Vegetation of Paekakariki – Pukerua escarpment ecoforest

Report for Nga Uruora

Maggy Wassilieff

Introduction

The ecoforest, an 8ha stand of coastal forest and regenerating shrubland situated midway along the Paekakariki –Pukerua Bay escarpment, is the subject of this report. I visited the ecoforest on 3 occasions in late April and early May 2010. The first visit was fleeting, consisting of a walk through the lower portion of the forest. The second visit of 5 hours encompassed an inspection of the forest boundary, a walk up the southernmost gully (Slump gully), and a descent down a central ridge. The third visit of 4 hours involved a check of the kanuka forest above the train tunnel terraces, a walk along the northern gully (Hut gully) and a sidle around slump gully and the southern boundary of the ecoforest.

Objectives

The aims of these visits were to:

- Determine the composition and condition of the forest
- Determine the nature of adjacent stands of vegetation
- Provide a vascular plant species list for the forest and its immediate surrounds, and
- Offer management suggestions for the vegetation at the ecoforest.

Landforms and geology of the ecoforest site

The ecoforest lies between 40m asl and 260m asl on a steep to very steep coastal escarpment. Two gullies are located in the ecoforest (Hut gully near the northern boundary and the larger Slump gully near the southern boundary). The basement rock is greywacke. Solid rocky bluffs are exposed immediately to the north of the ecoforest. Most of the ground in the lower slopes consists of unweathered coarse angular rocks and small boulders. When covered by grass or scrub vegetation, the rocky material appears stable, but within the forest it is apparent that there has been recent downslope

movement of rocks in the gullies, probably related to the intense rainfalls that hit this coast in the last decade (Oct 2003, Feb 2004, Jan 2005).

Geologists have tentatively identified the site of the ecoforest as being a prehistoric landslide slump (Hancox et al. 2005, GNS photo GH 0454). Nga Uruora collects its water from an incised stream in the slump gully. Above the curved scarp at the head of the slump gully is a flat terrace that forms the eastern boundary of the ecoforest.

Vegetation types of the ecoforest

(Numbers refer to the location of vegetation types on the aerial photograph)

Tall forest (1) grows in the gullies, whereas low coastal forest and scrub covers the ridges and an upper terrace above the slump scarp.

The forest has a smooth windshorn canopy. In the gullies the canopy is bright green, due to the dominance of kohekohe (*Dysoxylum spectabile*) foliage. A few scattered nikau (*Rhopalostylis sapida*) palms emerge a couple of metres above the canopy. Karaka (*Corynocarpus laevigatus*), pigeonwood (*Hedycarya arborea*), titoki (*Alectryon excelsus*), mapou (*Myrsine australis*), mahoe (*Melicytus ramiflorus*), and ngaio (*Myoporum laetum*) make a minor contribution to the canopy.

The low coastal forest (2) on the ridge between Hut gully and Slump gully is dominated by akiraho (*Olearia paniculata*), mahoe and kohekohe. On a steep northern slope below this ridge is an exposed scrub-flaxland of *Coprosma propinqua* and whaririki (*Phormium cookianum*) containing emergent cabbage trees (*Cordyline australis*).

Windshorn kanuka (*Kunzea ericoides*) forest (3) grows on the ridge and north-facing slope above the water-storage tank.

Low grey scrub (4), dominated by *Coprosma propinqua*, is found at the northern boundary and upper slopes between the two gullies. It has developed on previously grazed pasture.

A stand of young tree lucerne/tagaste (*Chamaecytisus palmensis*) (5) forms a low forest (canopy around 4m in height) on terraces below the water storage tank.

Rank pasture grasslands (6) make up most of the surrounds of the ecoforest.

Structure of the coastal kohekohe forest

One of the striking features of the kohekohe forest growing in the gully bottoms is the near absence of understorey and ground floor plants. (Karaka seedlings are an exception, see Recommendation 3). This contrasts with the abundant and diverse understorey on the adjacent gully slopes. The lack of ground cover results from frequent debris slides of rocks and soils that course down the gullies during heavy rains.

Tall kohekohe forest on gully bottom

Large kohekohe trees (between 30-70cm diameter at breast height) form a canopy between 15-20m high. An occasional karaka tree shares the canopy.

The understorey is sparse, consisting of scattered kawakawa (*Macropiper excelsum*), kanono (*Coprosma grandifolia*), and rangiora (*Brachyglottis repanda*).

Ground floor vegetation is limited, comprising scattered karaka seedlings to 50cm height. The forest floor is covered in unstable angular rocks (sides 10-30cm long).

Tall kohekohe forest on gully slopes

Large kohekohe trees (around 30-40cm dbh) form a canopy between 15-18m high.

An upper understorey (between 3-6m) is dominated by kawakawa, mahoe, and hangehange (*Geniostoma rupestre*).

A sparse lower understorey (0.3m-2m) is found in places, consisting of hybrid coprosma (*Coprosma propinqua* x *C. robusta*), *Coprosma areolata* and hangehange.

Ferns are common as the ground floor cover. In many places the creeping ferns *Blechnum filiforme* and *Arthropteris tenella* form a spreading mat over the rocks. At other locations clump ferns such as shining spleenwort (*Asplenium oblongifolium*) and shield fern (*Polystichum neozelandicum*) are common. Seedlings of kohekohe, karaka, and nikau are frequent.

Leaf litter is common on gentle slopes.

Mixed low forest on slopes and upper terraces

A more mixed forest is found on the slopes and terraces bordering the gullies. The canopy trees are thinner stemmed than those in the gullies (10-30cm dbh) and only reach 5-8m in

height. Mahoe, akiraho, ngaio, pigeonwood, mapou , and titoki share the canopy with kohekohe.

Climbing and perching plants are common. The following were noted: supplejack (*Ripogonum scandens*), native jasmine (*Parsonsia heterophylla*), bush lawyer (*Rubus cissoides*), 2 types of climbing rata (*Metrosideros diffusa, M.fulgens*), kiekie (*Freycinetia baueriana*), perching lily (*Collospermum hastatum*), and puka (*Griselinea lucida*).

The interior of the forest is well-developed with kawakawa, hangehange, rangiora, mahoe, karamu (*Coprosma robusta* and *C. lucida*), tarata (*Pittosporum eugenioides*), kohuhu (*Pittosporum tenuifolium*) and native jasmine forming an understorey between 1-3m.

Climbing and clump ferns abound on the ground along with occasional tufts of hook grass (*Uncinia uncinata*) and slender rice grass (*Microlaena stipoides*).

The vascular flora

The native vascular flora comprises 93 species and 1 hybrid. Trees and shrubs are the dominant growth forms, with ferns being the next most common. With 12 species present, climbing plants (lianes) are quite well represented, but the variety of grass, grass-like and herbaceous plants is poor.

The number and identity of native species is representative of Wellington's coastal forest fragments. All of the tree and shrub species present are typical of young or intermediate-aged successional forests. Long-lived tree species characteristic of old growth coastal forests are absent. An interesting feature is the presence of perching lily and puka (broadleaf) growing on trees in the low kohekohe forest. These two epiphytes are typical of old growth forests. Although no mature podocarp trees are present, one sapling of miro (*Prumnopitys ferruginea*) was found in low forest on the southern slope.

Hybrid coprosma (*Coprosma propinqua* x *C. robusta*) is particularly common both within and outside the forest. Forest interior plants exhibit the full range of leaf-size and shape between the parent species and probably represent a hybrid swarm. The hybrid plants growing in the open exhibit a more limited range of leaf size and shape.

No rare or endangered species were noted growing naturally at the site. Young trees of large-leaved milk tree (*Streblus banksii*) were planted at the edge of the ecoforest in the

late 1990s. The regionally uncommon small-leaved milk tree *Streblus heterophyllus* does occur naturally in the forest; adults and seedlings are present.

It is now generally accepted by botanists that karaka is only native to the northern half of the North Island (NZ Plant Conservation Network, Karaka notes). Around the greater Wellington area karaka is nearly always associated with sites of current or former human settlement (Sawyer et al. 2003).

The adventive vascular flora of the ecoforest and its immediate surrounds numbers at least 53 species. (This is very much an underestimation, as I made no effort to identity herbs and grasses that were not flowering or fruiting). In contrast to the native flora, tree and shrub species are poorly represented and herbs and grasses are common. Many of these adventives are typical of open habitats and are unlikely to persist under a forest canopy.

The exceptions here are English ivy and periwinkle. These two scrambling plants are pest weeds that can overwhelm native plants or usurp sites where natives could regenerate.

Condition of the ecoforest

The condition of the forest is very good. This is due to the effective mammal control and weeding work that has been carried out since the late 1990s (Peter Russell – Environmental weed report). I cannot recall seeing another isolated stand of lowland or coastal forest that has so few management problems.

Canopy condition Overall the canopy of all the forest types is closed and dense. Canopy gaps were only noted in a few places and each gap appeared to be due to the natural death of a canopy tree. A few titoki and kohekohe trees on the lower slopes of the forest have wind- burnt foliage. There was no sign of possum browse on kohekohe foliage and flower buds, or on mamaku (*Cyathea medullaris*) fronds (favoured foods of possum).

Internal Seedlings of kohekohe are abundant on the slopes and terraces, and at the times of my visits the adult trees were full of flower buds. However, there are no saplings or thin-stemmed (3-10cm dbh) trees of kohekohe in the understorey. This is a legacy of decades of possum and stock browsing in the forest.

On the ridges and terraces there are some standing dead stems and fallen trunks of subcanopy trees (often kawakawa). These represent the losers in the natural thinning process that occurs within young forest stands.

The only weed plant of any concern noted within the forest was English ivy. Infestation was light (mainly seedlings) and scattered, indicating that infestation was from bird-distributed seeds and not from vegetative fragments.

Edges The forest has a near continuous closed edge, whereby tree and shrub foliage form a dense cover from ground level to canopy. This closed edge forms an effective barrier to drying winds and helps preserve a moderate environment (temperature and humidity) within the forest. On the seaward margin of the forest there are occasional breaks in the forest edge that penetrate a few metres in. These seem to result from wind damage to canopy branches of boundary trees and shrubs.

At the time of my visits there was no evidence that stock or possums had had access into the forest or its periphery in recent times (no dung no grazed/nibbled plants).

One patch of periwinkle near the southern edge of the forest had been sprayed some months previously. A couple of fragments had survived and will need a follow-up spray treatment to ensure that this pest plant doesn't spread into the native vegetation.

Condition of surrounding vegetation

Tree and shrub regeneration There has been much regeneration of tree and shrub species on the northern boundary of the ecoforest. Especially notable are the prolific growth of kanuka around the water storage tank, and the spread of broadleaved species at the forest edge since the hut in Hut gully was built (assuming the hut was built at or very close to a forest edge).

Some regeneration of native plants has recently taken place into ungrazed grassland on the northern side of the kanuka stand. Seedlings of tauhinu and kanuka (up to 50cm height) are present. However the grass sward now appears too dense to permit much more establishment of such light-demanding seedlings. *Coprosma propinqua* shrubs also established in this locality when it was grazed, but no current recruitment of this shrub is occurring.

At the south-western margin of the forest where the forest abuts bracken-rank grasslands there is no recruitment of forest species into the grass sward. This lack of recruitment is either because seeds are failing to germinate or seedlings are failing to thrive under the dense grassy sward. When plants like taupata and ngaio are planted at the forest margin and kept clear of rank grass they grow well**.**

A small pile of hare pellets was noted in grassland at the south-western edge of the forest. Joe Clarkson commented to me that hares were occasionally seen on the escarpment. Although not a major pest, hares can inhibit regeneration by nibbling young saplings.

Weeds Because of the active weed eradication/control programme undertaken by Nga Uruora in and around the ecoforest there are no problem weeds in its immediate vicinity. (A nearby patch of sprayed periwinkle is showing some regrowth). There are, however a number of weeds elsewhere on the escarpment that could threaten the integrity of the forest. Climbing and scrambling plants such as periwinkle and English ivy are the main threats at the moment. Weed monitoring and weed eradication work will always be needed around and within this small stand of native forest. No new pest weed species were noted by me on my visits to the escarpment.

History of the ecoforest

My initial impression of the ecoforest was that it was a stand of secondary coastal forest that had grown up after the destruction of a structurally complex primary (old growth, pre-European) forest (Wassilieff, April 2010). Features that indicate that the forest is secondary in origin include:

- Absence of emergent podocarps and northern rata in the forest. (Old-growth coastal forest on Waikanae escarpment, Kapiti Island and in near-by Marlborough Sounds has/had tall podocarps emergent over a kohekohe canopy).
- The trunks of canopy trees fall into small or moderately sized diameter classes (most of the tree trunks are less than 50cm dbh).
- Absence of large tree trunks or rotting stumps on the forest floor (as would be expected in an old-growth forest).
- Near absence of canopy gaps or regeneration in-fill following the death of a canopy tree.

- Simple composition and structure of the forest.

However, after locating a few kohehohe with large girths (trunks greater than 1m in diameter at breast height) on the edge of the landslide slump, I have had to modify my initial impression of the ecoforest. Essentially most of the ecoforest is secondary in origin, but the large-girthed trees may be survivors from the original forest.

I cannot say how old the secondary kohekohe forest is (kohekohe and karaka do not display clear annual rings in their wood and have not been subject to aging studies), but I believe it post-dates the land slump on which it grows. None of the trees growing on the slump have partially buried trunks as might be expected had they had been present before the land slipped. Their moderate size and bark characteristics (pale and smooth) are similar to that of secondary kohekohe trees on Kapiti Island and in Wilton's Bush dating from the mid-late 19th century (Esler 1966, and pers. obs).

Peter Russell (Weed report) reports that forest was cleared from the escarpment during the establishment of Tunapo farm. Francis W. Smith settled Tunapo in 1859 and presumably cleared the forest and sowed pasture grasses sometime between 1860 and 1880. I suspect pasture grass failed to establish on the stony ground of the slump and a scrubland of kohekohe developed, possibly from seed dropped by surviving adult trees on the margin of the slip.

Over the years the forest has expanded outwards from the slump, so today there are various cohorts of trees in the ecoforest. The youngest trees are those on the northern edge.

Future prospects of the vegetation

Kohekohe-dominant areas

Kohekohe forms the terminal forest on exposed coastal sites in the Cook Strait Ecological District. In the absence of any major disturbance, kohekohe will continue to dominate the ecoforest's canopy well into the future. Over the next few decades other tree species such as mahoe, titoki and nikau might increase their contribution to the forest canopy. Without active management to control its seedling and sapling populations, karaka will become a co-dominant of the ecoforest.

Kanuka stand

With a life-span between 80-120 years, kanuka will persist on the northern slope for most of the 21st Century. As the kanuka forest develops, shade-tolerant broadleaved plants form an understorey and, in time, replace decadent kanuka in the canopy. This canopy replacement process is visible in the centre of the kanuka stand. At this site mahoe, fivefinger (*Pseudopanax arboreus*), tarata, karamu, *Coprosma lucida* and kohekohe are the most likely successors to kanuka.

Coprosma propinqua, tauhinu and tree lucerne shrublands

The shrublands and tree lucerne planting on the northern slopes of the ecoforest are likely to persist for some 10-50 years (depending on present age). They will be replaced by a broadleaved seral forest. Mahoe will probably be the dominant tree, although other mid-successional shade-tolerant species such as fivefinger, tarata, pigeonwood, mapou, *Coprosma* species, hangehange, kaikomako, and putaputaweta are likely to be represented.

Rank grasslands

Now that grazing has ceased, rank grasslands might persist on the escarpment in excess of 50 years. Few native plants can successfully germinate under dense swards of cocksfoot. In parts of Taepiro Gully, Kapiti Island, tall cocksfoot grassland was still present 60 years after grazing animals were removed (Fuller 1985). Bracken and pohuehue can invade dense grasslands from the margins of forest and scrub and, in time, may form a more open type of vegetation in which native shrubs establish (Esler 1965; Wilson 1994). The period for this regeneration is most uncertain, being dependent upon the rate of marginal invasion and the presence of birds to carry shade-tolerant seeds into the site.

Management Recommendations

To date sensible and successful actions have been undertaken by members of Nga Uroroa to safeguard the ecoforest, namely:

- stock animals and possums have been eradicated,
- good fencing has been installed;
- effective weed and predator animal control have been established; and
- revegetation with eco-sourced plants has begun.

Recommendation one –Increase forest edge plantings

My main recommendation is to increase plantings on the exposed edges of the ecoforest, especially where trees are showing signs of wind damage. Hardy eco-sourced plants should be used, and preferably should be planted in a couple of parallel rows with staggered plantings.

Suitable species for the windward edge include:

whaririki, coastal flax,

Coprosma propinqua,

porcupine shrub

Olearia solandri

tauhinu,

akiraho,

taupata,

mapou, red matipo

hybrid coprosma (*Coprosma propinqua* x *C. robusta*),

and ti, cabbage tree.

Suitable species for the inner row include:

fivefinger

tarata (lemonwood),

karamu *Coprosma robusta*

karamu *Coprosma lucida*

kohuhu

ngaio

titoki

mahoe

kawakawa

kaikomako

broadleaf – *Griselinea lucida*

pigeonwood

Recommendation two – Commence forest interior plantings

At some time in the recent past a couple of saplings of large-leaved milk tree (*Streblus banksii*) were planted just within the forest edge. This rare species does not appear to be naturally present within the ecoforest and should not be further planted at the site unless naturally growing specimens are located close by on the escarpment.

I did not notice any other plantings within the forest interior, but some could be undertaken. This would compensate for the palatable species lost to grazing animals and because bird distribution of seed is probably less nowadays than it was in former times. The following species could be planted under forest cover, including the young broadleaf forest on the northern slope:

miro

titoki

kohekohe

turepo

wharangi

putaputaweta

pigeonwood

Recommendation three –Remove karaka seedlings and saplings

In the last couple of decades karaka has become a serious weed in some small forest reserves around Levin and Wellington. Its prolific seedling regeneration forms such dense thickets that exisiting vegetation is overwhelmed. Karaka germination and seedling survival is especially vigorous following possum control.

Karaka seedlings flourish on the forest floor in the slump gully. Although some are periodically removed by Joe Clarkson in the lower reaches of the gully, it is clear that this species has the potential to become the dominant plant of the understorey and ultimately

much more common in the canopy. I advocate the periodic removal of all seedlings and saplings in the ecoforest, but I am not in favour of cutting down or poisoning any mature karaka trees. It is imperative that the intact canopy of this small wind-exposed forest is protected and unnecessary canopy gaps are not created.

Recommendation four – Plant a fireproof buffer above the railtrack, road and parking area

Rank grasslands are a fire hazard in summer months. There is potential for a fire to race up the grassy parts of the escarpment and into the forest and regenerating shrublands. Suitable native plants for this area that withstand fire to some extent include: coastal flax, taupata, karamu, ngaio, cabbage tree, hangehange, koromiko (*Hebe stricta* var. *atkinsonii*), mahoe and fivefinger.

As much of the lower escarpment is very steep and in places nearly vertical, it may prove too difficult to establish a continuous buffer of native plants. At such sites I recommend sowing tree lucerne seed.

Recommendation five - Use tree lucerne as a pioneer in rank grasslands

Tree lucerne is often used in regeneration projects at coastal and lowland sites to provide pioneer shelter for broadleaved species. It has been used by the Department of Conservation, Regional Councils and private groups. Some people are opposed to its presence at revegetation sites as it is not a native plant. This seems an irrelevancy to me, for usually revegetation is into sites that are or were dominated by exotic plants (introduced grasses, gorse, Scotch broom etc). The fact that tree lucerne grows quickly and creates sheltered forest cover in which native broadleaf plants thrive means that it is possible to establish native forest rapidly and economically. At many sites, a native forest can be established decades faster using tree lucerne as a pioneer plant than can be achieved by employing native pioneer shrubs.

Where tree lucerne is particularly useful is at exposed sites dominated by rank grass. Native broadleaved plants often struggle to thrive when they are planted into dense swards of ungrazed pasture. Rank grasslands are also prone to fire. The large fire at Whitireia Park, Titahi Bay in February 2010 not only burnt some 90 ha of regenerating scrub and forest but also destroyed two thirds of the 20 year revegetation effort at this

coastal site. I believe less damage would have occurred if boundary plantings of tree lucerne had been employed close to houses and if groves of tree lucerne had been strategically planted into and around stands of gorse and dry swards of grass.

Other advantages to using tree lucerne as a pioneer revegetation plant include:

- It is short lived and does not persist in the maturing native forest,
- It is nitrogen-fixing, and so provides an essential plant nutrient to sites that lost top soil following forest destruction,
- It provides food for native birds in autumn and winter months,
- It provides a roost for birds that deposit native seeds under the trees.

I recognise that there has been some concern that tree lucerne can spread from areas in which it has planted. This should not be a problem on a site where regular monitoring and weed control occurs. Around Wellington tree lucerne does not seem to be an effective escapee from plantings, unlike karo, pohutukawa, or hybrid fivefinger.

Recommendation six - Eliminate English Ivy and Periwinkle

At present weed infestation in or around the ecoforest is fairly light and it should be possible to virtually eliminate the two pest plants present. The established patches of English ivy within the ecoforest should be dug out or hand-pulled and all material bagged and removed from the site. As birds are bringing seed of ivy into the forest each winter, someone will need to walk through the forested patches each spring or summer and remove seedlings before they start to scramble over the ground floor.

Although it may be impossible to completely eliminate English ivy from the Paekakariki escarpment as long as the plant remains in private gardens, it should be possible to reduce the volume of ivy seed arriving at the ecoforest by spraying all fruiting patches on the escarpment. Large patches of English ivy should be sprayed with systemic herbicides in summer and early autumn while the plant is actively growing, but just before fruit ripen.

Periwinkle may prove easier to eliminate than English ivy as it does not set seed in the Wellington region. Spread is from stem fragments. The main source of periwinkle on the escarpment is probably from garden waste dumped along the road edges decades ago. The patches around the ecoforest should be completely destroyed (by applying systemic

herbicides and digging–up any resprouting crowns). To prevent further weed invasion onto the sprayed sites, native shrubs should be planted on the cleared patches.

Recommendation seven – Introduce absent native species

There are a number of relatively common plant species native to the Cook Strait ecological district that are absent from the ecoforest but are known to grow in similar coastal forest and regenerating scrub communities nearby. Amongst these are the following trees and shrubs that could be introduced to the revegetation programme*:*

kahikatea *Dacrycarpus dacrydioides*

matai *Prumnopitys spicatus*

rimu *Dacrydium cupressinum*

wineberry *Aristotelia serrata*

hinau *Elaeocarpus dentatus*

tree fuchsia *Fuchsia excorticata*

rewarewa *Knightia excelsa*

pukatea *Laurelia novae-zelandiae*

northern rata *Metrosideros robusta*

pate *Schefflera digitata*

lancewood *Pseudopanax crassifolius*

manuka *Leptospermum scoparium*

References

Esler, A.E. 1967: The vegetation of Kapiti Island. *New Zealand Journal of Botany 5*: 353-393.

Fuller, S.A. 1985: Kapiti Island vegetation. Dept. Lands & Survey, Misc. Pub. Wellington. 43pp

Hancox, Graham; Dellow, Grant; Perrin, Nick; McSaveny, Mauri 2005: Western Corridor transportation study: Review of geological hazards affecting the coastal highway and Transmission Gully routes. *Institute of Nuclear and Geological Sciences Client report 2005/161*

New Zealand Plant Conservation Network. Karaka notes: http://www.nzpcn.org.nz/flora_details.asp?ID=1762

Sawyer, John; McFadgen, Bruce; Hughes, Paul 2003: Karaka in the Wellington Conservancy. *DoC Science internal series 101*. Dept of Conservation, Wellington, 27p.

Russell, Peter. Environmental weed report – Paekakariki escarpment.

Wassilieff, Maggy 2010: Paekakariki escarpment – observations. Report to Nga Uruora. April 2010.

Wilson, Hugh D. 1994: Regeneration of native forest on Hinewai Reserve, Banks Peninsula. *New Zealand Journal of Botany* 32: 373-383.

Ecoforest vascular plant species list

(includes plants in the immediate surrounds from railtrack up pathway to ecoforest– but is not a species list of entire escarpment)

Native trees and shrubs

Alectryon excelsus titoki	occ, canopy tree and seedlings
Brachyglottis repanda rangiora	common in understorey
Carmichaelia australis NZ broom	unc , in scrubland at edge of ecoforest
Carpodetus serratus putaputaweta	unc, at edge of ecoforest
Coprosma areolata	occ, understorey plant
Coprosma grandifolia kanono	occ, understorey plant
Coprosma lucida	occ, understorey plant
Coprosma propinqua	abundant-dominant in scrubland on northern slopes
Coprosma propinqua x C.robusta	abundant in ecoforest understorey
Coprosma repens taupata	occ, on edge of ecoforest, also planted
Coprosma robusta	unc, understorey plant
Cordyline australis cabbage tree	common, on ridges
Corynocarpus laevigatus karaka	occ, as adults in ecoforest, many seedlings on forest floor
Dysoxylum spectabile kohekohe	dominant canopy tree of ecoforest
Dodonaea viscosa akeake	few on v. steep slope above railway
Geniostoma rupestre hangehange	abundant in understorey
Griselinea lucida akapuka	occ, as an epiphyte
Hebe parviflora tree koromiko	unc, edge of ecoforest
Hebe stricta var. *atkinsonii* koromiko	occ, edge of ecoforest
Hebe stricta var. *macroura* koromiko	1 plant on rocky bluff above terrace cuttings
Hedycarya arborea pigeonwood	occ, in canopy and understorey
Kunzea ericoides kanuka	abundant-dominant in scrub on northern slopes
Macropiper excelsum kawakawa	abundant in understorey; emergent in marginal scrublands
Melicope ternata wharangi	occ, low kohekohe forest
Melicytus crassifolius porcupine shrub	unc, marginal scrub
Melicytus ramiflorus mahoe	abundant in understorey; emergent in marginal scrublands
Myoporum laetum ngaio	occ,
Myrsine australis mapou	occ,
Olearia paniculata akiraho	occ, ridge forest
Olearia solandri	occ, marginal scrub
Ozothamnus leptophyllus tauhinu	common, marginal scrub
Pennantia corymbosa kaikomako	occ,
Pittosporum eugenioides tarata	unc
Pittosporum tenuifolium matipo	occ, at edge of forest, or as seedlings in forest light gap
Prumnopitys ferruginea miro	1 sapling on slope, southern end of ecoforest
Pseudopanax arboreus fivefinger	occ
Rhopalostylis sapida nikau	common as adults and abundant seedlings in forest
Solanum aviculare poroporo	unc,
Streblus banksii milk tree	planted at lower margin of ecoforest
Streblus heterophyllus turepo	unc, adults and seedlings present on upper terrace
Urtica ferox tree nettle	unc,

Lianes

Calystegia tugoriorum powhiwhi	occ, at forest margin and in scrublands
Clematis forsteri	unc,
Freycinetia baueriana kiekie	occ, on upper terrace
Metrosideros fulgens climbing rata	common
Metrosideros perforata climbing rata	abundant
Muehlenbeckia australis pohuehue	occ, at forest margins
Muehlenbeckia complexa pohuehue	common in low scrub

Parsonsia heterophylla native jasmine	common
Passiflora tetrandra native passionfruit	occ
Ripogonum scandens supplejack	occ
Rubus cissoides bush lawyer	unc
Tetragonia implexicoma NZ spinach	occ, at edge of forest

Herbaceous plants

Cardamine debilis native cress	unc, on forest floor
Centella uniflora	occ, grassland
Collospermum hastatum perching lily	unc, epiphytic on trees, upper terrace
Haloragis erecta	unc, forest edge
Hydrocotyle heteromeria waxweed	occ, forest floor
Hydrocotyle moschata waxweed	occ, forest floor
Microtis unifolia onion orchid	unc, grassland
Parietaria debilis native pellitory	occ, forest floor near edges
Phormium cookianum coastal flax	common on steep northern slope
Pseudognaphalium luteoalbum cudweed	unc, on tracks
Stellaria parviflora NZ chickweed	unc, forest floor
Wahlenbergia ramosa harebell	unc, rocky bluff

Grasses, rushes, sedges

Carex flagellifera	unc, forest floor
Carex ?geminata cutty grass	occ, damp gully
Carex virgata cutty grass	unc, damp site on forest edge
Echinopogon ovatus hedgehog grass	unc , forest floor
Ficinia nodosa noded sedge	common, exposed grasslands
Mariscus ustulatus cutty grass	occ, damp gully
Microlaena avenacea bush rice grass	occ, forest floor
Microlaena stipoides fine rice grass	occ, forest floor
Uncinia uncinata hook grass	occ, forest floor
Uncinia leptostachya hook grass	occ, forest floor

Ferns

Arthropteris tenella jointed fern	abundant, forest floor
Asplenium gracillimum	occ, forest floor
Asplenium hookerianum spleenwort	occ, forest floor
Asplenium oblongifolium	occ, forest floor
Asplenium polyodon sickle spleenwort	occ, forest floor
Blechnum chambersii lance fern	occ, forest floor
Blechnum filiforme climbing hard fern	abundant, forest floor
Blechnum fluviatile kiwakiwa	unc, forest floor
Blechnum novaezelandiae kiokio	unc, gully
Cyathea dealbata ponga	unc, forest understorey
Cyathea medullaris mamaku	occ
Lastreopsis velutina velvet fern	common, forest floor
Paesia scaberula ring fern	occ, grasslands
Pellaea rotundifolia	occ, forest floor
Phymatosorus diversifolius	occ, forest floor
Phymatosorus scandens	occ, forest floor
Pneumatopteris pennigera gully fern	occ, forest floor
Polystichum neozelandicum	common, forest floor
Pteridium esculentum bracken	common, grasslands
Pteris tremula	occ
Pyrrosia serpens, leather fern	occ, forest floor

Adventives (Introduced)
Trees and shrubs
Chamaecytisus prolifer tree lucerne (planted)
Cytisus scoparius Scotch broom
Lupinus arboreus tree lupin
Physalis peruviana Cape gooseberry
Ulex europaeus gorse

Climbers & scramblers
Fumaria muralis fumitory
Galium aparine cleavers
Hedera helix English ivy
Lathyrus latifolius everlasting pea
Tropaeolum majus garden nasturtium
Vicia sativa vetch
Vicia tetrasperma (fine-leaved vetch)
Vinca major periwinkle

Grasses
Agrostis capillaris browntop
Aira caryophylla
Anthoxanthum odoratum sweet vernal
Cynosurus cristatus crested dogstail
Dactylis glomerata cocksfoot
Echinochloa crus-galli
Erharta erecta veld grass
Holcus lanatus Yorkshire fog
Lolium perenne rye grass

Herbs
Achillea millefolium yarrow
Apium nodiflorum
Arctium minus burdock
Capsella bursa-pastoris shepherd's purse
Carduus tenuiflorus
Chenopodium album fathen
Cirsium vulgare Scotch thistle
Conyza bilboana fleabane
Crepis capillaris hawksbeard
Digitalis purpurea foxglove
Foeniculum vulgare fennel
Galinsoga parviflora
Geranium molle dovesfoot
Hypochoeris radicata catsear
Lactuca serriola
Linaria purpurea
Marrubium vulgare horehound
Orobanche minor broomrape
Plantago lanceolata plantain
Phytolacca octandra inkweed
Picris echioides
Ranunculus repens creeping buttercup
Rumex acetosella sheep's sorrel
Senecio glastifolius holly-leaved daisy
Senecio jacobaea ragwort
Silybum marianum variegated thistle
Solanum nigrum black nightshade
Sonchus asper
Trifolium arvense hare's foot trefoil
Verbascum thapsus woolly mullein
Verbena bonariensis

November 3rd, 2010

In relation to your request for info re status of all the native plants in the ecoforest, I've tried to assemble the most-up-to date info….. with a glance back at how things stood in the 1970s-early 1980s.

National status

This matter of nationally and regionally threatened/ uncommon plants is a bit of a moveable feast, as new determinations in plant's taxonomy are made, as new plant locations are found or known locations disappear and because the criteria for inclusion on the national list changes.

So in relation to the Melicytus crassifolius…. It would seem that the entity (entities) in the south Is, that have been previous treated as M. crassifolius are probably not the same as the Wellington coastal species….. So that would explain why M.crassifolius now appears on the national register of threatened and uncommon plants…

Streblus banksii and Arthropodium (cirratum) bifurcatum have relict status. Both appear to have been planted at the locations I saw them on the Paekak escarpment..

The lists are published periodically in the NZJBotany, i.e. Threatened and uncommon plants of New Zealand. NZJBotany Vol 42, 2004.

(But to keep up-to-date, I use the NZPCN site for info).

Regional status

The Source of information for regional status is:

J.W.D. Sawyer 2004: Plant Conservation Strategy – Wellington Conservancy 2004-2010.

Only the above 3 species appear on the regionally threatened list…

M. crassifolius – regionally, in decline

Arthropodium bifurcatum – regionally, endangered

Streblus banksii – regionally, endangered.

But from my own knowledge of plant communities around the Wellington – Kapiti area, I would also consider Dodonaea viscosa, Streblus heterophyllus and Melicope ternata to be in decline….. as on the mainland they seem to be confined to small patches of bush.. often in a degraded state.

The Wn DoC Plant conservation strategy also lists plant communities that are threatened.

Only one is found on the Paekak escarpment:

grey scrub (the seral scrublands dominated by Coprosma propinqua and containing Melicytus crassifolius, Muehlenbeckia complexa, Olearia solandri, Ozothamnus leptophyllus, etc) is in serious decline .

Over time this grey scrub should regenerate towards mixed coastal forest.

The Plant conservation strategy also lists Plants of importance to local iwi that require conservation management (to ensure that there is a supply of material for cultural purposes):

The following are found in the ecoforest :

Ti kouka – Cordyline australis

Karaka – Corynocarpus laevigatus

Kiekie – Freycinetia baueriana (banksii)

Wharaki – Phormium cookianum

Bracken fern – Pteridium esculentum

Nikau – Rhopalostylis sapida

Maggy Wassilief

Mixed broadleaf forest on upper terrace

Southern boundary

Wind-blasted kohekohe on forest edge

Interior of tall kohekohe forest

Large diameter kohekohe in Hut gully

Kohekohe forest in Hut gully; kanuka and mahoe in foreground

Coastal flax and cabbage tree on exposed slope (mid photo); kanuka in foreground

Kanuka forest on north-west facing slope; tree lucerne in foreground

Broadleaf regeneration within a kanuka stand

Coprosma propinqua scrub with mahoe and kohekohe emergent

Mahoe and kawakawa regenerating through bracken-rank grass; kanuka forest beyond

Rocky outcrop with Scotch broom and coastal flax; kohekohe, mahoe and karaka in foreground