that every settler would have at least one length of windbreak on his property. He could then hopefully plant others in between to give a 400 m coverage as finance becomes available. Far more (effective use of subsidy money has been made by this relatively early, large-scale planting. The scheme involves Lands and Survey Department, Ministry of Works and Board staff in planning the siting of the windbreaks and N.Z. Forest Service in the supply of tree stocks and advice on species and spacing.

As a result of this Te Anau-Mossburn scheme with the Lands and Survey Department, other regional schemes have been designed for groups of farmers within the Catchment Board's windbreak tree planting area and there is now a total of 272 km planted privately under subsidy.

PROBLEMS AND PROGRESS ON TWO TUSSOCK PROPERTIES

MT HAMILTON FARM SETTLEMENT — 7,257 ha

This property was resumed by the Crown in 1959 and then carried about 2,500 ewes. The altitude ranges from 335 m on the flats to 1,490 m (Mt Hamilton). About 55% is flat to gently rolling red tussock country at an altitude of 455 m and the balance is rolling to steep. Development has been achieved through conventional practices which include extensive cultivation and conversion to improved grass on the better drained arable country, oversowing and topdressing of tussock country, and the successful use of breeding cows on unimproved red tussock in the period April to August. This latter aspect of management has been a very worthwhile financial and conservation alternative to extensive burning and is becoming a widespread district practice.

Problems

(1) The most important single problem is wind cutting or burning off the feed, especially during the growing season. This

is a physical effect of gale force winds which may come at any time in the November-January period.

(2) It is not possible to stock blocks heavily enough in the summer period to control growth and prevent reversion. This is a common factor to most large developing tussock properties where the carrying capacity is limited to the stock numbers which can be wintered.

(3) Many of the hill country and unimproved tussock blocks are too large.

(4) Young stock do not grow out particularly well and are inclined to be small.

(5) The growth of juvenile or "creeping" matagouri in some blocks.

Progress

Stock carried:
1960: 1,000 two-tooth ewes
1965: 5,900 sheep, 490 cattle
1971: 12,800 sheep, 2,600 cattle

Improved grass (cultivation) : 1,580 ha

Oversown and topdressed tussock: 2,225 ha

Ways of Overcoming Problems

(1) The cost of manipulating wind velocities with shelter planting would be prohibitive, and it is doubted if there is a practical solution to this problem.

(2) More arable country is needed to grow more winter feed, or one learns to, accept some reversion.

(3) Considerably more subdivision is planned.

(4) This position is expected to improve following closer subdivision and more intensive shepherding, and as pastures improve.

(5) Burning of the matagouri and subdivision are the present methods of control and are likely to remain the only economic methods.

NOKOMAI STATION — *38,500* ha

The present owner, F. L. Hore, purchased this property in 1949 from the estate of D. A. Cameron and became its second owner in almost 100 years. The altitude ranges from 275 m to 1,860 m and the property is about 52 km long and averages 6.4 km wide. About half lies within Otago and its shape, snow risk, and serious imbalance between winter and summer country, resulting in low per-head stock, production, had given Nokomai the reputation of a tough property.

A five-year run plan was prepared by Board staff and adopted by Mr Hore to:

(a) Remove grazing pressure on the higher country.

(b) Spell and where feasible oversow and topdress eroded fescue tussock country.

(c) Develop less eroded fescue tussock to provide alternative grazing.

The fertilizer rates used on,, the initial 3,240 ha treated were 190 kg/ha of molybdenized sulphur superphosphate with a maintenance dressing every third year of 125 kg/ha. Seeds mixtures have varied over the years but are now: 6 kg cocksfoot, 2 kg dogstail, 1 kg timothy, 3 kg white clover, 3 kg Montgomery red clover, totalling 15 kg/ha.

Maintenance topdressing rates have lately been increased to 190 kg/ha every second year.

This work, together with extensive fencing and roading, has enabled worthwhile management changes to take place, and, through the outstanding managerial abilities of Mr Hore and his son, Nokomai Station is more like a gigantic farm than a run today.

Problems

(1) The improvements have not altered the snow risk and, unlike the old set-stocking pattern of the pre-1950 high country run, work has to tie in very closely with the seasons. There is now no set-stocking pattern and stock are now shifted far more frequently than they would have been 20 years ago.

(2) The control of rank growth, especially silver tussock, following topdressing. This is a problem of scale and at the moment can only be overcome by burning periodically.

(3) Before any oversowing and topdressing wosk was done, Nokomai was a badly balanced property — far too much summer country was snow covered in the winter, and there was far too little safe winter grazing.

Progress

Stock carried:
1960: 19,600 sheep, 30 cattle
1965: 25,000 sheep, 270 cattle
1971: 33,700 sheep, 1,140 cattle

Wool weights:
1960: less than 3.2 kg
1971: 3.6 kg

Lambing average:
1960: 63%
1971: 85%

Surplus stock:
1960: Relatively few sold
1971: All sold fat

CONCLUSION

The sort of agricultural and pastoral progress seen in Southland in the last ten years seems to fit a Herbert Spencer quotation "Progress therefore is not an accident, but a necessity — it is a part of nature".

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REFERENCE

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