

NOTES ON THE VEGETATION

TYPES OF LITTLE BARRIER

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I n t r o d u c t i o n

Though Hauturu is recognised as one of the few places in New Zealand retaining some primaevial forest cover, considerable areas have been modified as a result of man's activities. However, it is now more than fifty years since grazing animals were removed from the island (apart from Te Titoki Flat) and no further damage has occurred as a result of fire or timber felling since 1900. Regeneration in such affected areas is now taking place and these have reverted to tall *Leptospermum* and young Kauri broadleaf dicotylous forest.

Because of its very rugged, highly dissected topography and the rapid change in elevation from sea level to the summit peaks at almost 2,400 ft., Little Barrier, in the virgin state, offered a wide variety of plant habitats. To an already diverse pattern of vegetation types must be added those resulting from the ravages of the late 19th century. Such areas of regrowth show all stages of development from low *Leptospermum* scrub to late 'ricker' Kauri and mature *Nothofagus truncata* forest. To attempt a survey of such a complex vegetation pattern primarily from aerial photographs may appear ambitious and perhaps unsound, but those familiar with the terrain of Little Barrier will well realise the great difficulty that such a survey based only on ground work would present. The production in 1953 of a set of aerial photographs of the island has enabled a more detailed vegetation map of Hauturu to be prepared. In the limited time available for our stay on the island, only a small portion of the vegetation could be examined, and then only briefly.

Because of these difficulties it was found that the ground observations made from the summit peaks and other promontories were especially valuable in recognising and delimiting the vegetation types from the air photos. From the excursions made round the island by dinghy and launch, we were able to observe the entire coastline and some of the hinterland. Hence, areas which we would have found impossible to visit were seen at reasonably close quarters.

Due to the complexity and very dynamic state of much of the plant cover, the vegetation types recognised on the map are broad ones. This follows to some extent the system used by the National Forest Survey where local facies and minor stages in the succession may be included under the one forest type. The number of vegetation types which can be recognised and mapped from air photos is to some extent limited. Also the practical difficulties in reproduction of such a small scale map are of necessity limiting factors in this respect.

Finally we recognise that the present map is preliminary only - future Field Club parties visiting Little Barrier could be able to correct errors which inevitably are present in such project. Areas not visited by the 1954 party should be particularly noted and a revision of our map could then be made.

VEGETATION TYPES:

1. Induced Pasture.

This grassland meadow is confined to the six acres of flat land near the homestead (at Te Titoki Pt.). Originally this land was cropped by the Maoris but has since been used by excessive caretakers for grazing sheep and other stock. Much of the pasture is dominated by Dactylis glomerata (cocksfoot), Paspalum latatum and Trifolium repens (white clover). Also included are two swampy areas colonised mainly by Mariscus ustulatus, Carex rigata and Juncus polyanthemus.

2. Coastal Cliff and Boulder Beach Communities.

Within this type are included the various plant communities found at the head of the boulder beaches, on rock faces just above the sea and on the high cliffs themselves. The plants colonising these habitats are characterised by their varying toleration of salt spray to which they are continually exposed. The characteristic plant of the upper boulder beach is Muehlenbeckia complexa. Also growing amongst the boulders is Calystegia soldanella and Pellaea rotundifolia with Phormium tenax fronting the coastal scrub at the base of the cliffs.

The steep rock faces very near the sea, exposed to excessive salt spray, are colonised by such succulent halophytes as Mesembryanthemum australe, Salicornia australis, Rhagodia tans and Tetragonia trigyna.

At the base of the high cliffs behind the boulder beach may be found a coastal scrub community which varies in height depending on the exposure to wind. Typical species present include Coprosma retusa, Corynocarpus laevigatus, Hymenandra novae-landiae, Pseudopanax lessonii, Meliccytus ramiflorus, Pittosporum assifolium, Suttonia australis, Brachyglottis repanda and Macropiper celsum.

Much of the high, steep cliff faces which are such a characteristic feature of Little Barrier support comparatively little plant cover. On eroding rock faces, such as those seen north-west of Te Hue Point, only Arundo conspicua, Astelia banksii and Thropodium cirrhatum maintain sure footholds. Other species on such cliffs include Phormium tenax, Coprosma retusa, Pseudopanax lessonii and Myoporum laetum.

Where the rock is more stable and erosion is lower the cliff vegetation is dominated by Metrosideros excelsa, and may be found colonising cliff faces 1,000 ft. above the sea, as at Te Titoki. Most of the earlier mentioned coastal scrub species are also

present together with possibly Sideroxylon nova-zelandicum and also Entelea arborescens on newly developed slips.

3. Pohutukawa Coastal Forest.

This type is found over the whole of Hingaia or Pohutukawa Flat, where it covers an area of about 60 acres. Though Hingaia was not actually visited this year, the canopy of the forest (from the aerial photos and off-shore observation) appears to be of uniform, open headed pohutukawa. The scattered coastal trees mentioned by Hamilton (1937) in this forest do not break the typical pohutukawa canopy. The uniqueness of this particular community is evidently the luxuriant growth of Nikau, Astelia spp., ferns, mosses and liverworts - all growing on a shattered rock substratum with little soil. The "small area, devoid of vegetation towards the centre of Hingaia" reported by Hamilton is now no longer recognisable as it has been colonised by vegetation. The other two areas of coastal and semi-coastal forest at Hingaia recognised by Hamilton were not considered sufficiently distinct from our observations, and are therefore included under this present type. Other important areas covered by this coastal pohutukawa forest type are seen on the broad ridges both north and south of Te Hue Point. The canopy is dominantly pohutukawa, but evidently less profoundly so than at Hingaia. Important forest species also present include Corynocarpus laevigatus, Knightia excelsa, Vitex lucens, Dysoxylum spectabile, Beilschmeidia taraire, B. tawa and Melicope ramiflorus. This latter type of pohutukawa forest often grades imperceptibly into the pohutukawa cliff community.

4. Semi-coastal Forest of the Lower Stream Valleys.

This mixed forest type is intermediate in character between the Metrosideros coastal forest and the broadleaf dicotylous type growing at higher levels. It occurs typically in the valley bottoms towards the coast, especially near the mouths of streams on the south and west sides of the island. As an ecologically distinct type it differs from the preceding one in the lack of dominance of pohutukawa which, though often present, is of no greater importance than the other forest trees mentioned above. Accompanying these are Litsaea calicaris, Laurelia novae-zelandiae and Sideroxylon nova-zelandicum, while Agathis australis may descend into the valleys higher up.

But it is the stream valley vegetation with its coastal aspect that makes this type physiognomically distinct. Especially noteworthy in this respect are the luxuriant specimens of Rhopalostylis sapida together with such light demanding species as Cyathea medullaris, Aristolelia serrata, Fuchsia excorticata, Entelea arborescens, Brachyglottis repanda and Schefflera digitata. Macropiper excelsum is generally abundant. Epiphytes such as Collospermum hastatum, Astelia solandri, Earina mucronata and Lycopodium billiardieri are common while Rhipogonum scandens and Freycinetia banksii impede one's progress higher up the valleys. The soil is damper and the forest floor is carpeted in mosses, liverworts, Hymenophyllum spp., Trichomanes spp., and such ferns as Blechnum norfolkianum, B. filiforme

and Asplenium spp.

5. Leptospermum scrub and forest.

This scrub and forest type is characterised by having a canopy dominated exclusively by Leptospermum ericoides and L. scoparium. For this reason it is especially distinctive in the aerial photos in having a light, fine textured appearance. L. scoparium does not seem to be as important as L. ericoides in general, except in a few localities where the manuka had a more scrubby heath-like aspect. For example, on the open clay ridges north of Aowhenua low, open L. scoparium forms a broken canopy, with such shrubby species as Cyathodes acerosa, Leucopogon fasciculatus, Hebe alicifolia, Olearia furfuracea and Suttonia australis. The ground is covered by a dense growth of Schoenus tendo, Gahnia lacera, Gahniaeformis and Lepidosperma laterale. L. scoparium is also present on the lower ridges above Te Titoki Flat, where regeneration is not as far advanced. Otherwise in the taller and probably older Leptospermum forest L. ericoides is the canopy dominant. Here the associated shrub layer consists of Coprosma spp., Nathopanax arboreum, Leptospermum umbellatum, Suttonia australis, Olearia furfuracea and Pathea dealbata. The ground layer is characterised by an abundance of seedlings of these species, and where the parent seed trees are not too distant, those of Agathis, Knightia, Dysoxylum and Beilschmeidia sp.

On the broad south-eastern ridges which descend comparatively gently towards the coast, the tall Leptospermum canopy is broken by fairly numerous emergent heads of young Knightia celsa and some pole and 'ricker' Kauri, both of typically conical form. In this area around to East Cape regeneration is more advanced probably because it has been little disturbed since it was first burnt. In general, the Leptospermum type is found as triangular tongues or strips, directed inland from the coast. These are found over almost the whole southern sector of the island from Te Hue on the west to beyond the East Cape. There is no doubt that their boundaries correspond with those areas heavily burnt by fires which swept up the ridges from the coast to as far as the wetter, inland forest. In between these completely modified blocks on the ridges are the damp beam valley semi-coastal communities.

6. Leptospermum-Agathis advanced regeneration forest.

Higher up some of the ridges above the Leptospermum forest proper and along the ridge sides, the vegetation suffered less damage from fire and stock, and regeneration of the forest in such areas is at a more advanced stage. Apart from tall Leptospermum ericoides the larger tree species include Agathis (pole and 'ricker' stages), Beilschmeidia taraira, Knightia and Dysoxylum. This community has perhaps similarities to the Leptospermum-Agathis species of regenerating Kauri in the Waitakere Ranges, Auckland - especially as regards the composition of the undergrowth.

flora. However, with increasing altitude this type changes in appearance and composition, especially with increasing abundance and size of Nothofagus truncata (hard beech). This damaged intermediate community probably corresponds to Hamilton's Transition Forest.

7. Kauri-dominated Forest.

From the relatively large area classed on the map as belonging to this type it can be seen that we have regarded Agathis as an important physiognomic species. This Kauri type varies in aspect and floristic composition over the island but can be subdivided into two sub-classes, mainly differentiated on altitudinal distribution. The lower Kauri communities which extend up to about 800 ft. resemble the Waitakere Kauri association. Sub-dominant trees include Nothofagus truncata, Beilschmiedia tawa, Knightia excelsa, Lentospermum ericoides, Phyllocladus trichomanoides and Suttonia salicina. It is, however, the following associated forest floor species which are most reminiscent of the mainland association - Alseuosmia macrophylla, Astelia trinervia, Blechnum fraseri, Gahnia xanthocarpa, Senecio kirkii and Freycinetia banksii.

From 800 ft. up to 1800 ft., though Kauri can be recognised from the photos and the summits as the main canopy tree, beech (Nothofagus truncata) must be regarded as almost of equal importance. From within the forest beech is seen to be the most abundant tree, ranging in size from seedling, through pole classes to over-mature decaying adult trees. Few of the large trees are sound. Associated with these two dominant trees in tier II are Weinmannia sylvicola, B. tawa, Knightia and scattered Metrosideros robusta. Below, in tiers III and IV are found Ixerba brexioides, Quintinia serrata, and Dracophyllum latifolium, while the ground is covered in the forest floor species mentioned above.

Because of the very dissected nature and related immaturity of much of the soil of the island, the Little Barrier Kauri forest may be rather slower growing than that in other northern localities. But probably of greater importance to the development of Agathis forests on Hauturu is the exposure to severe winds experienced on most ridges above an altitude of 500 ft. Wind damage to mature Kauri growing at higher levels is evident. Below the exposed west face of Haurua peak, for example, the effect is well shown by the wind-shorn appearance of the Kauri there. Their upper branches are bent almost horizontal and parallel to the prevailing westerlies. It appears possible that Agathis on Hauturu may never attain the large size nor form the extensive forests of those on neighbouring Great Barrier Is. where the habitat conditions must be much more favourable. The principle factor responsible for this difference between the two islands is probably exposure to wind.

8. Mixed broadleaf dicotylous forest.

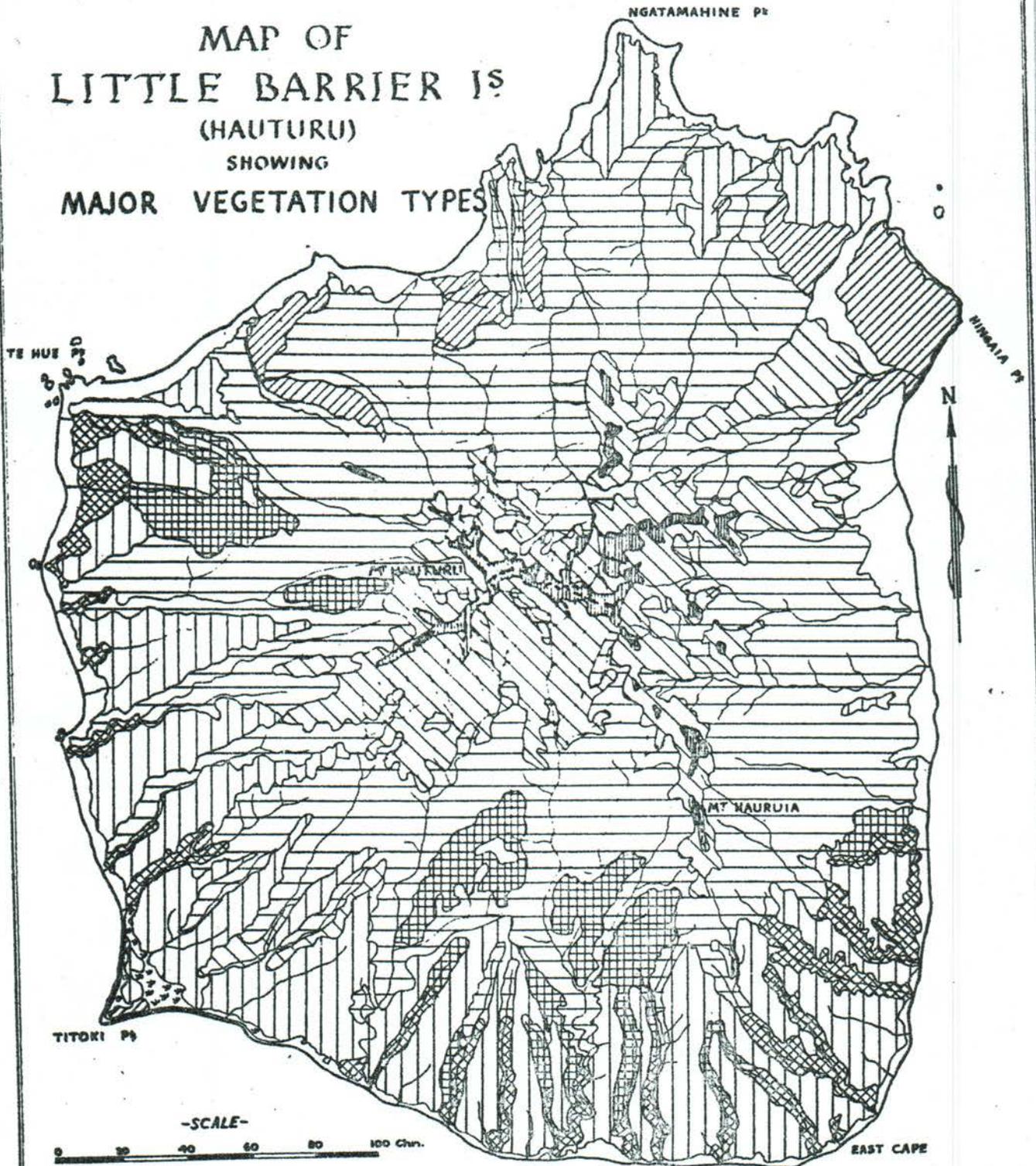
steep valley sides towards the head of the streams the forest is a very mixed nature and varies considerably in floristic composition. Important tree species found in the upper canopy are B. tawa, Weinmannia sylvicola, Laurelia novae-zelandiae, Metrosideros robusta, Podocarpus nivalis, Knightsia excelsa, Ixerba brexioides, Elaeocarpus dentatus and occasional Podocarpus ferrugineus. Compared with a similar mainland or Great Barrier forest the most striking difference is the almost complete lack of Podocarps. Rimu (Dacrydium cupressinum) is rarely seen while Miro and Totara are not common. Though the soils are poorly developed and often only skeletal in nature the top layer and undergrowth is dense - usually a tangled mass of Asplenium platyneuron, Lygodium articulatum and Rhipogonum scandens. The forest floor is dark and wet with a profusion of ferns, especially Adiantum spp., Blechnum spp., Hymenophyllum spp. and Leptopteris enophylloides.

On the ridges above 1,500 ft. Weinmannia sylvicola is the dominant tree forming the main canopy. Below this are found Ixerba brexioides, Drimys axillaris, Quintinia serrata and Pseudopanax colensoi, all forming a luxuriant growth under the high humidity conditions prevailing. At the upper levels, as under the scrub on the summit track, the wetter conditions become more evident in the trunks and branches draped in mosses, liverworts and filmy ferns. Terrestrial and epiphytic ferns of many species are abundant.

9. Montane Moss Forest.

On the highest ridges of the island and on the summit peaks where the effect of the wind is severe this moss forest is found. Though the trees are taller than sub-alpine scrub, their branches grow out in all directions with the main trunk often parallel to the ground. The main canopy species are Ixerba brexioides, Metrosideros umbellata and Quintinia serrata. The canopy is often uneven in height and presents an irregular appearance. Other with the dominant species are Weinmannia sylvicola, Podocarpus nivalis, Archeria racemosa, Griselinia littoralis, Phyllocladus glaucus and Pseudopanax discolor. One of the most outstanding characteristics of this habitat is the saturated condition within the forest. Every branch is covered in a mass of epiphytic mosses, liverworts and filmy ferns. These latter include Hymenophyllum dilatatum, Polypodium multifidum, H. ferrugineum, Trichomanes lyalli with Polypodium ardieri, P. grammitidis and Tmesipteris tannensis. Particularly striking is the pendulous moss Weymouthia draped from the branches and hanging in long strands. The forest floor is carpeted with a spongy carpet of bryophytes as Dicranoloma spp., Leucobryum candidum and Schistocarpus spp. This wealth and luxuriance of ground floor species has led to the formation of a deep layer of humus material filling the gaps between the branches lying close to the ground. In travelling the high ridges between the summit peaks one sinks through a wet, decaying mass which has been formed in many places to a considerable depth.

MAP OF
LITTLE BARRIER IS
(HAUTURU)
SHOWING
MAJOR VEGETATION TYPES



10. Wind-Induced Summit Scrub.

On the very tops of the exposed central peaks and along parts of the connecting ridges, the montane moss forest is reduced to scrub less than ten feet in height. Here the wind force reaches its maximum intensity and the vegetation is thick and at times almost impenetrable. Characteristic species, apart from those predominantly found in the moss forest type, include Elytranthe tetraloba, Nothopanax colensoi, Metrosideros albiflora and Phyllocladus lucus. Along from the trigonometrical point on the summit of Hauturu on the northern face of the ridge is a community of unusual aspect. Here the slopes are entirely covered by a uniform mass of Junia pauciflora, Astelia trinervia and Phormium colensoi. Standing erect above this are frequent tall, spindly specimens of Dracopis recurvatum. The steep north-eastern rock face of 'The Umb' peak supports a low growth of Phormium colensoi, Metrosideros albiflora, Gleichenia cunninghamii and Blechnum minor. The most heterogeneous collection of scrub plants is to be found on Mt. Muriua, an isolated rock peak to the south-east of the summit group. These include Hebe salicifolia, Metrosideros excelsa, Hebe this australis, Pittosporum umbellatum, Senecio kirkii, Coprosma robusta, Coriaria ruscifolia and Leucopogon fasciculatus plus the numerous summit species.

Although many of the summit scrub inhabitants of Little Barrier are important representatives of the north-eastern montane element recognised by Cockayne, there are no true alpine elements recorded from the island. Hauturu is evidently too far north for the development of the cold wind-induced mountain flora and on Te Moehau in the Coromandel Range.

Reference:

Hamilton, W.M. (1937). Little Barrier. D.S.I.R. BULL. No. 54.

