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PRECIS OF REPORTS AND PARTICULARS RELATING  
TO SAND DUNES AND DRIFTING SANDS

1903

(Extract from file "Lands and Survey  
Head Office 50621").

Forest Management Division  
New Zealand Forest Service  
WELLINGTON

October 1965

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## INTRODUCTION

In recognition of the interest manifested throughout the Colony in regard to waste tracts of sand, and the passing of "The Sand Drifts Act, 1903", it has been thought advisable to obtain reports and particulars from the Chief Surveyors and other officers upon the areas of such waste lands in the several Land Districts. These reports are published either in extenso, or in a condensed form, and are attached hereto.

The total area of sand dunes and drifting sands in the Colony, is 512,993 acres. The localities and detailed areas of the same, are set forth in the schedule and map accompanying this compilation.

In addition to the above particulars, articles and extracts from reports upon the subject in other countries, will be found appended; these ~~xxxxxx~~ indicate the similarity which exists in the characteristics of sand drifts in various parts of the World; and are interesting from the fact that they afford information as to the best remedial measures to cope with the difficulty and convert barren, useless wastes into valuable forests and pasture lands.

Surveyor General

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SAND AREAS IN NEW ZEALAND

Copy of a Circular issued by the Surveyor General to all Chief  
Surveyors of the Colony.

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Lands and Survey Department,  
Wellington, 5th August 1905

CIRCULAR NO. 584

Sand Dunes & Drifting Sand

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I have to request you to please report on all areas of sand dunes and tracts of drifting sand in your district, as it has been decided that the whole question of dealing with, and utilizing lands of this description, should be carefully considered.

Will you, therefore, please furnish:-

- (1) Full information as to the sand tracts in your district, accompanied by illustrative plans indicating their extent, area, and tenure; and of the lands immediately adjoining them which are affected.
- (2) Information (a) as to whether the sand is encroaching upon the adjoining lands; (b) whether these latter are Crown, private, or native lands; (c) whether the encroachment is of a serious nature; and also (d) whether the lands are sufficiently valuable to warrant the adoption of measures for their protection.
- (3) A scheme for dealing with the sand drifts where the encroachment is serious; your ideas as to the best remedial measures to cope therewith; and whether the sand areas could be utilised for timber planting.

Will you also take into your consideration the question of the advisability of setting up local boards for the purpose of dealing with the areas, and indicate the powers which should be entrusted to such Boards in regard to rating, insisting upon fencing, planting &c.

J.W.A. MERCHANT

Surveyor General

## SAND AREAS IN AUCKLAND

Precis of a report by *the Chief Surveyor & Asst Surveyor Genl.*  
~~Mr. G. J. Maclellan, Commissioner of Crown Lands~~

7th October 1903

About 183,940 acres of Crown, freehold, and native lands in this District, comprise sandhills.

These commence at Cape Maria Van Diemen, and extend 70 miles south along the coast to Ahipara. The land is generally poor but there are extensive and valuable gum fields. The next stretch is a ten mile strip from Hokianga Heads northwards, which is principally native land generally of a broken character and not valuable. North of the entrance to Kaipara Heads, the land affected is of poor quality but there is a considerable strip and a steady encroachment by the drifting sand. South of the Heads, some very good land is being rapidly covered, most of it being freehold land. Between the south head of the Manukau Harbour and the mouth of the Waikato River, there is a considerable encroachment of drifting sand, especially near the mouth of the Waikato at Maioro, and many hundreds of acres of fertile land have been covered up. Near Kohekohe on the Awitu Peninsula, the drifting sand has made considerable encroachment, especially on the fine native block of Pehiakura. To the north of the Waikato River, there is another large encroachment of drifting sand. The land adjoining is all freehold or native land. Besides those enumerated, there are four smaller encroachments on the west coast, viz, - north of Raglan Harbour; on the north and south sides of the Aotea Harbour; and on the south side of the Kawhia Harbour. On the East Coast, the area of drifting sand is limited, and is not encroaching much on the adjacent land. There is a small encroachment between the Katikati entrance and the Tauranga Harbour; and another from a point two miles south of Maunganui Mountain to about nine miles east of Opotiki Harbour.

Efforts have been made in various parts of the District to cope with the trouble. Mr A. Mhir, the owner of the Pehiakura Block, has striven against the further encroachment of the sand,

with

with a very great measure of success. He has grown a belt of sand grass of considerable width all along his western boundary. With this he has mixed a sprinkling of Californian lupin, a very hardy shelter plant, which grows freely on sand, hardening it and checking the drifting. After these two plants are established, a growth of buffalo grass and white clover gradually spreads amongst the lupins and checks further encroachment. Mr Buckland, who owns a large area of land in the Waioneke Parish (near Kaipara Heads), has for years been successfully combatting the sand encroachments by planting lupins and a certain grass, the name of which is not known. In addition, Messrs, Monk and Phillips in the same district, have been fighting the sand drifts. Ice plant has also been used by several settlers in staying sand encroachments.

G. J. Mueller  
Chief Surveyor

(4)

SAND AREAS IN HAWKE'S BAY

Precis of the reports of Mr E.C.Gold Smith (Commissioner of Crown Lands) and Mr F. Stephenson Smith (District Surveyor, Gisborne)

28th September 1903

There is only a small area of sand dunes in the Land District, and this is not encroaching on the adjoining lands to any extent. The total area of the sand wastes in the District, is 5,345 acres ~~in the Hawke's Bay (or southern) portion~~, comprising freehold lands 2,532 acres; native lands 1,803 acres; and Crown lands 960 acres; <sup>of which 965</sup> ~~and 1,803~~ <sup>is</sup> ~~in the Poverty Bay (or northern) portion~~, the latter area being made up of <sup>102</sup> ~~102~~ acres of freehold lands, <sup>783</sup> ~~783~~ acres of native lands, and <sup>80</sup> ~~80~~ acres of Crown lands.

In addition to the above tracts, there are small areas between Whangara and Pakarae, and at the mouth of the Waipua River, but these do not much encroach.

In many instances the encroachments only affect poor lands, but there are cases where good and fertile land is menaced.

Mr Gold Smith thinks that the only remedy is to plant trees, <sup>and</sup> ~~and~~ Mr Stephenson Smith is of opinion that most of the country could be profitably utilized for tree planting.

## SAND AREAS IN TARANAKI

Report by Mr Jas. MacKenzie, Chief Surveyor.

26th May 1904

In December 1903 I started to inspect the coastline of my District in connection with the sand dunes and drifts that exist more or less throughout the whole length of the Taranaki coast. Having now completed my traverse of the coast, from Patea on the south, to Mokau on the north, I append the results thereof, together with some general remarks bearing on the question as to cause of drift, its prevention &c.

Starting from the mouth of the Patea River, the country around which some years ago was threatened to be entirely covered and swept away by drifting sand, I found that a vigorous policy of sand grass planting had been carried out, with the result that the danger had been quite overcome, and the whole coast belt reclaimed and brought back into good rough pasture. These remarks are applicable to the stretch of coast extending from Patea to the Wain-gongoro River, with the exception of a bad drifting patch on Native Reserve 537, Patea District, at the mouth of the Tangahoe River. This drift was of very extensive dimensions up to 3 or 4 years ago, and had spread over the adjoining valuable pasture land, burying up the greater parts of Sections 264, 265 and 266 in its onward march; but is now quite stopped by the planting of sand grass and confined to the native reserve.

In the Carlyle District the dunes extend 2 or 3 miles inland, notably in the neighbourhood of Kakaramea. Drifts started in these dunes owing to overstocking, but they are now all overcome and pasture again is fairly good and strong.

The coastline along what is locally known as "The Waimate Plains" district, is a bold one consisting of a line of high cliffs rising sheer up from the beach below at a height of from 120 to 180 feet, so that the sand is not greatly in evidence along here. But I noticed one remarkable thing, in this connection, in a large sand dune seaward of Hawera. The drift had started on the top of sheer cliffs quite 200 feet above high water mark, with no possible connection (at the present time) with the beach below.



The most extensive and dangerous drifts are those known as the Oeo sand dunes. Sections 2 and 4 Block II Oeo Survey District being part of Hone Pihama's grant, have been practically clean swept of all vegetation by the action of the drift which is very pronounced along this part of the coast, owing to its extremely exposed and wind swept position. This drift has now covered about 700 acres of what was 20 years ago some of the best pasture land on the coast, and should be worth now at least £15 per acre had the drift been stopped in its initial stages. In its present state it is now practically valueless.

Joining this block across the Ouri Stream, is Section 1 Block I Oeo Survey District. Twelve months ago between 300 and 400 acres of this section was pure drifting sand; the drift had crossed the great South Road and was threatening the neighbouring farms. Last year the sand was taken in hand by Messrs. Good and Lambie, the new lessees, and it is now all planted with sand grass, with patches of barley between, and the drift completely stopped, and all danger passed.

From here to Opunake, there is nothing to claim special attention, excepting the considerable drift towards the town between the Tangatara and Waiteika Streams - Native Reserve - This was one of the bad sand patches, but last Spring the lessee, Mr Carroll, planted it out with sand grass. Unfortunately he was a bit late in the season and the dry fine spring coming on a little too soon, killed off the grass planted over a big sand hill near the main South Road.

This will be replanted during the present winter and all danger of further encroachment stayed.

The next block (Maori land) between Waiteika and Mangahume, is all more or less sand hills, in the same state as they have been for generations, that is, covered with a growth of rush, flax, toi and rough grass. The cattle, however, are beginning to show what might happen if they are allowed to roam indiscriminately over these sand hills, as by horning and breaking into the surrounding turf they are enlarging the sand areas. If not combatted, the sand will probably make serious inroads over this block.

From the Mangahume Stream, one mile south of Opunake, to the Motoiti Stream, Block V Opunake Survey District, the sand drifts at various points have been taken in hand, planted, and fenced off from the stock. These drifts were caused by the stock breaking into the old sand dunes that line this coast, in a more or less extensive way, from Patea to Cape Egmont. The only serious drift now existing along this part of the coast (South Taranaki) is that between the Motoiti and Pungaereere Streams, in Blocks I and V Opunake Survey District. The southern portion is now well in hand. Mr Chas. Sole, the owner of Section 2 Block V, having planted this out during last winter, and will continue the work where required. One half of Section 87 is fully covered with pure sand, which is encroaching fairly rapidly into the big swamp barring the drift inland.

From the Okau to the Pungaereere River, the drift is not serious, as there is still a great deal of native vegetation growing over the sand dunes; the same applies to Section 102 (native land) on the north side of Pungaereere; here the sand dunes are of considerable height and well covered with a growth of flax and scrub. The coast along here is very low, only a few feet above high water mark, and is called "Harriet Beach". This expanse of sandy beach is the most extensive in Taranaki, being some miles in length with a vast accumulation between high and low water marks. The sand comes in straight off the sea-bed, the water being shoal for a considerable distance out to sea, and the seabed ~~xxx~~ covered with reefs of volcanic rocks; added to this, there is always a surf running, grinding and pounding up the rocks into small shingle and we have nature manufacturing in large quantities the sand that is drifting up on the foreshore, and driven inland by the prevailing westerly winds which blow dead inshore along this beach.

The sand dunes here practically end at the Waitaka Stream on the border line between Cape and Opunake Survey Districts, and from here on, past Cape Egmont to within a mile or so of the mouth of the Stoney River, no sand is seen.

Between the Puniho Road and the Stony River the old sand hills are to be found, but no encroachment is going on, the only small drift being one at the Native Cemetery, part of Section 24 Block IV Cape Survey District. The dunes that formerly existed on either side of the Kaihihi Stream (Block I Cape S.D.) are now planted with sand grass and the drift has ceased. The only other encroachment between Stony River and Paritutu, is that at the mouth of the Oakura River. Being on native land, it has, as usual, been neglected, but it is not serious and could be stopped at any time with a few rows of the sand grass.

Around the base of Paritutu, what was in the early days of the settlement a thickly wooded belt, interspersed with flax, toi and native grass, has been swept clean away. This result is directly traceable to the inroads of stock, and what was once a beautiful and fertile piece of country, is now a howling waste of sand or hard pan volcanic clay. The sand drift is now, however, confined to within narrow limits through the planting of sand grass.

North of New Plymouth the first sand dunes are those between the Henui and Waiwakaiho Rivers. This is again a native reserve. At one time the drift from these dunes threatened the whole of the fine stretch of land known as "Fitzroy", and it was here that the first systematic attempt was made in Taranaki to beat back and recover the sand drift. Mr W.J. Foote was eminently successful and reclaimed the greater part of his farm that had previously been over-run with sand. His efforts of 15 years ago have been the model upon which the settlers up and down the coast have since worked.

At the mouth of the Waiwakaiho there is a great mass of pure sand, but all danger of further encroachment has now passed, the rims of the drift having been planted out and fenced.

Harbour Board Reserve No. 157 Hua District, and Native Reserve No. 27 Bell District, together with Native Reserve No. 154 Waitara West District, contain the most extensive drifts on the north Taranaki coast. The spread, however, appears to be now arrested by planting sand grass around the inland rim of the drift. A considerable block of pasture land has been destroyed in this locality through neglect in not planting some years ago. The coast  
between

between the Waiongona and Waitara Rivers is free from sand encroachment, but on the east bank of the latter river, practically the whole of native reserve No. 81 and Section 14 Waitara East District, are bare sand, drifting steadily eastward from the mouth of the Waitara by the driving south-westers, the prevailing wind along this coast. Planting has been started along the edges of the drift, which it is anticipated will stop <sup>its</sup> ~~xxx~~ onward movement. ~~xx~~

From this point on to the Urenui River, there are only two small patches of sand, the one of Sections 3 and 4 Block II Waitara Survey District, and the other on Section 1 Block III Waitara Survey District. These are not drifting and need not be taken into consideration. These remarks also apply to a small accumulation on Section 12 Block III Waitara District, at the mouth of the Urenui River.

At the mouth of the Mimi Stream, west bank, near the historic Arapawa Pa, there is a considerable deposit of live sand intermixed with small patches of sand grass, but planting has been done around the inland rim and the grass has got a good hold and the drift stayed,

Proceeding through the Pukearuhe District, I found that in Sections 2, 6, 7 and 8 a drift had staid in a most peculiar position. The cliffs rise here from 150 to 200 feet sheer from the water; there is no beach, the base of the cliff is always washed by the sea; but on the summit of these cliffs a sand drift started some 15 years ago almost suddenly and in a very short space of time covered several acres of the finest pasture on the "Clifton Downs Estate". Sand grass has since been planted along the back edge of the drift and further encroachment has been stopped.

From Pukearuhe to Mokau, there are no drifts worth considering; the sand hills at the mouth of the Mohakatino River are well covered with strong native vegetation and under present circumstances are not likely to break away. The small sand slip in the Waipingau Valley is within the forest and scenery reservation of Paraninihi (Sections 11 and 12 Block VII Mimi Survey District). It is of small extent and not drifting.

Two other

Two other small accumulations are (1) at the mouth of the Rapanui Stream (Section 1 Block I Mimi Survey District) and (2) near the mouth of the Mokau River. Neither of these patches is dangerous.

The foregoing description covers the whole of the sand dunes and drifts in the Taranaki District.

As a result of this inspection of the sand dunes and drifts, it has been found that:-

(a) Prior to the occupation of the coast by Europeans, the beach land was more or less bounded by a series of sand dunes all of which were covered with a heavy growth of scrub, flax, toi, rush &c and practically none of these dunes were drifting.

(b) Soon after the land was thrown open for settlement, the dunes began to drift. This was owing directly to the custom of the settler heavily stocking these hills, which led to the destruction of the flax, toi, and scrub; following on this came the breaking away, in patches, of the thin crust of turf and the enlarging of these patches by cattle. The high vegetable growth which protected the grass &c from the heavy winds along the coast having already disappeared, the wind had full play on these sand patches, enlarging them at a dangerously rapid rate. Where prompt action was taken, and the ground fenced off and planted, no further damage was done, but in some cases through neglect, hundreds of acres of the finest pasture were swept away.

(c) The sand drifts have now passed through their most dangerous stage, and the settlers having been fully warned to the danger, have within the last few years, taken the matter seriously in hand and from one end of the District to the other, with one or two exceptions, the danger has been faced and we consider, overcome by the regular planting of marram grass. This grass was introduced into Taranaki in the "fifties" by a Mr Adams, a solicitor, who in his spare time used to make up bundles of this grass and go along the coast north and south of New Plymouth planting it amongst the sand dunes. The present proprietors of Taranaki coast lands are under great obligations to the foresight of this good man, who

many

## SAND AREAS IN WELLINGTON

Reports by the Commissioner of Crown Lands, and Messrs. Craig and Lundius, Crown Lands Rangers.

14th June 1904

The total area affected in this District, is about 91,200 acres, and is practically confined to a narrow strip along the sea coast extending from Paikakariki to the Patea River. This area, which is very approximate, is made up as follows:- Crown lands under lease, 25,650 acres; Native lands 8,700 acres; and Freehold land 56,850 acres.

The encroachment of the sand on the unaffected lands appears to be slow and not of a serious nature. Much of the adjoining land is valuable, well worth protecting, and where such is the case, many of the owners have taken, and are still taking to some extent, the necessary steps to prevent further encroachment by planting marram grass, lupin, and ice plant; but all such planting has hitherto been fragmentary and irregular, there being no attempt at combined action on a systematic plan.

The first steps necessary, would probably be for the Government to actually define the sand area by survey, and then to take the necessary land under provisions of the Public Works Act. It would then be a matter for consideration whether the necessary work in connection with the proclamation and planting of these areas should be done by the Government through its Forests Branch of this Department, or whether if a sound and practicable scheme of finance can be devised, these sand drift areas would be better placed under the control of the respective County Councils interested, or of specially created Sand Dunes Boards to be elected by the settlers in the Sand Dunes Special Rating Districts, with special rating powers over all lands within a defined distance of the sand line, such rates to be subsidised by Government at the rate of £1 for £1 for a period of ten years from the commencement of such rating in the respective Special Rating Districts. After the first few years, the rate could be gradually reduced, as the amount of fencing and planting required, would become less each year.

These

These Boards, if created, should take the necessary steps to at once fence off their sand areas, and also to sow or plant them down with lupine or other similar herbaceous plants of strong and rapid growth. This would effectually stop the sand from drifting, to a certain extent retain the moisture in the sand, and provide the necessary shelter to protect belts of the young plants of such hardy varieties of native shrubs and flax, toi grass &c as will provide a more permanent shelter behind which to plant such suitable varieties of timber producing trees as are adapted to the sandy soil and capable of resisting the blizzards and storms of salt spray not uncommon on the west coast of the North Island, and which prove so destructive to the varieties of trees and shrubs usually planted, and which may flourish for a few years, but are liable to be completely destroyed by a blizzard at any time. The trees which successfully resisted the worst blizzards along the plains between Patea and Opunake in the Taranaki District, were the *pinus muricata*, *pinus austriaca*, and the Norfolk Island pine. It would also be necessary to start several nurseries at suitable spots along the Coast for propagating in large quantities, seedlings of the various plants, shrubs, and trees likely to be required for the work.

I feel satisfied that if the intention is to plant these sand hills with forest trees, that the lupin will be found a much more speedy and useful auxiliary than the marram grass, as the latter, although exceedingly useful in helping to bind the mass of sand, does not so effectually stop the drifting as the lupin, neither does it retain the moisture, nor provide the quick and effective shelter that the latter does for young trees. If the tree lucerne will grow in the sand, it makes a speedy and excellent shelter. I do not think anything of the marram grass as a fodder plant. Stock will only eat it when very young, or when pressed by hunger, and the quantity of sand always adherent to it would be injurious to their health and ruinous to their teeth. All stock should be fenced out as soon as possible, as they will not only (to some extent) eat the lupins when young, but keep the surface of the sand stirred up and ready to drift.

To summarise the steps that should be taken at once:-

- (1) To define the sand area and acquire the necessary land;
- (2) To fix the drifting areas by planting or sowing, and fence the same;
- (3) To get the land into a suitable state for tree planting, the true object aimed at.

This can be done by (a) sowing all the sand hills and drifting parts (even before fencing) with marram grass, lupin, or other quick growing herbaceous plants; when these have obtained a firm hold, then plant on the exposed faces (among the lupin &c), *cleria traversi*, *taupata*, *ake rautanga*, *karaka*, *ngaio*, *veronica*, and any other quick growing native shrubs sufficiently robust and hardy habit to resist the blizzards. Native flax and *toi toi* might also be planted. These would form shelter belts behind which the more valuable timber trees could be planted.

(b) As soon as the land has been fenced, forest tree planting could at the same time be commenced in the sheltered hollows behind the sand hills, and be gradually extended out (as the shelter ~~xxxxxxxxxx~~ increases) among the shrubs previously planted, on the more exposed parts.

In defining the area of land to be taken, it would probably be necessary to include a strip of good land on the inner side of the present sand line, to avoid the possibility of claims for compensation arising ~~xxx~~ owing to drift before the reclamation is thoroughly effected. These portions of good land need not necessarily be fenced in with the sand area, but could be let to adjoining owners for farming purposes. Failing something of this kind, legislative action may be necessary to bar claims of this sort being raised against the Government.

The control of these coastline sand dunes, is probably more a national than an individual or local matter, as the loss of any good land affects not only the actual owner, but also the Government and the people through the less productiveness of the country, and for this reason it may be necessary that the Government should retain the direct control of these areas, where much of the work in connection therewith might possibly be done by prison labour.

JOHN STRAUCHON  
Commissioner of Crown Lands



Wanganui,

5th October 1903

The only portion of my district in which there are sand dunes and drifting sand, is a narrow tract of country extending from the Manawatu River to about a mile south of Paikakariki. This stretch of sand varies in width; near the Manawatu it is about  $1\frac{1}{2}$  miles in width, but at Paikakariki it is only a few chains wide, the average width being about 20 chains. It contains a series of sand mounds and ridges from 10 feet to 80 feet in height, intersected by small valleys in which flax, fern, toi toi, taihini, and manuka scrub and other small plants are growing. Some of the hills are all bare drifting sand, others are overgrown with plants the same as in the valleys.

The approximate area of this sand tract is 7,315 acres and of this area 3,040 acres are freehold, 1330 acres are held by Europeans under native lease, and 1710 acres are owned and occupied by Maoris.

The land immediately adjoining ~~it~~, is of a very sandy nature, but it is overgrown with grasses of various kinds and does not drift. This area extends inland from one to three miles from the sand tract. Inland from this again, the land is of first class quality, and is probably worth ~~xxx~~ from \$15 to \$25 per acre.

I spoke to a number of old settlers in the district and learnt from them that although the sand is encroaching inland, its progress is very slow and not of a serious nature. The drift appears to confine itself chiefly to the sand area, the contour of which is continually changing. Here and there along the coast individual efforts have been made to check the drift, but no systematic plan has so far been adopted. The plants chiefly used are marram grass, lupin, broom, gorse, and in some places the ice plant. There can be no doubt that the marram grass is the most effective as it is the cheapest and most useful, while stock will eat it when pinched for food and it is not destroyed by stock running over it once it has got a proper start. It is usually planted in rows, and spreads from the roots, gradually covering the whole of the sand  
and preventing

and preventing drift. It grows from 18 inches to 3 feet in height. Lupin is a short scrubby plant, which grows from 2 feet to 5 feet in height, and is also very effective in checking the drift, but is not of any value as food for stock, while it is more expensive than marram to plant. Broom and gorse are also used in places, but I do not think they should be recommended as they are not so good as marram or lupin, and there is also the danger of their spreading over the adjoining land. The ice plant is used more for stopping drifts about towns, and is not of much use for lands on which stock are running, as it is easily destroyed. On account of being so close to the sea, I do not think any of this sand tract is suitable for forest tree planting, as the salt spray would probably kill any of the heavy timber trees.

D. CRAIG

Crown Lands Ranger

Wanganui,

6th October 1903

Between KKK Patea and the Manawatu River, the coast line is more or less affected by drift sand, the areas being respectively about 53,310 acres of freehold land; 4,425 acres of native land; and 25,650 acres of Crown land. As far as I am able to ascertain, the sand is slowly encroaching on adjoining lands, which are mostly private property and, in a few cases, native land.

There are a number of pastoral runs along the coast, comprising mostly sand hills from 20 to 100 feet in height, with swamps and valleys between. They are not all bare sand, but are partly covered with vegetation of manuka, tawhini, taumatokuni, toi toi, flax, rushes and patches of native grasses, but I do not think the land is of sufficient value to warrant any great expenditure on planting with sand grass. If any trees could be found that would grow in this sandy soil and stand the salt spray, it would be beneficial and profitable to have these runs planted.

In almost every case the same persons hold the land affected by drift sand, and the land adjoining it, and they are checking  
the drift

the drift for their own protection, by planting marram, lupin, or broom. I do not consider the encroachment of a very serious nature in most cases, but wherever it is serious, the owners of the land generally take steps to check it and several settlers have one or two men constantly planting sand grasses.

The best and, to my mind, only manner in which to deal with drift sand, is by planting the several grasses that will grow in sandy soil and stand the salt spray. The marram (*ammophila arundinacea*) is generally planted in the Wanganui and Rangit<sup>ikei</sup>~~iki~~ districts. The best time to plant it, is about April or as soon as the winter rains have set in to consolidate the sand. It is generally grown from roots but can also be grown from seed, but transplanting the roots is the surest way of getting the plant to grow. The planting may be done by plough, or by spade, in rows about 3 ft apart and 18 inches between each plant. On a windy day when the sand is on the move, the roots may be thrown broadcast on the surface, when they will soon be covered and form better tussock than planted by plough or spade. It grows to a height of about 4 feet and is eaten by cattle. It is practically indestructible as burning, cutting, or eating off only makes it grow more vigorously. Lupin and broom also grow in this soil and check the sand drift effectively, but are of no use as forage plants and are not much planted.

I think it would be beneficial if the local bodies were given powers to compel owners of land on which driftsand exists, and where it is spreading on to adjoining lands, to take effective steps to check the spread, and if the owners refuse or neglect to do so, the local bodies could have the work done at the expense of the owners of the lands from which the sand comes, though, as already stated, I think owners of land on which drift sand exists, generally keep it in check for their own sake, as they also own the adjoining land.

I may mention that I have not heard of any complaints about drift sand encroaching from neighbouring land in my district.

H. LUNDIUS

Crown Lands Ranger

SAND AREAS IN MARLBOROUGH

Precis of report by Mr C.W.Adams, ~~Chief Surveyor~~ ~~Commissioner of Crown Lands~~.

*Blenheim*  
26th August 1903

The sand areas are situated chiefly on the East Coast, at Cape Campbell, Whernside, and Puhī Puhī districts, comprising 1,500 acres approximately. There is also a small area between Kowhai and the Kahutara River, near Kaikoura, which is being taken in hand by Mr G.F. Bullen.

With one exception, below the mouth of the Clarence River the adjoining lands are all freehold and are sufficiently valuable to warrant the adoption of measures for their protection.

It is proposed to plant marram grass, and yellow tree lupin. The experimental planting of marram grass on the East Coast has proved a great success. The reclamation of sand wastes would be of great benefit to the proposed Blenheim-Kaikoura railway

Arrangements have already been made with Mr E.S. Rutherford for marram grass to be planted along the three mile strip of sand waste from the mouth of the Kekerangu river, <sup>so</sup> northwards; the Government defraying the cost of labour. Plenty of marram grass seed is obtainable in Marlborough. The expenditure of from £5 to £10 for this purpose, is recommended.

The planting of marram grass and yellow tree lupin in a narrow belt, is recommended in the first instance, to be done throughout the length of the sand hills to be reclaimed. The natural increase of the plant from year to year would be available for widening the plantation subsequently. Afterwards the areas could be utilized for forest tree planting.

Blenheim,  
June 1904

SAND-DUNES AND SAND-TRACTS.

There is not much drifting sand in the Marlborough District. With the exception of one or two isolated patches, the bulk of the sand lies on the east coast between Flaxbourne and Kaikoura. The chief area of sandhills lies on the eastern sea-coast of Cape Campbell, Wharfedale, and Puhipuhi districts, comprising about 1,500 acres in all. There is also a small area beyond Kaikoura, between the Kowhai and Kahutara Rivers, but this is now being taken in hand by Mr. G. F. Bullen. The main areas referred to consist entirely of Crown lands, and the lands immediately adjoining them are mostly freehold, though in one case below the south of the Clarence River the adjoining land belongs to the Crown.

There is generally a slight encroachment, the sand travelling inland, but nowhere to a dangerous or serious extent. The land is chiefly freehold, with the exception noted above. The encroachment is in no case of a serious nature.

I think the lands are sufficiently valuable in every case to warrant the adoption of measures for their protection, providing it can be done at a small expenditure. The scheme I propose for dealing with these lands is very simple. The two chief plants which have been found to answer the purpose are marram-grass and the yellow tree-lupin. I am not sure, but I think that the yellow lupin succeeds best where there is a considerable proportion of lime in the sand. The Golden Gate Park, near San Francisco, though once a waste of blowing sand-hills, was reclaimed entirely by the planting of yellow lupin, and is now a very ornamental place of recreation. I am not aware whether the sand-hills at the Golden Gate Park were of a calcareous nature.

A very successful instance of a yellow-lupin plantation is to be seen over hundreds of acres between Christchurch and New Brighton. We have them also growing in a few localities near Kaikoura. Again, the marram-grass has grown vigorously and proved a great success wherever it has been planted along the east coast of Marlborough. There are now a great many acres covered with a luxuriant growth of marram-grass, nearly all of which has been planted by the Road Boards since I came to this district.

The proposed railway will go through or near to all the areas of sand-hills that I have described, and it will greatly facilitate the construction of the line, and prevent it being covered with sand after it is made, if a beginning were made now to plant the proposed line of railway with marram-grass and yellow lupin.

The present road from Kekerangu southwards for three or four miles is very tortuous, and has very steep grades; it was made thus in order to avoid about three miles of blowing sand extending along the face of a cliffy hill from the mouth of the Kekerangu southwards. I have already arranged provisionally with Mr. E. S. Rutherford, who has undertaken to superintend the planting of marram-grass along this three-mile strip, provided the cost of the labour required is defrayed by the Government. The marram-grass is now growing all along the coast, and I have no doubt the Awatere Road Board would allow the plantations to be thinned out judiciously without charge. I would advocate the planting of marram-grass and yellow lupin. I have no doubt the sand-areas could be utilised for forest-tree planting, but to insure success the sand should be first reclaimed by planting marram-grass and lupin; the tree-planting could then take place after the marram-grass and lupin were well established. If, as I anticipate, it will turn out a success for the three miles south of Kekerangu River, I think it would be a wise plan to take the main road along the sea-coast as soon as the drifting sand is conquered, as there is plenty of limestone in the vicinity for metalling the road. I do not think it would be necessary to set up any local Boards; all that is necessary to be done could be done under my direction, with the co-operation of the Awatere Road Board. The main thing is to plant a very narrow belt in the first instance throughout the whole length of the sand-hills to be reclaimed, and the natural increase of this plant year by year will be available for widening the plantation until it is all reclaimed.

The marram-grass has been known in Scotland from time immemorial. The yellow lupin grows very strongly—10 ft., 12 ft. or 20 ft. high in favourable localities.

C. W. Adams  
Chief Surveyor

(19)

SAND AREAS IN NELSON

Report by the Chief Surveyor of Nelson.

June 1904

The Nelson District is fortunate in not being seriously troubled with areas of drifting sand. In several cases where encroachment was threatened, it has been successfully dealt with by the planting of marram grass by the owners of the adjoining land.

It would perhaps be advisable to secure the strip along the sea frontage to Section 5 Block II Waimea Survey District, a quarantine reserve known as "Rabbit Island", by planting marram grass, and I would add that the island could be greatly improved by tree planting.

Some 4,000 acres of worthless sand-spit at Cape Farewell Onehanga Survey District, might also be planted with roots of marram grass with benefit, though there is no immediate danger of encroachment on the land, as most of the drifting sand is blown seaward by the prevailing winds.

W.G.MURRAY

Chief Surveyor

(19)<sup>a</sup>

## SAND AREAS IN NELSON

Precis of reports by Messrs, Montgomeris and Sadd, District Surveyors.

4th December 1903

### Waimea County

There is a narrow strip of drifting sand along the frontage to the sea-coast of Sections 1 and 2 Block IV Waimea Survey District, and this extends inland from high water mark three or four chains, over freehold land partly planted with marram grass and trees. Along the sea frontage of the quarantine reserve, known as Rabbit Island, in Block II there is a strip of drifting sand, extending inland eight or ten chains, and containing 300 to 400 acres. The remainder of the island is very sandy, but covered with manuka, fern &c and not drifting. The drifting sand could be held by planting marram grass and the whole of the island would be improved by planting blue-gum, pinus insignis and mimosa trees, a few of which are already growing well.

R. T. SADD  
District Surveyor

### Collingwood County

Along the sea front of Clifton Village there are about 25 acres of Crown lands, formerly all drifting sand. About five years ago it was planted with marram grass which has taken well and greatly abated the trouble. The sand spit on which Cape Farewell light-house is situated, is all drifting sand containing about 4,000 acres. Probably the planting of marram grass would have a good effect. As the prevailing winds blow away from the land, the sand is not spreading on to the mainland to any great extent.

Along the west coast from Cape Farewell southward, there are several small areas of drifting sand, opposite Archway Island of which about 40 acres are Crown lands on the frontage of Sections 2 and 3 Block I Onetsua Survey District; 20 acres of freehold land on Section 2; 50 acres of leasehold land on Section 2 Block XVI, this last being the only serious encroachment. The loss of the land has for years been planting marram grass and is

Along the north-west frontage of Section 8 Block V Pakawau Survey District, about 30 acres are partly covered with drifting sand.

Generally the best remedial measures are (a) the planting of marram grass roots, and when these have taken and the sand is held, such trees as blue gum and pinus insignis.

J.A. MONTGOMERIE

District Surveyor



## SAND AREAS IN WESTLAND

Report by the Chief Surveyor of Westland.

12th August 1904

There are practically no sand tracts in this District. There is a very narrow margin (nowhere exceeding ten feet in height, nor one chain in width) along parts of the low shelving sea-coasts. This low sandy mound has, in all cases, been turned over repeatedly by the gold-miners, is well over-grown by flax & and is nearly always hemmed in between the sea and a parallel creek. The sand is nowhere encroaching upon the adjoining lands.

G. J. ROBERTS

Chief Surveyor

SAND AREAS IN CANTERBURY

Report by the Chief Surveyor of Canterbury.

June 1904

This district is fortunate as compared with other parts of the colony as regards this trouble. The only part affected to any degree is, first and principally, a strip along the coast from the mouth of the Avon and Heathcote to a point about six miles north of the Ashley River, with an extension inland in the vicinity of Bottle Lake, and another patch of a few hundred acres between the railway-line and the sea near the Waimakariri. In all, it is judged to be about 8,000 acres. A very considerable area of this is vested in the Christchurch City Council and other local bodies, some of whom, as well as the adjoining freeholders, have done a good deal of planting of marram-grass. The whole area is to a very large degree covered with lupin and marram-grass, and other growths, which have proved very effective in stopping further encroachment to any material extent, so far as the Waimakariri River. Between that river and the Ashley there is a tendency to further encroachment on the freehold property, but it is not considered a serious matter.

There are also about 400 acres (partly freehold) north-west of Lake Ellesmere, a narrow strip of 300 acres a few miles in length along the coast north of the Taumutu Lagoon, and a few acres at Gore Bay.

In South Canterbury the trouble along the coast is very limited, and is the cause of no great anxiety, for it can easily be controlled: some of it is already planted, and its spread thoroughly checked. Inland, near Lake Tekapo, there is a sand-drift which the Ranger says "is a matter almost impossible to control, and the land on to which the sand drifts is of the poorest."

Thos. Humphries  
Chief Surveyor

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In separate  
list

SAND AREAS IN CANTERBURY

Precis of reports by Messrs. Ward & Williams, Crown Lands Rangers

30th September 1903

There are about 9,000 acres of sand wastes in North Canterbury, chiefly situated <sup>(1) in</sup> ~~xxx~~ a stretch of eleven miles to the northward of the mouths of the Avon and Heathcote Estuary. This area, <sup>of 5,000 acres</sup> comprises municipal ~~xxx~~ reserves and sea-beach. The next largest portion is an area of 2,000 acres from the mouth of the Waimakariri northward for 9 miles to the mouth of the Ashley River and inland, it being made up of domain and plantation reserves, and half unused beach sandhills. For about 4 miles northward from the mouth of the Ashley and a little inland, there are about 1,000 acres of coast and sand dunes. Certain small areas to the north-westward of Lake Ellesmere, comprising about 400 acres of partly freehold and partly lake side, and occupation licenses for grazing purposes. A very narrow strip of sandhills in the Southbridge Survey District, embracing about 300 acres, and extending for about 5 miles along the coast northeastward from the mouth of the Taumutu Lagoon. And finally about 20 acres of sandhills comprised in a very narrow strip of road and beach reserves, at Gore Bay on the Cheviot coast.

The above is exclusive of numerous <sup>odd</sup> ~~xxx~~ bits of riverside sand drifts along the courses of the Waimakariri and Ashley riverbeds, and the great riverbeds of North Canterbury which comprise many thousands of boulders intermixed with sand.

Effectual measures against encroachment are already being taken, and by the planting of lupins, and marram grass, and trees, the difficulty is being coped with. Further planting is required between the Ashley and Waimakariri Rivers, and southwards. In many places it would be quite possible to grow useful timber trees.

F. WARD

Crown Lands Ranger

29th September 1903

The only sand dunes in South Canterbury are situated at the Otipua Lagoon, and at the Normanby Railway Station, about 15 and 20 acres respectively. Neither sand waste will do harm for years to come. At Otipua Lagoon the deposit is composed of shingle, which is required for the safety of the railway line. At Normanby the sand is not encroaching, and is fenced off by the Railway Department, which has planted marram grass. This sand dune requires protection in every way possible. Another sand drift is at Lake Tekapo, and the sand there does good to the poor class of soil it blows on to.

W.H.WILLIAMS

Crown Lands Ranger

SAND AREAS IN OTAGO

Report by D. Barron Esq., Commissioner of Crown Lands.

-c00-

June 1904

The area affected by sand dunes in Otago is limited in extent <sup>being about 5,425 acres.</sup> The largest of these are in the Clutha or Molyneux Valley. At Cromwell, situated at the junction of the Kawarau and Clutha Rivers an area of about 700 acres to 900 acres, and between the towns of Alexandra and Clyde about 2500 acres are under sand. On the Otago Peninsula there are several small drifts and at False Island near the Catlins Estuary a small area is under sand. In the cases of Alexandra and Cromwell the sand is not extending to any great extent. It seems to blow backwards and forwards over the same piece of country without taking in any extent of new ground. Marram grass has been tried to some extent there and with very fair success. When those settlers most affected by the sand trouble find that marram grass is so, it is probable that every year a further area will be sown and in a few years the nuisance practically abated. With the dunes near the coast, particularly those on the Otago Peninsula, much more damage is being done. Fresh supplies of sand are being regularly thrown up by the sea, hence fresh areas are being destroyed from time to time. At the Ocean Beach, near Dunedin, marram grass and lupin are being extensively sown, and they have both given every satisfaction. The settlers on the peninsula whose lands are being affected are also now taking steps to protect themselves, but as their efforts are only being lately made they have not yet borne much fruit. On the Native lands near the Otago Heads the sand has been making rather serious inroads of late

SAND AREAS IN OTAGO

Summaries of reports by the Commissioner of Crown Lands, and Mr George Mackenzie, Crown Lands Ranger.

Mr D. Barron

26th September 1903

The area in Otago is limited in extent, only comprising about 5,425 acres. In some cases the sand is encroaching along the sea-coast, and the adoption of measures to prevent the encroachment, is desirable. Marram grass or lupin might be planted.

Along the Tomahawk Beach, near Dunedin, the road and adjoining land has been protected on the sea-side by lupin and marram grass, with successful results. Similar work has been done by the Ocean Beach Domain Board.

D. Barron

Commissioner of Crown Lands

(Reports on Sand Drifts at Tarras)

21st January 1903

During a recent visit to Morven Hills I had a look at the marram grass planted at Sandy Point some time ago in order to stop the encroachment of the sand. I found the grass had made excellent growth and is now in firm large tufts and fit to be subdivided and planted out systematically. The sand has already covered portions of the farms of several settlers, encroached on leased runs, and there is every prospect of further encroachment on the leasehold land. I propose that Mr McWhirter and the settlers provide the necessary labour for the erection of a fence, and subdivide and plant out the marram grass and any other sand-binding plants or trees provided. The Morven Hills Station would also provide sufficient willow posts for the fence, and as they grow would probably assist in checking the sand. About 1 mile of wire netting, 2 plain wires and 1 barbed wire would be necessary to keep out rabbits and stock.

J. LETHBRIDGE  
Dalgety & Co., Dunedin.  
Manager ~~XXXXXXXXXXXX~~

I have the honour to report upon the encroachments made by sand in the Tarras district. There are only two drifts of any consequence in this locality, and there is very little accumulation of sand lying on them, the whole length being swept clean down to the sandy clay which is quite hard and covered with stones which the wind has been unable to remove. At the end of each drift, large hills of sand have accumulated on account of the high ridge at Sections 6 and 16, though it is coming over the ridge on to the sections. The whole of the sand drifts from the high cliffs to the end of Sections 6 and 16, is quite bare and this surface continues to the top of the high cliffs at Sandy Point, which were caused by the high flood in 1878 scouring away the gravel and allowing the sand and earthy matter to fall down, breaking the surface and letting the wind do its work. As the sand falls down it is blown over the top and carried down the drifts just like a stream. On the top, at the edge all round, is a bed of sand which varies from 18 inches to 3 feet in depth. This is continually being undermined. The cliffs go down about 6 to 15 feet perpendicular, then towards the river at a grade of about 1 in 2.

( )

The marram grass planted has grown well, but is useless in keeping back the sand, for if the whole of the hill was planted with it, the sand would still come over, cover it up, and blow on. What is wanted is something to prevent the sand leaving the cliffs.

The only thing I can think of, would be a sort of fascine work laid flat on the top of the sand for a certain distance down from the top. As there is a natural slope from the river upwards, if this was carried out, and the scrub fastened securely and carried down, about 80 to 100 links, very little would come from below. I would recommend that 15 chains be done as an experiment. Where the scrub was laid I think any kind of seed would grow. Round about Sections 7 and 10 Block VII much of the sand waste is being reclaimed by the weeds fat-hen, thistles, docks &c

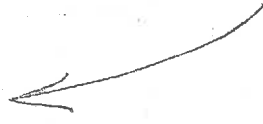
(127) <sup>1904</sup> ~~1903~~ <sup>1904</sup> ~~1903~~ January 1904  
When last over at Tarras I spent some time in visiting those interested. I would suggest that ~~the £100 should be expended in~~ <sup>£60 be expended in</sup> planting marram

grass on the accumulated heaps of sand on the north side of Section 6 and the N.W. side of Section 16 Block XII Tarras District. When the grass is planted it will require wire netting. As stated previously, the planting of marram grass is simply to consolidate the heaps of sand at the end of the drifts to prevent it shifting. This, however, will have no effect in stopping the sand drifts at their source. By the expenditure of £300 the drift might be stopped at Sansy Point, but the drift down the River is a more serious matter. I think that before a work like this is begun, an expert should visit the place and give his opinion.

GEO. MACKENZIE  
Crown Lands Ranger

June 1904

Sand drifts in the Tarras District are still looked upon as a great source of danger. For the last 12 months, the sand has not been so bad. The Sansy Point drift has almost stopped, thus giving a good opportunity of fixing the heaps at the end of the drifts. <sup>The</sup> £60 <sup>authorised</sup> is now being expended in netting in portions & planting with marram grass, which I have no doubt, will be a success.





(23)  
SAND AREAS IN SOUTHLAND

Reports by Ranger Campbell and District Surveyor Mathias.

17th November 1903

I have now inspected the sand ridge and dunes along the sea-beach from Fortrose to Waipapa Point, and find that the drifting has done very little harm in this district for the last 35 years, with the following exceptions.

Two hundred acres of Sections 18 & 19 Block VIII Fortros Survey District (the property of Mr Donald Fraser) are partly covered with sand, which is of coarse quality and mixed with a little loam. Mr Fraser has planted about half an acre of Section 18 with marram grass, which is acting very well in binding the sand. Section 7 Block XI Toetoes Survey District (the property of Mr Edward Attwood) is completely covered with sand, which leaves it of no value to the owner. About ten acres of the signal reserve are covered with sand and about thirty acres of sand are drifting on Section 32 Block XI Toetoes District (Mr S. Miller's land).

The only remedy I can suggest is to plant the areas affected with marram grass. I do not think planting forest trees would be of any value whatever, as I am afraid the spray from the sea would kill them. Probably the supplying of marram grass to those settlers whose lands are affected with sand drift, and the planting of same in a proper manner would give better results than planting with forest trees. I do not think local boards would be of any value in this District at present. Very little, if any, Crown lands are affected by drifts in this locality at present and as a whole, the encroachments are not of a serious nature.

The above mentioned sections are sufficiently valuable to warrant the adoption of measures for their protection.

D. CAMPBELL

Crown Lands Ranger

"THE SAND DRIFT ACT, 1903"

(Precis of its provisions)

Section 2, - The Governor may, on receipt of a petition from the persons affected, declare that the Act shall ~~be~~ come into force within any specified area in New Zealand, such area to be publicly notified.

Section 3, - Within six months after such proclamation, the Minister of Lands shall file a scheme for controlling the sand drift and preventing its further encroachment, and apportion the cost thereof among the owners of land within the proclaimed area.

Section 4, - Notice of the filing of such scheme shall be served on all persons affected thereby.

Section 5, - Within two months after the serving of such notice, any person may appeal ~~xxxx~~ against the exclusion of any lands from the proclaimed area, or inclusion therein, or the apportionment of the cost as proposed by the scheme, and the Stipendiary Magistrate and two assessors shall hear the appeal and thereupon may vary the proclaimed area (if necessary) or confirm or vary the apportionment.

Section 6, - Every such apportionment shall be binding upon all owners of land within the proclaimed area.

Section 7, - The Minister may either carry out such operations as are mentioned in the scheme, or delegate to any local authority power to do so.

Section 8, - "Owner" referred to previously, means freeholder, Crown lessee, or in the case of Crown Lands not leased or occupied as runs, means the Crown, and in the case of land owned by Maoris, means the owner thereof. "Local authority" includes Maori Council.

SCHEDULE OF LOCALITIES AND AREAS OF SAND DUNES AND SAND DRIFTS

In NEW ZEALAND.

No. of Map.	Auckland Land District.	Locality.	Area in Acres.
1.		Situated on the west coast of the North Island about 3 miles south east from Cape Maria Van Diem -man and extending along the Sea coast in a south -erly direction for a distance of 1.7 miles with an average width of 1.7 miles.	1850
2.		Situated on the west coast of the North Island extending along the coast for a distance of 47 miles from Scott's Point to Ahipara Bay, and vary -ing from 1 mile to 5½ miles in width, <del>and an</del> <sup>an</sup> average width of 3 miles.	76250
3.		Situated on the west coast of the North Island between Ahipara Bay and the mouths of the Tarutamu and Waitaha Streams (about 2 miles south-east from Reef Point), and extending along the coast in a southerly direction for a distance of 3 miles, and having a width of 3 miles at the widest part.	2750
4.		Situated on the north shore of the mouth of the Herekino River.	650
5.		Situated on the west coast of the North Island and extending for a distance of 7½ miles in a norther -ly direction from Hokianga Harbour and varying from ½ mile to 2½ miles in width.	5600
6.		Situated on the west coast of the North Island and extending along the sea coast in a northerly direction for a distance of 29 miles from the northern shore of the entrance to Kaipara Harbour and varying in width from ½ mile to 3½ miles.	16800
7.		Situated on the west coast of the North Island extending in a southerly direction along the sea coast, from the entrance to Kaipara Harbour for a distance of 30½ miles and varying in width from 1 mile to 4 miles, <del>and an</del> <sup>an</sup> average width of 1¼ miles.	35100
8.		Situated on the west coast of the North Island & extending along the sea coast in a northerly dire -ction from the mouth of the Waikato River for a distance of 16 miles and varying in width from ¾ mile to 2 miles, <del>and an</del> <sup>an</sup> average width of 1 mile.	9800
9.		Situated on the north shore of the entrance to Whaingaroa Harbour.	720
10.		Situated on the northern shore of the entrance to Aotea Harbour.	1430
11.		Situated on the Sea coast between Aotea Harbour and Kawhia Harbour a distance of nearly 6 miles and having an average width of 1 mile.	3580
12.		Situated on the west coast of the North Island about 2 miles south of Kawhia Harbour and extending along the coast in a southerly direction for about 2½ miles and being 1½ miles at the widest part.	2250
24		A narrow strip situated on the east coast of the North Island about 2 miles south-west from the North Cape.	50
		Carried forward	156,830

	Locality.	Area in Acres	
	Brought forward	156850	
25.	Situated on the east coast of the North Island and extending along the coast from Parengarenga Harbour to Paxton Bay a distance of nearly 15 miles and varying in width from $\frac{1}{4}$ mile to 2 miles.	5500	
26.	Situated on the east coast of the North Island at Henderson Bay.	300	
27.	Situated on the east coast of the North Island between Grenville Point and Perforated Point.	290	
28.	Situated on the east coast of the north Island and extending in a southerly direction along the coast for a distance of 6 miles from Hohouka Harbour and the Takahunu Stream, with an average width of $\frac{1}{2}$ mile.	2300	
29.	Situated on the shore of the Bay of Plenty and extending from Tauranga Harbour to the mouth of the Waikata River, (7 miles to the east of Opotiki) a distance of 92 miles and having an average width of nearly 37 chains.	1320	183040

TARANAKI LAND DISTRICT.

13.	Situated on the west coast of the North Island and consisting of scattered areas along the sea coast from the mouth of the Motu River to New Plymouth, having an aggregate area of 21621 Note:-227 acres of the above area have been planted with grasses etc.	21621	
14.	Situated on the west coast of the North Island consisting of scattered areas, and extending in a southerly direction along the sea coast from about 8 miles north of Cape Egmont to the mouth of the Patea River and having an aggregate area of 4712 Note:-3860 acres of the above area have been planted with grasses etc.	4712	6353

HAWKE'S BAY LAND DISTRICT.

30.	Situated on the east coast of the North Island at the mouth of the Waiapu River.	100	
31.	Situated on the shore of Poverty Bay and varying in width from 5 chains to 15 chains and an average width of 10 chains.	885	
32.	Situated on the Pukenui Beach (about 6 miles north west from Table Cape.)	190	
33.	Situated on the shore of Hawke Bay, close to the Township of Mahia and lying towards the north.	200	
34.	Situated on the shore of Hawke Bay and extending along the beach on either side of the mouth of the Manakopu River for a distance of nearly 5 miles and an average width of $\frac{1}{4}$ mile.	680	
35.	Situated on the east coast of the north Island on the beach at Waimarama (about 8 miles south of Cape Kidnapper.)	430	
36.	Situated at the mouth of the Porangahau River.	1100	
37.	Situated on the east coast of the North Island and adjoining Cape Turnagain.	1780	584
	Carried forward		198613

	Locality.	Area in acres.
Brought forward WELLINGTON LAND DISTRICT.		195618
15.	Situated on the west coast of the North Island and extending along the sea coast in southerly direction from the mouth of the Patea River to the mouth of the Kai-iwi Stream and varying from 30 chains to 180 chains in width, with an average width of about 60 chains.	15240
16.	Situated at the mouth of the Wanganui River and extending in a northerly direction along the sea coast for a distance of 3 miles 30 chains, and extending up the River, almost to the boundary of the Wanganui Borough, with an average width of 50 chains.	2050
17.	Situated on the west coast of the North Island between the mouth of the Wanganui River and the mouth of the mouth of the Wangaehu River, a distance of about 8 miles and an average width of nearly 2 miles.	7450
18.	Situated on the west coast of the North Island between the mouth of the Wangaehu River and the mouth of the Rangitikei River a distance of nearly 19 miles, with a greatest width of 6 miles and an average width of $2\frac{1}{2}$ miles.	37460
19.	Situated on the west coast of the North Island between the mouth of the Rangitikei River and the mouth of the Manawatu River, a distance of about 11 miles with an average width of $2\frac{1}{2}$ miles.	21050
20.	Situated on the west coast of the North Island and extending in a southerly direction from the mouth of the Manawatu River for a distance of 40 miles to Paikakariki and having an average width of 20 chains, and a greatest width of 85 chns.	7950
21.	Situated on the shores of Porirua Harbour.	400
22.	Situated on the northern shore of Port Nicholson (Wellington Harbour).	350
23.	Situated at Lyall Bay near the entrance to Port Nicholson.	320 92270
NELSON LAND DISTRICT.		
38.	Situated on the shore of West Wanganui Inlet.	30
39.	Situated on the west coast of the South Island and lying to the south of Cape Farewell	110
40.	A Sand Spit extending into the sea about 14 miles from Cape Farewell with an average width of $\frac{1}{4}$ mile.	4000
41.	Situated on the beach at Clifton Village, on Golden Bay.	25
42.	Situated on the shore of Rabbit Island at the mouth of the Waimea River, Tasman Bay.	350 4515
Carried forward		292403

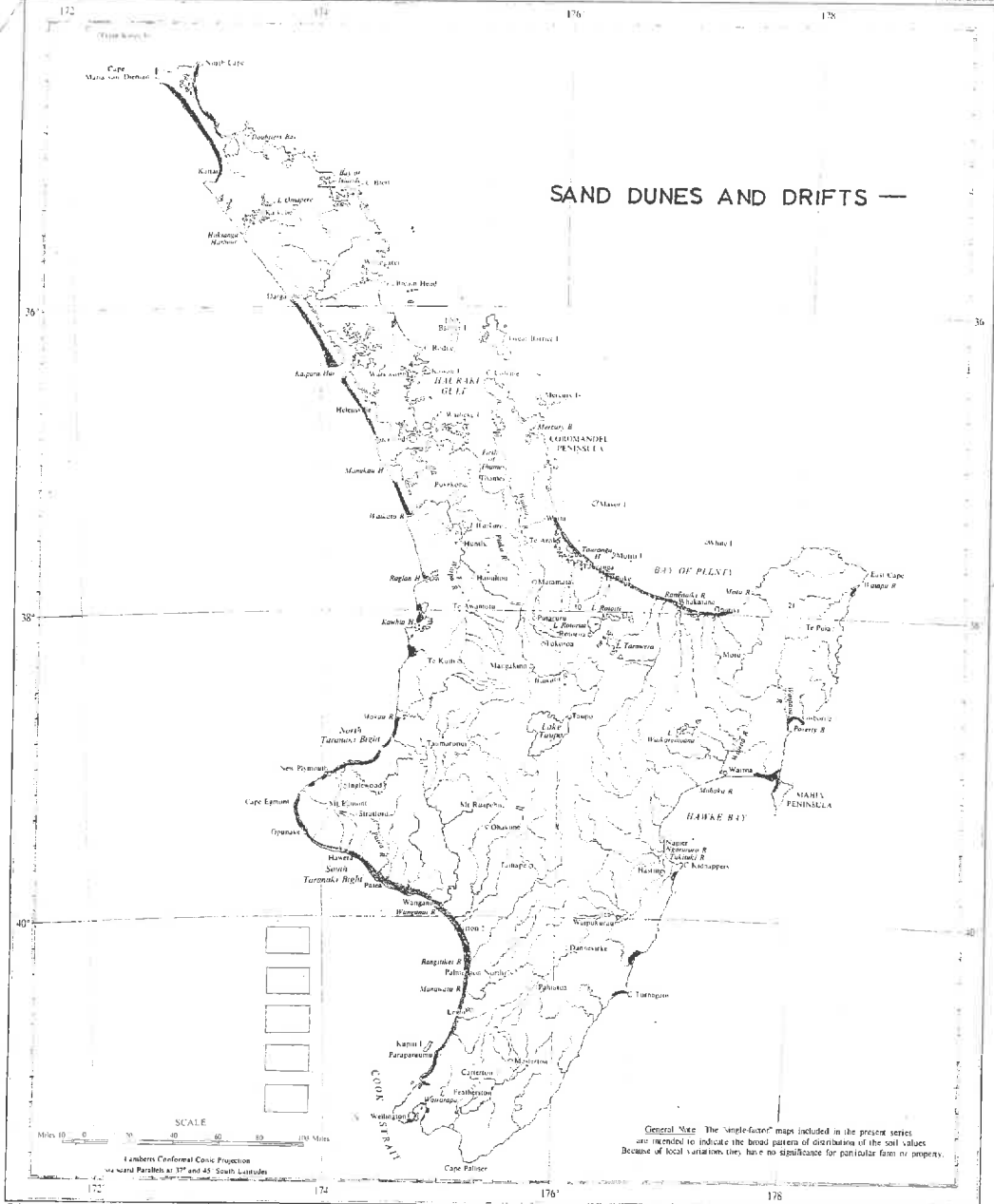
Locality.	Area in Acres.	
Brought forward		
		202403
<u>MARLBOROUGH LAND DISTRICT.</u>		
43.	Situated on the east coast of the South Island and extending in a southerly direction along the sea coast from the Ure River (about 14 miles south of Cape Campbell) for a distance of 12½ miles with a width varying from 5 to 10 chains, and an average width of 7 chains.	800
44.	Situated on the east coast of the South Island and extending in a southerly direction along the coast from the mouth of the Clarence River to Waipapa Point a distance of 3½ miles and varying in width from 20 chains to 1 chain.	700
		1500
<u>CANTERBURY LAND DISTRICT.</u>		
45.	Situated on the east coast of the South Island on the beach at Gore Bay.	20
46.	Situated on the east coast of the South Island and extending along the coast in a southerly direction from about 3 miles north of the Ashley River to the mouth of the River Avon, a distance of nearly 24 miles, and an average width of 20 chains	8000
47.	Situated on the coast between Lake Ellesmere and on the shores of the Lake, and Taumutu Lagoon	700
48.	Situated on the east coast of the South Island about 3 miles north of Timaru, at Otipua Lagoon and Normanby Station.	35
		8755
<u>OTAGO LAND DISTRICT.</u>		
49.	Situated on the east coast of the South Island consisting of scattered areas extending from Taiaroa Head (Otago Peninsula) to Brighton Beach near the mouth of the Taieri River,	1310
50.	Situated on the shores of False Island, at the mouth of the Matlin's River.	15
56.	Situated in Central Otago, on the banks of the Clutha River at Tarras (about 14 miles above Cromwell)	700
57.	Situated in Central Otago, on the banks of the Clutha River, at Lowburn, (about 4 miles above Cromwell)	200
58.	Situated in Central Otago, at Cromwell on the banks of the Clutha and Kawarau Rivers.	700
59.	Situated in Central Otago consisting of scattered areas between the Townships of Alexandra and Clyde extending over an area of nearly 6 miles long by an average of 2 miles in width.	2500
		5425
<u>SOUTHLAND LAND DISTRICT.</u>		
51.	Situated on the South coast of the South Island at Forpeise Bay near the mouth of the Waikawa River.	380
52.	Situated on the south coast of the South Island at Haldane Bay.	420
53.	Situated on the south coast of the South Island between Black Point and Waipapa Point.	920
		1720
Carried forward		50303
		1720 50303

No.	Locality.	Brought forward	Area in Acres.	
			1720	308093
54.	Situated on the south coast of the South Island and extending along the coast in scattered areas from Waipapa Point to Toetoes Bay.		1390	
55.	Situated on the north shore of Foveaux Strait and extending along the shore in scattered areas from New River Estuary to Orepuki.		1800	4910
	Total Area.-			512993

= 126 663.773 ha.

W.A.  
6/8/04  
J.M.B.  
9.2.04

SAND DUNES AND DRIFTS —





SAND DUNES AND DRIFTS —

