VEGETATION AND FLORA AT THE HEAD OF LAKE TAUPO

R.O. Gardner

INTRODUCTION

These notes describe some of the "lowland" botany of the southern shores of Lake Taupo - the lake-edge plants, the forest and scrub on the lower slopes of the volcanic hills to the west and the delta swamps and pumice terraces at the mouth of the Tongariro River.

Early maps and traveller's descriptions (see REFERENCES) picture an open landscape with a forest edge some way up on the western hills. Tussock was present near the Tongariro River and tree-less swamp or scrub covered most other places. One gains the impression that bracken rather than teatree or koromiko, tutu &c. was the dominant scrub species and that this cover had been encouraged by Maori fires (e.g., Bidwill p.66-68, Dieffenbach Vol. 1 p.336).

PLANTS, HABITATS

Podocarps

From about Turangi upstream the Tongariro River terraces have scattered large totara, matai and kahikatea. Pole stands are uncommon and totara is the only species regenerating widely here.

Tanekaha was seen only once in the district (a seedling on Motuoapa headland).

The prominent stand of cutover forest above Waihi was originally composed of rimu, matai and totara over hinau, rewarewa, kamahi and miro.

Beech

Red beech and black beech (and a few mountain and silver beech) occur singly or in small stands along the Tongariro River terraces, like the large podocarps seldom more than 50 m or so from the water.

Beech also occurs (presumably as relicts) on the scrub-covered rhyolitic domes of Maunganamu and Motuoapa headland.

Beech is scarcely regenerating in any of the present-day scrub communities though there are a few tall pole stands above the Tongariro River adjacent to older stands.

Kowhai

This is a characteristic tree of the kanuka scrub along the Tongariro River and also occurs in the west on the andesitic cliffs between Waihi and Pukawa and onto the lacustrine terraces at Omori. I place all specimens in Sophora microphylla though there is quite a range in leaf size and a non-divaricating juvenile.

There are no adult kowhai, and very few smaller plants, around the mouth of the Tongariro River and eastwards on the beach ridges - evidence probably for the youthfulness of this topography.

Kanuka and manuka

One notices the dominance of kanuka rather than manuka in teatree scrub on a range of dry sites, e.g., on the pumice terraces of the Tongariro River and on rhyolitic and andesitic hillsides. It is kanuka too that is now the prominent species of what formerly was tussock land southwards along the Desert Road - "with the introduction of sheep [1850s] came the manuka [sic] or scrub and today the country extending from Rangipo to Tokaanu ... which used to be rolling downs of tussock, is now [scrub]" (Grace 1959 p.525).

Manuka dominates wetter sites such as swamp margins, low beach ridges and inter-terrace depressions on the Tongariro River, and also occurs in "frost flats" along these terraces (where an iron pan has developed). It is much more subject than kanuka to damage by blight and chrysomelid bettle.

I have not aged any kanuka in the district but very few are greater than 25 cm dbh.

Kamahi and rewarewa

These species rise to dominance in secondary forest on rocky hillsides e.g., the western slopes of Maunganamu, and on scarps in river gravels but are uncommon where the pumice is deeper. Other tall hardwood species are virtually absent from the district (rare hinau and maire, no tawa or rata).

Understorey shrubs

The beech stands of the Tongariro River have an understorey of xerophytes, e.g., matipo, Coprosma lucida, C. rhamnoides, Cyathodes spp. In the taller kanuka scrub here there is much kohuhu and fivefinger.

Ferns

Except for bracken and kiokio ferns are not abundant, presumably being restricted by drought, e.g., the kanuka scrub on deep pumice at Motuoapa headland lacks a silver tree fern understorey.

Under tall kanuka the most drought-resistant species begin to appear - Asplenium flaccidum, Hymenophyllum sanguinolentum and Phymatosorus diversifolius. An attractive feature are the occasional large pieces of pumice clothed with Asplenium flabellifolium or A. hookerianum.

Wetland and lake-edge plants

To judge by their lack of large podocarps, cabbage trees and kowhai and their rather limited flora the delta swamps of the Tongariro River are of no great age. Raupo, flax, Baumea rubiginosa, Carex secta, C. geminata, toetoe, Leptocarpus and manuka are the abundant species. The only rarity seen by me was Utricularia protusa, in the lagoon at Motuoapa. Ruppia polycarpa and Isoetes are perhaps present in the district.

Glossostigma and Limosella grow together on the sandy shore at Waihi and Hydrocotyle hydrophila can be found on mossy rock around Motuoapa headland.

There are old records of the coastal plants Calystegia soldanella, Chenopodium ambiguum, C. pusillum and Rumex flexuosus from the shores of Lake Taupo but I saw none of these. I did find the native form of Geranium solanderi at Pukawa, much the furthest inland station for this plant.

Karaka, seen as a small number of adults and young plants near the lake edge at Waihi and Pukawa, is presumably of Maori introduction. (Similarly Dodonaea viscosa does not grow naturally in the central North Island but modern plantings thrive, e.g., at Turangi, and the species is known (AK 136989) from a Maori site at the northern end of the lake.)

Pohutukawa does not occur in the district.

Mistletoe

At Omori in lake-edge scrub there are perhaps a hundred plants of the native mistletoe Tupeia, growing only on medium-size kohuhu. Possums have badly damaged many colonies. Fruit is being set in good number but seemed to remain an unnaturally long time on the plant when ripe.

According to J. Smith Dodsworth Tupeia and Ileostylus micranthus are abundant on Motutaiko Island north-eastwards in the lake.

Thermal areas

These occur most prominently at Tokaanu and north of here on the hillside at the Hipaoa thermal area. In both places kanuka dominates a low scrub with Cyathodes fasciculata in the understorey; manuka is uncommon. At Tokaanu there is much Leptocarpus, especially on salt pans, while the ground cover at Hipaoa is mostly Paesia and Dianella. A patch of warm soil near the summit of Maunganamu has low kanuka over Paesia.

Of New Zealand's subtropical swampy ferns only Cyclosorus interruptus has been seen at Tokaanu (Cheeseman AK 139508) but it was not relocated by me. Hypolepis "giant" and Lycopodium cernuum grow at Hipaoa.

Adventives

As well as the thoroughly-established crack willow, blackberry, sweet briar and broom younger scrub communities have much lupin, buddleia, heather (Calluna), Himalayan honeysuckle and radiata pine. Pine is a notable new colonist of the sandy beach ridges at the tip of the Tongariro River delta.

Further up the river Cotoneaster spp. and rowan are spreading from Turangi gardens and will become troublesome in the Scenic Reserves here.

Pampas grass (Cortaderia selloana) has been planted at a few places and is just beginning to naturalize.

On warm soil at Tokaanu and Waihi there are some weeds otherwise rare or absent from the district: nut grass, Oxalis articulata, morning glory and winged tobacco (Nicotiana alata).

In scrub above the Mission site at Pukawa large eucalypts are nearing the end of their lives - these, and the very large oak and chestnut (and sycamore?) in the valley bottom here are probably the oldest foreign trees in the district. Locust (Robinia pseudoacacia) is taking over some areas of scrub here and also near Motuoapa.

In the landscaped grounds of the Trout Hatchery on the Tongariro River Himalayan balsam (Impatiens glandulifera) has become plentiful and the large waratah (Telopea oreades) has naturalized sparingly into kanuka scrub 1 km away. The single old lacebark (Hoheria populnea) in these grounds, an introduction to the district, has not naturalized.

FERNS

Adiantum cunninghamii
Asplenium bulbiferum ssp. bulbiferum
A. flabellifolium
A. flaccidum ssp. flaccidum
A. hookerianum
A. oblongifolium
A. polyodon
Azolla rubra
Blechnum capense
B. chambersii
B. discolor
B. fluviatile
B. penna-marina
B. vulcanicum
Ctenopteris heterophylla
Cyathea dealbata
C. medullaris
C. smithii
Cyclosorus interruptus
Doodia media
Dicksonia fibrosa
D. squarrosa
Diplazium australe
Gleichenia dicarpa
Grammitis billardieri
G. ciliata
Histiopteris incisa
Hymenophyllum demissum
H. multifidum
H. rarum
H. sanguinolentum
Hypolepis ambigua
H. dicksonioides (H. "giant")
H. rufobarbata
Leptopteris hymenophylloides
Paesia scaberula
Pellaea rotundifolia
Phymatosorus diversifolius
Pneumatopteris pennigera
Polystichum richardii
P. vestitum
Pteridium aquilinum var. esculentum
Pyrrosia serpens
Schizaea bifida
Trichomanes reniforme

FERN ALLIES

Lycopodium cernuum
L. deuterodensum
L. volubile
Tmesipteris sp.

GYMNOSPERMS

Dacrydium cupressinum
Phyllocladus trichomanoides
Podocarpus dacrydioides
P. ferrugineus
P. hallii (seedlings only)
P. spicatus
P. totara

DICOT TREES & SHRUBS

Aristotelia serrata
Brachyglottis repanda
Carmichaelia arborea
Carpodetus serratus
Coprosma australis
C. lucida
C. parviflora
C. propinqua
C. rhamnoides
C. rigida
C. robusta
Coriaria arborea
C. pteridoides
Corynocarpus laevigatus
Cyathodes fasciculata
C. fraseri
C. juniperina
Dracophyllum strictum
D. subulatum
Fuchsia excorticata
Gaultheria antipoda
Geniostoma ligustrifolium
Hebe stricta
Hedycarya arborea
Helichrysum aggregatum
Knightia excelsa
Leptospermum ericoides
L. scoparium
Melicytus ramiflorus
Myrsine australis
Nestegis cunninghamii
N. lanceolata
Nothofagus fusca
N. menziesii
N. solandri var. cliffortioides
N. solandri var. solandri
Olearia arborescens
O. rani
O. virgata
Pernettya macrostigma
Pimelea prostrata
Pittosporum colensoi
P. eugenioides
P. tenuifolium
Pomaderris phylicifolia var. ericifolia
Pseudopanax arboreus
P. crassifolius
P. edgerleyi
Pseudowintera colorata
Schefflera digitata
Solanum laciniatum
Sophora microphylla
Tupeia antarctica
Weinmannia racemosa

DICOT LIANES

Clematis forsteri
C. quadribracteolata
C. paniculata
Metrosideros diffusa
Muehlenbeckia australis
Parsonsia capsularis
Rubus cissoides
R. schmidelioides

DICOT HERBS

Acaena anserinifolia
A. novae-zelandiae
Cardamine debilis
Celmisia gracilenta agg.
Centella uniflora
Drosera binata
D. peltata ssp. auriculata
Epilobium billardierianum spp. cinereum
E. chionanthum
E. nerteroides
E. pallidiflorum
E. pedunculare
E. rotundifolium
Geranium potentilloides
G. solanderi "large petals"
Gnaphalium gymnocephalum
G. involucratum
G. keriense
G. limosum
G. sphaericum

Glossostigma elatinoides
Gonocarpus micranthus
Haloragis erecta
Hydrocotyle elongata
H. hydrophila
H. microphylla
H. moschata
H. novae-zelandiae
Lagenifera pumila
Limosella lineata
Montia fontana
Muehlenbeckia axillaris
Myriophyllum propinquum
M. triphyllum
Nertera ciliata
Oxalis magellanica
Parahebe catarractae
Pelargonium inodorum
Pratia angulata
Ranunculus hirtus
R. sp., ?R. rivularis
Raoulia sp.
Senecio glomeratus
S. hispidulus
S. minimus
Stellaria parviflora
Utricularia protusa
Viola filicaulis
Wahlenbergia gracilis

ORCHIDS

Acianthus fornicatus
Earina autumnalis
E. mucronata
Microtis unifolia
Pterostylis banksii
Thelymitra ixioides
T. longifolia

GRASSES

Cortaderia fulvida
Deyeuxia sp. or spp.
Dichelachne crinita
Echinopogon ovatus
Elymus rectisetus
Isachne globosa
Lachnagrostis filiformis
Microlaena avenacea
M. stipoides
Poa anceps
P. imbecilla
Rytidosperma sp. or spp.

OTHER MONOCOTS

Astelia fragrans
A. solandri
Baumea rubiginosa
B. tenax
Carex breviculmis
C. coriacea
C. echinata
C. geminata
C. maorica
C. secta
C. solandri
C. virgata
Collospermum microspermum
Cordyline australis
Cyperus ustulatus
Dianella nigra
Eleocharis acuta
Juncus gregiflorus
Lemna minor
Lepidosperma australe
Leptocarpus similis
Luzula picta var. picta
Morelotia affinis
Phormium cookianum
P. tenax
Potamogeton cheesemanii
Ripogonum scandens
Schoenus maschalinus
Scirpus lacustris
S. sp., ?S. inundatus
Typha orientalis
Uncinia laxiflora
U. scabra
U. uncinata
U. sp., ?U. distans

LAKE TAUPO
1176'

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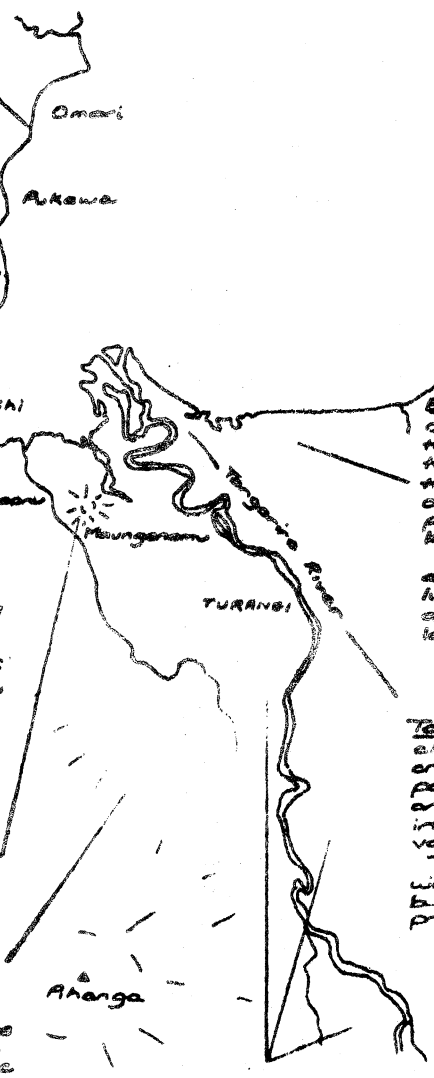

Rukawa & Omori terrace formed by blockage of lake after A.D. 126 Taupo Pumice eruption; long-occupied by the Maori, perhaps in tōtara forest originally, now mostly broadleaved scrub (kohuhu, five-finger, tutu, karamu, koromiko).
Mistletoe Tupeia at Omori, only on kohuhu. Geranium solanderi at Rukawa (as a Maori weed?).
Kowhai has not reached the rear of the terrace, or far up the streams.
Willow, lupin, tall fescue on lake edge — v. few natives.

Andesitic cliffs mostly scrub & 2° kamahi - rewarewa fst, a few large tōtara & kowhai. Much Leucosteria on clay screes.
Karaka at Waihi & Rukawa, presumably naturalised from Maori plantings.

Plateau edge with cut-over podocarp fst., — no rata, tawa, beech.

Hipaua thermal area. Low kanuka & ringiringi over Pteris & Dicranella; Hypolepis "giant" and Lycopodium cernuum warm-soil notables.

Tokaanu: thermal area mostly in kanuka (manuka uncommon). Leptospermum in open places and Cyperus ustulatus by warm water.
Early cultivation here of maize, wheat, kumara, potatoes, taro, tobacco, water-melons, pumpkin, peaches & apples.
Pampas starting to naturalize on main highway.

Hauungaroa a rhyolitic dome with tall kanuka of 2° kamahi - rewarewa fst according to presence or absence of pumice. Has a v. few relict red beech.

Lower slopes of the andesitic Kakaramea Range had mostly bracken and scrub in early European times — some perhaps natural (transitional between the tussock on the deep pumice along the Tongariro River and the podocarp forest above) and some perhaps induced (Maori firing of forest for cultivation).
Much bracken, kanuka & scrub remains today, though sites disturbed in the last few decades have mostly broom.

Metuaopa headland, a rhyolitic dome mostly in tall kanuka; at least one stand of black beech.
Lagoon between the headpits here has much Utricularia protrusa.

Extensive swamps between Metuaopa: manuka on the low ridges (old beaches), toetoe, Baumea & carices in the depressions; raupo in the deepest water. No large podocarps, cabbage trees or kowhai.
Modern beach ridges are dominated by gorse and lupin (many of the latter drowned by the very high lake levels of '83-4).

Tongariro River floodplain: slope to the river mostly crack willow - blackberry or pasture (a few young kowhai and beech), petering out into damp kanuka then various swamp communities.
Tip of delta dominated by willow & blackberry; young but large pines becoming prominent on fore-shore.

Tongariro River pumice-capped lake and river terraces: a few large podocarps and stands of beech esp. near the river among kanuka - kowhai / five-finger - kohuhu scrub. Manuka only in the wettest places and along the frost flats by the highway. Pines and broom well-established in the younger scrub, Calluna a newcomer.
Newest river flats have toetoe and adventives (broom, buddleia, tall fescue, lupin, blackberry) — v. few mountain plants. Similarly adventives are pushing out the smaller shrubs, grasses & orchids along the river-edge tracks.
No evidence (eg. no relict tōtara, kowhai) that there has ever been extensive forest between the river and the hills to the east and west — Kerry-Nicholls writes of approximately the site of Turangi in 1893: "covered with fluvial drift and enormous trachytic boulders... where-ever vegetation could spring up the tussock grew luxuriantly [apparently none in district today]. Through the centre of this broad expanse the [river] rolled onwards... its winding course marked by tall trees and other vegetation."

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MEMO ABOUT MANGROVES

Lucy B. Moore

Every Aucklander has seen the breathing roots that poke up stiffly, like dirty asparagus shoots, from the mud under mangrove trees. As these 'pneumatophores' grow older they breath less but provide relatively firm surfaces to be colonized by small red seaweeds belonging to three different genera, the common little fouling barnacle, or rock or Pacific oysters -- all organisms that enjoy being surrounded alternately by air and by salt or brackish water.

Trace a pneumatophore down and you will probably find a bunch of fine, much-branched feeding roots and then the thick horizontal support root out of which the breathing roots grow. But how often is there a down-growing pneumatophore emerging not from a root but from a woody trunk that bears leafy twigs above? This I saw recently on the Mahurangi River. The trunk was at least as thick as my wrist and the lowest pneumatophore, about 30 cm long, still did not reach down to the mud; several shorter ones were rather closer together higher up. All were fairly clean except for an odd patch of the tiny red alga, *Caloglossa lepreurii*.

Another thing perhaps worth recording is ear fungus (*Auricularia polytricha*) on mangroves. This was unexpected, but perhaps not improbable, on high branches of trees that had died. In another place a fine bunch was growing on a live branch with plenty of leafy twigs. It was in a hole lined with dead tissue that the fungus had found a suitable niche. Has anyone made an exhaustive list of the species whose dead wood supports this fungus in New Zealand?

5 March 1984