

# **A review of the endemic trees (and shrubs) cultivated by Māori in Aotearoa (New Zealand) from 1769 - 1840**



Te Paeatatu - Landscape transformation and human interaction  
in pre-1840 Bay of Islands, New Zealand.

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## 1.0 Summary

Māori came from a strong gardening and tree farming tradition which continued and developed on their arrival in Aotearoa. Not only were Polynesian cultigens introduced, but many endemic species, and trees in particular, were grown within and/or beyond their natural range. Molecular, palynological, biogeographical and archaeological evidence, together with traditional knowledge, indicate that at least nineteen species were cultivated for their food, timber, medicinal or aesthetic value. Changes in consumption of some food products from subsistence to ceremonial use, disruption to traditional life-ways, and the introduction of alternative European crops probably resulted in the reduction or abandonment of cultivation of most of these plants from the early to mid 19<sup>th</sup> Century. While the cultivation of traditional species declined, and was eventually abandoned after European contact, the arboricultural tradition continued with new, introduced species.

## 2.0 Introduction

The ancestors of the Māori in Polynesia had a long tradition of arboriculture and would have been familiar with the propagation of tree species, both by seed and transplanted seedlings. Coconut (*Cocos nucifera*), bananas, ti (*Cordyline fruticosa*), *Pandanus* spp, breadfruit (*Artocarpus altilis*), vi apple (*Spondias dulcis*), Tahitian chestnut (*Inocarpus fagifer*) and the Malay apple (*Syzygium malaccensis*) were all so treated. On their arrival in Aotearoa, it was natural for Māori to have compensated for the loss of these tropical tree crops by taking local species into cultivation (Leach and Stowe 2005). In a New Zealand context, we know a great deal about the Polynesian cultigens introduced by Māori. We also have a good understanding of the uses Māori found for elements of New Zealand's indigenous flora. In contrast, information from primary sources on the actual cultivation of indigenous plants is scarce, even for those species purported to have been cultivated or translocated within New Zealand.

This is even more apparent when looking for direct evidence of Māori arboriculture. Early ethnographers and botanists in New Zealand such as Colenso, Best, Kirk and Taylor diligently recorded observations on the use of various tree species for food, timber, dyes and medicines. While these observations sometimes included notes on which species were actively cultivated, as opposed to collected from the wild, very little information is available on actual cultivation and translocation practices. What information there is, is generally indirect and exists only scattered through a large variety of sources. A good example is *karaka*. Many authors described its preparation and use in great depth, and even alluded to the planting of it in many parts of the country, yet little or no detail was given on its cultivation or translocation. This means that the early literature must be supplemented by other sources of information.

## 3.0 Sources of evidence for Māori arboriculture

### *Analysis of plant distribution patterns*

Provided contemporary plantings or naturalization can be excluded or accounted for, the appearance of a species outside its natural distribution range, or in an anomalous ecological context, can be an indicator of human intervention. One problem with this approach is that detailed distribution data for many plants is often lacking. In addition, plants may have disjunct distributions as a result of ecological, biogeographical or stochastic factors – rather than cultural ones. Forest clearance and land use changes may also have created disjunctions in distribution.

### *Correlation with archaeological sites*

Distribution information can be augmented by including other data. For example, Stowe (2003) investigated the spatial correlation between *karaka* and archaeological sites, and defined the climatic conditions under which *karaka* reproduces in lowland forests. If Māori moved and cultivated *karaka* both within and beyond the natural range, such trees are likely to occur in association with archaeological sites. Trees growing in areas where ecological conditions were suitable for unaided reproduction, and where archaeological sites are absent, are more likely to be natural components of the vegetation.

### *Presence of other plants with ethnobotanical significance*

The co-occurrence of plants with ethnobotanical significance increases the probability of identifying populations with a cultural origin, particularly when they occur near archaeological sites. For example, the existence of *rengarenga* (*Arthropodium cirratum*) in scattered, local populations around the Cook Strait area, some of which grow near pre-historic gardening sites and *karaka* groves, led Harris & Te Whaiti (1996) to conclude that these populations were remnants or descendents of cultivated plants. Stowe (2003) also found *rengarenga* growing in the same context at several other locations. *Rengarenga* is well documented as being cultivated as a source of food, and had medical and spiritual uses (Colenso 1868, 1880, 1891).

### *Traditional knowledge*

Traditional tribal knowledge, published and unpublished, is another source of information. For example, the names and origins of several introduced *karaka* in the Taupo area are known. One tree, named *kahukuri*, was grown from seed taken from Napier after a raid on Wharekuri Pa by Tamamutu of Ngati Te Rangiita. Early Native Land Court Minutes are also a good source. This excerpt is from the Waikato area (Native Land Court Minutes 1888):

‘...Te Waiwhakaate was a pa on Kakepuku...below pa are karaka trees planted by Te Maungariri... [there is a] pa which belonged to Tuhua, fortifications can still be seen...karaka trees on it were planted by Tuhua...these were all kainga at the [Mt] Titirapenga end of the Pouakani block: Whatapo, Te Weraroa, Pakaraka (where the ancestor of Ha planted a karaka from Kawhia)...’

### *Morphological changes brought about by cultivation*

Other clues to possible cultivation can come from morphological changes brought about by human selection. This has been demonstrated previously in the wider Pacific area (Lepofsky et al. 1998, Yen 1974). In New Zealand, differences have been found in the fruit size of ‘wild’ and cultivated *karaka* (Platt 2003, van Essen & Rapson 2005). However, this requires intensive cultivation and relatively long time periods to occur. Also, cultivated plants need not show any obvious morphological differences compared to their wild relatives (Leach and Stowe 2005).

### *Palynological/phytolith studies*

More direct evidence for the cultivation or translocation of plants can come from palynological or plant micro-fossil studies. For example, Horrocks et al. (2000) used the presence of pollen and phytoliths to prove that a variety of Polynesian plant cultigens were grown near Pouerua, Northland. Little work has been done in this regard on indigenous tree

species. However, *karaka* pollen made its first appearance at three North Island sites (Kauaeranga Valley, Taranaki and Wellington) at the same time as fires and deforestation coinciding with presumed Māori settlement (Byrami et al. 2002, Wilmshurst et al. 2004, Mildenhall & Moore 1983). *Karaka* pollen has also only been found on the Chatham Islands in surface layers (Mildenhall pers. comm.). Further studies of this kind are needed.

#### *Plant population genetics*

Population genetic studies also have great potential, enabling hypotheses of historical migration and dispersal patterns to be tested through patterns of genetic variability between and within populations. Molecular techniques have begun to be utilized in the study of human commensals, particularly animals (Matisoo-Smith 2001, Allen et al. 2001) and some plants (Harvey et al. 1997, Armstrong and de Lange 2005). There is a need for more molecular work on other potentially translocated indigenous plants.

### **4.0 Scope and definition of cultivation**

The term ‘cultivation’ can encompass a broad spectrum of practices, which ethnobotanists and anthropologists now see as a continuum (Yen 1991). These may range from the weeding or protection of plants living in the ‘wild’, to selection/transplanting of self-sown trees, to raising selected seeds or seedlings, and ultimately to full domestication where reproduction is entirely human controlled. In this wider sense, the creation of stands of trees through deliberate firing of vegetation, or indirectly as the intended end-point of land use sequences starting with gardening, can also be considered as cultivation. Maori arboriculture could therefore have ranged from the direct, or indirect, creation of groves of specific trees to more informal manipulation of species composition within a ‘natural’ forest setting. In the case of the latter, the forest retained around many *pa* and *kainga* may in fact have been highly manipulated.

The cultivation and translocation of plants beyond their natural range probably indicates more intensive gardening practices, and would have served to provide resources that were not locally available. Cultivation within the natural range would have been done to augment or increase local resources (either for local consumption or for trade). The extent to which this was done probably depended on the availability and demand for the particular resource. It may also have served to ‘localize’ a resource that was otherwise scattered.

The species listed below are those for which evidence exists for cultivation and/or translocation. Good evidence is available for some; while others are relatively speculative at this stage. In some cases it is reasonable to use an argument by analogy with *karaka*, for which there is a good range of evidence for cultivation and translocation in many parts of New Zealand.

### **5.0 Plant species cultivated and/or translocated in New Zealand**

#### *5.1 Karaka (Corynocarpus laevigatus)*

A database of *karaka* distribution was compiled for the Northland area which was then correlated with New Zealand Archaeological Association (NZAA) site records (see Appendix). Trees were then classified into stands/individuals with or without cultural associations. Trees occurring within 500m of an archaeological site were classed as ‘cultural’. The dataset includes information sources and grid references, as well as a

description of the common canopy associates and the NZAA site record number and type. The full nationwide dataset can be found in Stowe (2003).

Several points should be noted about this data. Firstly, if archaeological sites have been destroyed or not yet recorded, then some 'unknown' *karaka* could be 'cultural'. Conversely, some *karaka* may be growing coincidentally with archaeological sites and the association is not a cultural one. In addition, no attempt was made to indicate the number of trees at any one site. Therefore a grid reference may indicate an individual tree, a grove of trees, or a wider area where *karaka* is present. Some records are old or historic and the trees they represent may no longer exist.

Karaka is found in many coastal and inland locations in the Northland area and on many off-shore islands such as the Three Kings, Murimotu, Cavalli and Poor Knights (see Appendix). It becomes progressively less common and more coastal through the lower North Island, while in the South Island *karaka* is exclusively coastal.

For New Zealand as a whole, 82% of trees were cultural. This increased to 100% for trees growing on the South Island east and west coasts and in the central North Island (Lake Taupo). Most occurrences from the lower North Island and upper South Island, and on the off-shore island groups, including the Chatham and Kermadec Islands were also associated with archaeological sites and *karaka* is likely to have been introduced to these areas also (Stowe 2003).

Karaka occurs naturally in the northern North Island (Stowe 2003), where it is a fairly common canopy species in mixed kauri-podocarp-broadleaf forest and volcanic-broadleaf forest (Department of Conservation 1999). This means that differentiating planted trees from those naturally occurring is more difficult, as the two coexist. From a sample of 118 occurrences in the Northland area, 54% were cultural and 46% were unknown. More definitive confirmation of which populations are derived from cultivated sources requires palynological or molecular work.

While fruit was likely to have been collected from both wild and cultivated sources in Northland, this does not mean that cultivation did not occur. Karaka 'orchards' were described by early observers. In 1769, while visiting Doubtless Bay, crew from the St. Jean Baptiste saw a plantation of *karaka* at a bay called Paatia-matariki where they described 'an orchard bearing a yellowish-red fruit, the size of a large olive, which has a long stone like an olive; this fruit is edible' (Olivier et al 1987). There is also a close association between *karaka* and archaeological sites on many off-shore islands (e.g. the Poor Knights), many of which have a long history of Maori occupation and gardening. Palynological work in progress may confirm whether these trees occur naturally or were planted (Robinson pers. comm.). Māori in Northland were certainly utilizing other tree species. For example at Pouerua cone there is evidence of consumption, at least, of hinau fruits.

### 5.2 *Whau* (*Entelia arborescens*)

The light, corky wood of *whau* was widely used for making floats for seine nets (Colenso 1868, Kirk 1899). Some of these nets were very large; for example Banks reported a net that measured 5 fathoms deep and 400-500 fathoms long (Kennedy 1969).

Allan (1961) describes *whau* as being common in coastal and lowland forest in the north of the North Island to as far south as Raglan on the west coast and Tairua on the east coast. South of these points it tends to be local and infrequent, eventually reaching its southern limit in the northern South Island.

While there is no direct evidence for *whau* being cultivated or translocated, populations present in the lower North Island and the top of the South Island at the margins of its distribution may be derived from Māori plantings. Stowe (2003) recorded *whau* growing with *karaka* and *taro* at an archaeological site at Te Toto (south of Raglan), at Pouerua Bush (Northland) as part of an extensive complex of pa and cultivations, and at two pa sites in Taranaki where it occurred in secondary forest containing *karaka*, *titoki* and *kowhai* among others. *Whau* is also said to have been introduced to Mokoia Island, in Lake Rotorua, along with a suite of other trees including *karaka*, *totara* and possibly *pohutukawa* (Andrews 1992, Clarkson et al 1991). Mokoia Island has a long history of human occupation and extensive gardening (Andrews 1992). In the South Island, its distribution appears to have little ecological or biogeographical integrity. It has been recorded north of Big River (near Kahurangi Point) and with middens and *karaka* at Kaihoka north of Whanganui Inlet. One documented planting and 1896 herbarium record exists for *whau* on Fisherman's Island (Abel Tasman National Park). Its biggest populations are in eastern Golden Bay in the vicinity of Wainui Bay/Pohara Beach (where *karaka* is also locally abundant in conjunction with pits and middens) and Taupo Point. Several, mostly old, scattered records also exist for the Marlborough Sounds (Kenepuru, Endeavour Inlet, D'Urville Island and Delaware Bay).

### 5.3 *Titoki (Alectyon excelsum)*

The seeds of the *titoki*, when pressed, provided Māori with highly prized, quality oil. The oil was made fragrant by the addition of *heketara* (*Olearia* spp.), *koareare* (*Raukaua edgerleyi*), *manuka* (*Leptospermum scoparium*) or *tarata* (*Pittosporum eugenioides*) leaves and used in the hair or in scent sachets (Best 1977).

Today, *titoki* is found in coastal and lowland forest in the North and South Islands from North Cape to Banks Peninsula and just north of Karamea. Its distribution is similar to the human modified distribution of *karaka* (Leach & Stowe 2005), with which it is a relatively common canopy associate - particularly in the Kaikoura area. However, just one reference to the planting of *titoki* was found. On Motutaiko Island, Lake Taupo, two trees exist – the only representatives of their type in the Taupo Basin. These trees grow alongside groves of *pohutukawa* which are said to have been introduced by Tuwharetoa ancestors centuries ago (Nga Whenua Rahui 2006).

### 5.4 *Tawa (Beilschmiedia tawa)*

*Tawa* kernels were a highly valued food source, and rank alongside *karaka* and *hinau* in their favour with Māori (Colenso 1880, Best 1977). Productive gathering grounds were prized and belonged exclusively to certain *hapu* (Makareti 1938). Māori appear to have recognized two varieties of *tawa*, with 'rua rangi' (syn. *Beilschmiedia tawaroa*?) distinguished on the grounds of its bigger fruit and leaves, as well as some characteristics of its timber (Anderson 1954 two references, Best 1977). Anderson (in Beaglehole 1967) described *karaka* and *tawa* growing in Queen Charlotte Sound in 1777;

“...there is a great variety of trees on the small flat spots behind the beaches. Amongst these are two that bear a kind of plum of the size of prunes; the one yellow, called *karraca*; and the other black, called *maitao*....”

The latter was considered by Best (1977) to be a reference to *tawa*. Anderson (in Beaglehole 1967) also wrote about eating *karaka*, *tawa* and cabbage tree while in Queen Charlotte Sound.

Today, *tawa* is common in lowland to lower montane forest in the North Island. In the South Island it is common north of the Wairau River and abundant through most of the lowland Marlborough Sounds and south to the Richmond Range and west to the Bryant Range (behind Nelson). West of Nelson though, it is very rare, occurring sporadically on the Moutere Hills. It is absent from Able Tasman National Park but in Golden Bay there are a handful of records from the Takaka River and one or two sites in the lower Aorere catchment. *Tawa* reaches its southern limit on the east coast at Kaikoura, where it is an occasional component of coastal forest at Hapuku River, Puhipuhi, Blue Duck Creek, Jordan Stream and a couple of sites on the plains north of Kaikoura township.

No specific references were found to the planting of *tawa*. However, by analogy with *karaka* (regarding its importance and value as a food source), stands of *tawa* might reasonably be expected to have been created or augmented to some degree – both within and beyond its natural range. In particular, populations present in the South Island (particularly west of Nelson and at Kaikoura) are good contenders for being derived from Māori plantings. They are disjunct from the main north Marlborough populations and many occur in sites with a long history of human occupation and with other species likely to have been planted by Māori.

### 5.5 *Pohutukawa (Metrosideros excelsa)*

*Pohutukawa* is found in coastal forest from the Three Kings Islands and the northern North Island south to about Poverty Bay and Urenui, as well as several inland locations (Allan 1961). It is in the latter areas that its presence is perhaps out of context. Kirk (1873) considered that Māori were responsible for the southerly extensions to its range. On the shores of Lake Taupo, *pohutukawa* co-occurs with archaeological sites and *karaka* of cultural origin and was probably introduced by Maori. It also grows on Motutaiko Island in Lake Taupo, where it is said to have been planted by Tuwharetoa ancestors (Nga Whenua Rahui 2006). Likewise, in the Rotorua area, Clarkson et al. (1991) suggested *pohutukawa* may have been introduced by the Arawa people to Mokoia Island and some of the Rotorua lakes.

### 5.6 *Kowhai (Sophora spp.)*

*Kowhai* had medicinal uses and the flowers may have had some ceremonial importance. Eight species are known from New Zealand (Eagle 2006<sup>1</sup>). Several references were found to the planting of *kowhai*. *Sophora chathamica* has a biogeographically anomalous distribution; found from Northland to the Tongaporutu River in the west, from Waihi to Porirua/Wellington Harbour in the east, and on the Chatham Islands, where it is likely to have been planted by Maori (Heenan et al. 2001). Perrott and Armstrong (2000) considered *kowhai* to have been introduced to Mokoia Island, in Lake Rotorua, and a grove of trees growing with several different forms of *harakeke* in George Sound, Fiordland, are likely to have a cultural origin (C. West pers. comm.).

### 5.7 *Ti (Cordyline spp)*

Numerous references exist to the planting of various species of cabbage tree in many areas of New Zealand. It is possible that the overall distribution of cabbage trees reflects human translocation and cultivation more than natural migration or dispersal (Simpson 1994, Simpson 2000). Anderson (1998) stated that *ti kouka* (*C. australis*) was cultivated in the South Island, and was encouraged by cutting and burning in the vicinity of settlements. Cabbage trees are frequent associates with *karaka* and *harakeke* on many *pa* in Taranaki (Simpson 1994) and *ti kouka* may have become naturalized on the Chatham Islands following introduction by Māori (de Lange et al. 1999). It has also been suggested to have been introduced to the Poor Knights Islands (Beever 1986). There may have been a non-flowering selection of *C. australis* named *ti para* (synonymous with *ti tawhiti* and *ti towhiti*) which was developed for its enlarged rhizome (Simpson 2000). Best (1976) contains references to this plant being cultivated in Taranaki, Wanganui, Bay of Plenty, Whakatane, Hawke's Bay and Waikato. Wade (1842) observed *ti* seedlings (possibly *C. pumilio*) being carefully selected and planted out in the Waikato area. In addition, *C. kaspar* is only known from Three-Kings Islands, Poor Knights Islands and Murimotu Island, along with occasional records from the mainland east coast (Beever 1986, Eagle 2006<sup>1</sup>). Many of the larger near-shore islands off New Zealand's North Island were permanently occupied by Māori and their biota was significantly modified by pre-historic transplants and forest clearance (Hayward 1986). Molecular work or palynological studies are required to clarify this.

### 5.8 *Puka (Meryta sinclairii)*

*Puka* is found only on the Three Kings and the Hen and Chicken Islands (Allan 1961). Hayward (1986) considered that it had been introduced by Māori to the Chicken Islands, along with *karaka*. *Puka* was also moved to the mainland. Best (1977) found one specimen at Whangaruru Harbour, Bay of Islands, in 1836, and Hooker's description of the species is reputed to have been based on a tree planted by Māori - also at Whangaruru (Allan 1961). Historically, *puka* may once have occurred on the Poor Knights Islands (possibly as a Māori introduction), as Best was informed that the plant he saw growing at Whangaruru came from there (Best 1977).

### 5.9 *Koromiko (Hebe salicifolia and allied species)*

The name *koromiko* was probably applied to a number of allied *Hebe* species. It was widely used by Māori and European settlers as a remedy for diarrhea and dysentery (Brooker et al. 1987). Eagle (2006<sup>1</sup>) gives its distribution as South and Stewart Island in lowland and montane scrub. On Stewart Island, Wilson (1982) describes it as rather local and uncommon. It is also found at one site on both Codfish Island and the Auckland Islands. On Codfish Island *koromiko* grows at the site of a sealers camp which was occupied from 1800-1820 and may have been introduced by Māori or European sealers at this time. However, the camp itself overlies an archaic Māori settlement site so an earlier introduction cannot be ruled out (Edgerton pers. comm.). *Koromiko* may also have been introduced to the Auckland Islands as the only population there grows at the site of the Enderby farmhouse. These may be a European introduction but could also have been planted earlier by Māori sealers.

### 5.10 *Titirangi, napuka (Hebe speciosa)*

Titirangi was probably valued for its showy red flowers, which were likely to have been a trade item. Eagle (2006<sup>1</sup>) gives its distribution as coastal cliff tops at Scotts Point, South

Hokianga Head, Maunganui Bluff, Muriwai, Ngatu-tura Point, Taranaki bluffs near Aotea Harbour, Mokau, Tongaporutu, Urenui and Titirangi Bay (Marlborough Sounds) – although it is thought to be now extinct in some of these places. Recent molecular work has shown that only three of the known, northern populations (South Hokianga Head, Maunganui Bluff and Muriwai) are natural. The Marlborough Sounds and southern North Island occurrences are likely to be the result of deliberate plantings by Māori (Armstrong and de Lange 2005). *Titirangi* was well established in the Marlborough Sounds before European settlement so its cultivation was probably more widespread than is indicated by its contemporary distribution.

#### 5.11 *Kowhai ngutu kaka, kakabeak (Clianthus spp.)*

This species was also probably valued for its flowers. Two cryptic species exist in New Zealand (Eagle 2006<sup>2</sup>) both of which were cultivated by Māori. *C. puniceus* may have been found naturally only in Northland and Auckland. The only extant population is on an island in Kaipara Harbour which was formerly a *pa*. *C. maximus* was once present on Great Barrier Island and possibly near Thames. It is now known only from a handful of eastern North Island sites including Lake Waikaremoana, Hawke's Bay and parts of the east coast north of Gisborne (Heenan 2000). Colenso (1885) speculated that it was cultivated and planted at some inland sites.

#### 5.12 *Kanuka (Kunzea spp.)*

*Kanuka* was widely used by Māori (and early Europeans) for firewood and thatching. Two varieties are suggested to have been planted or translocated by Māori. *K. ericoides* var. *linearis* is found in the North Island from Te Pahi to Dargaville in the west and Lake Tomerata in the east, Great Barrier Island, Waitemata Harbour and Kaihere. The type specimen was collected by Thomas Kirk from a tree on Ahatawapa Pa in Waitemata harbour in the 1860's. The southern occurrences may be derived from Māori plantings as they are disjunct from the northern populations and mostly grow on clay soils in the vicinity of old *pa* sites (de Lange pers. comm. in Eagle 2006<sup>2</sup>).

*K. aff. ericoides* is found in the North and South Islands but is absent from Taranaki and scarce in the South Island. The South Island plants growing at Banks Peninsula, Dunedin, Westport and Hokitika may also have come from introductions made by Māori (de Lange pers. comm. in Eagle 2006<sup>2</sup>).

#### 5.13 *Tutu (Coriaria spp.)*

*Tutu* is found throughout New Zealand (including Stewart Island and Chatham Island) in coastal to montane forests and shrublands on alluvial ground. It often forms pure successional communities (Allan 1961).

Use of the juice expressed from *tutu* berries was widespread and much appreciated by Māori and European settlers alike (Best 1977, Colenso 1880). While no reference to the planting of *tutu* has been found, groves may have been created by the extensive burning which also served to maintain large areas in bracken fern (Cockayne 1921), or indirectly, but intentionally, as the endpoint of a forest clearance/cultivation/abandonment land use sequence. Best (1977) states that in some places large numbers of *tutu* grew in a small area and that such groves were sometimes named (for example at Ohae, Ruatoki, there was a grove named Ure-takohekohe). Such groves were often preserved for the owners and protected by *rahui*.

#### 5.14 *Poroporo* (*Solanum* spp.)

*Poroporo* is found in coastal and lowland forest margins and shrubland throughout most of New Zealand (Eagle 2006<sup>1</sup>). The fruit was eaten and the plant was considered to have been cultivated in gardens and *pa* (Colenso 1880, Colenso 1868, Best 1976). No other evidence for the planting or translocation of *poroporo* was found. It is possible though, that Māori land use practices promoted the growth of *poroporo* in the same fashion as suggested above for *tutu*. Taylor (1855), for example, stated that *poroporo* grew when forest was burned but not cultivated.

#### 5.15 *Akeake* (*Dodonea viscosa* ssp. *viscosa*)

*Akeake* is found from the North Cape to Banks Peninsula and Greymouth on coastal and lowland cliffs. It is also present, but scarce, on the Chatham Islands, where it may have been planted by Māori (Molloy pers. comm. in Eagle 2006<sup>2</sup>).

#### 5.16 *Totara* (*Podocarpus totara*)

One reference was found to the planting of *totara*. A single large tree occurs on Mokoia Island, which is said to have been planted from a cutting (Andrews 1992). *Karaka*, *tawa*, *whau* and *rengarenga* also grow in the vicinity.

#### 5.17 *Hinau* (*Elaeocarpus dentatus*)

Cakes made from *hinau* fruits are commonly referred to as a favoured food, along with *karaka* and *tawa*, and were still being prepared and eaten in the early 1900's (Best 1977, Colenso 1880). Fruit kernels have been found in middens at Pouerua, a large *pa* and cultivation area in Northland (Sutton et al. 2003) and in a pre-historic house excavated in Palliser Bay (Leach and Leach 1979), indicating consumption at least at these locations.

Today, *hinau* is found in lowland to montane forest in the North and South Island to as far south as latitude 43°30'S or 46°S ((Eagle 2006<sup>1</sup>, Allan 1961). As with *tawa*, no reference has been found to the cultivation of *hinau*. However, its importance as a food source makes it a potentially cultivated species. It is a common tree but tends to be scattered through forest rather than occurring as a canopy dominant. This would make it a good candidate for its augmentation in a forest setting.

#### 5.18 *Rewarewa* (*Knightia excelsa*)

Rewarewa was used as timber for fences and palisades of *pa* and possible as a source of honey (Best 1977, Best 1975, Colenso 1868). It is found in lowland to low montane forest from North Cape to the Marlborough Sounds. It is included speculatively in this review as its distribution in the Marlborough Sounds is indicative of an introduced species dispersing outwards from its initial point of establishment. Again, molecular or palynological work could confirm this.

## 6.0 Were cultivation practices changed or abandoned between 1769 and 1840?

Māori arboriculture is likely to have been much less visible than the gardens that many writers documented. In a visit to the Bay of Islands in 1772, Crozet (in Best 1976) observed;

“...excepting some small fields planted with potatoes, gourds, aloes-pite, and very small flax, the whole country appeared to me to be lying fallow, and producing only the wild natural growths. I saw nothing which might have been taken for an orchard, and I did not meet with the least fruit, either wild or cultivated.”

This in a region where the planting and harvest of *karaka*, at least, is likely to have been widespread. However, tree planting may have taken place away from *kainga*, informally in a forest setting or along paths and trails, as was sometimes the case in Melanesian arboriculture (Yen 1974). Longer periods of study and visits to the interior were probably necessary to detect the extent of Māori arboriculture. Furthermore, the type of tree farming practiced by Māori was probably outside of the European experience of ‘orchard’ type enclosures (Leach and Stowe 2005). To make matters worse, cultivation was of tree species that observers would have identified as ‘wild’, as with the exception of *karaka* and some *Cordyline* varieties, there were limited morphological differences between farmed and ‘wild’ individuals.

In contrast, accounts of the consumption of traditional foods from tree crops are common throughout, and beyond, this period. Māori were observed eating *karaka* and *tawa* nuts as early as 1777 at Queen Charlotte Sound during Captain Cook’s third voyage (Anderson in Beaglehole 1967). The earliest mention of use of *tutu* is from Foveaux Strait in 1827 (Begg & Begg 1979), and was described many times after this. Skey (1871) quotes Colenso’s 1836-1839 description of a youth poisoned by *karaka* kernels, and *karaka* was evidently still being gathered in the Tokerau district prior to 1875 (Native Land Court Minutes 1875) and near Tarawera before 1889 (Kirk 1889). Both *tawa* and *hinau* were still in use in the early 1900’s (Best 1977). *Ti kouka* (*C. australis*) was widely harvested and eaten throughout the 19<sup>th</sup> century, particularly in the South Island. *Tawa* was still being eaten in large quantities in the Wairarapa in the 1850’s (Earp 1853) and was served at a feast in Hikurangi in 1874 along with *mamaku* (*Cyathea medullaris*), *pohue* (*Calystegia* spp.), *puha* (*Sonchus* spp), *para* (*Marattia salicina*) and *aruhe* (*Pteridium esculentum*) (Potts 1879).

As the last reference shows, later 19<sup>th</sup> Century records may have documented the use of these foods for ceremonial use, or on special occasions, rather than everyday subsistence. If this was the case, then the cultivation of some of these plants is likely to have been reduced or abandoned, although it is difficult to generalize over the entire spectrum of ‘farmed’ species, and the cultivation of some species evidently continued longer than others. Whether or not cultivation of traditionally grown plants was abandoned probably depended on the esteem in which they were held in the first place, the availability of alternative products, and the relative effort or convenience needed to procure them. In addition, the exchange of many resources, including food, formed a vital part of inter-*iwi* and inter-*hapu* relations and had a long-standing cultural history (Anderson 1998). This may explain why the use of crops such as *kauru* and *karaka*, which required considerable processing to prepare, continued for longer than others. However, trading networks between *iwi* and *hapu* were severely disrupted by mid-1800. In addition, Māori had taken to growing large quantities of other crops, such as potatoes, which were common currency in trading for desirable European goods such as metals and muskets.

There is no doubt that some traditional foods and crops did fall into disuse. Non-flowering plants such as *ti pore* (*Cordyline fruticosa*), which was ‘fairly common’ in the Bay of Islands up until 1850, all but disappeared - replaced after that time by European sugar (Best 1976). *Cordyline pumilio* was still being planted in Waikato in 1840 (Wade 1842) and the cultivation and harvest of *ti kouka* continued beyond the 1850’s, but also eventually declined (Anderson 1998):

“.....large scale production of *kauru* in the nineteenth century suggests that had the arrival of Pakeha settlers been delayed a few more generations, *Cordyline australis* would have become a garden plant and eventually a domestic crop. Such an eventuality was forestalled by the introduction of European crops.”

The inclusion of *karaka*, *tawa* and *hinau* in lists of ‘wild’ food products by early writers suggests that their cultivation was also abandoned, although as discussed above, European observers may not have recognized these ‘orchards’ within a forest setting. In addition, *karaka*, *tawa* and *hinau* could continue to have been harvested even if cultivation ceased in the mid 1800’s as they are long lived trees and can reproduce naturally even in areas where they may not have grown originally. Other foods that were not cultivated also fell into disuse. Colenso (1868) considered that ferns used for food, such as *Asplenium oblongifolium*, *Asplenium bulbiferum* and *Botrychium australe*, had been neglected for 40-50 years in favour of introduced, naturalized wild cabbage (*Brassica oleracea*).

The introduction and uptake by Māori of alternative European crops was probably a contributing factor in the decline of traditional tree farming. Māori were quick to grow and distribute European fruit trees once they became available. For example, chief Tara grew a peach tree from a stone given to him by Marsden on the first visit of the Active in 1814 (McNab 1914). In Taranaki, a Māori sailor is said to have planted peach stones from Sydney in 1829, which by 1841 had become large trees. These provided stones for peach groves established all along the coast. Likewise in Waikato, Peachgrove Road was so named after a plantation of peaches sown by Māori (Druett 1983). On Mokoia Island, the planting of both European and indigenous fruit trees are related in the testimony of claimants at Land Court hearings (Native Land Court Minutes 1916);

“.....afterwards Ropata Korakai lived there. The *karaka* trees were planted then. Whatakai was the name of one tree....I have heard of a *karaka* tree of that name....N’Tuteniu planted it and other trees....Ringori grew cherry trees there....”

It seems likely that the European introductions contributed to the decline, and eventual abandonment, of most of the traditional tree crops.

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## 8.0 Appendix: karaka distribution in Northland and relationship with archaeological sites

### Abbreviations:

ARC = Auckland Regional Council  
 NZAA = New Zealand Archaeological Association  
 Akl. = Auckland  
 CANU = Canterbury University  
 FRI = Forest Research Institute  
 DOC = Department of Conservation

source	location	region	status	map	easting	northing	notes	NZAA site number
Otago University Herbarium	Three Kings Islands, West Island	Northland	cultural	L01	2422100	6779400	Terraces/stonework	L01/5
Otago University Herbarium	Three Kings Islands, South West Island	Northland	cultural	L01	2425500	6780500	Stoneheaps/terraces/midden	L01/29, L01/28, L01/4
Akl. Museum herbarium	Three Kings Islands, Great Island	Northland	cultural	L01	2431500	6782500	Burial cave/terraces/stonework	L01/12, L01/7
Otago University Herbarium	Three Kings Islands, North East Island	Northland	cultural	L01	2434300	6785300	Terraces/stonework	L01/6
Conning & Holland 2000	Tapotupotu Bay	Northland	cultural	N02	2484700	6751600	Pa. Broadleaf forest kohekohe, puriri, taraire, houhere, mahoe, mapou, karaka	M02/10
Conning & Holland 2000	Tauotupotu Bay, south in gully	Northland	cultural	N02	2485500	6751000	Pa/terraces in gully south of bay. Puriri, taraire with maire, karaka	M02/15, M02/157, M02/73
Conning & Holland 2000	Tirikawa Trig	Northland	cultural	N02	2487000	6751000	Pa. Rewarewa, hinau, nikau, houhere, mapou, taupata & occasional karaka	M02/98
Conning & Holland 2000	Pandora, west end of Spirits Bay	Northland	cultural	N02	2490600	6750000	Pa/terraces. Scattered pohutukawa, karaka, tawapou	N02/8-9
Conning & Holland 2000	Broughtons Gully, north of Waitiki Landing	Northland	cultural	N02	2496500	6744000	Pa nearby. Karaka, kanuka common in canopy	N02/218
Conning & Holland 2000	Kohuronaki Trig, north east of trig	Northland	cultural	N02	2496500	6747000	Pa/pits. Puriri, taraire forest with rewarewa, kohekohe, houhere. Karaka present	N02/108, N02/18, N02/117
Conning & Holland 2000	Poroiki Hill	Northland	cultural	N02	2504000	6749600	Pits/terraces. Taraire, kohekohe common with karaka, puriri, kohuhu, nikau.	N02/904-905
Akl. Museum herbarium	Kerr Point, North Cape	Northland	cultural	N02	2510200	6754800	Pa/house sites	N02/65, N02/260, N02/253
Wassilieff 1984	North Cape	Northland	cultural	N02	2513000	6755000	Pa. Coastal forest with karaka	N02/188
Akl. Museum herbarium	Murimotu Island, North Cape	Northland	cultural	N02	2515700	6754000	Terraces/midden	N02/567
NZAA database	Rawene	Northland	cultural	O05	2543300	6641400	Karaka	O05/94
NZAA database	Hokianga Harbour, Waipoua	Northland	cultural	O06	2544500	6636300	Torere/karaka	O06/68
NZAA database	Hokianga Harbour, Waipoua	Northland	cultural	O06	2545400	6634800	Karaka	O06/83
NZAA database	Hokianga Harbour, Waipoua	Northland	cultural	O06	2545800	6639200	Karaka/midden	O06/86
DOC 1999	Huaki, Waipoua	Northland	cultural	O06	2555300	6619000	Pits. Remnant kauri with puriri, taraire, kohekohe, totara, karaka	O06/473
Akl. Museum herbarium	Tauranga Bay	Northland	cultural	P04	2582300	6687700	Terraces/midden/pa	P04/434, P04/152, P04/157
Campbell & Atkinson 1999	Cavalli Islands, Motukawanui Island, Cavalli Group	Northland	cultural	P04	2597000	6689000	Pa/terrace. Few karaka - heavily modified by farming.	P04/211
Akl. Museum herbarium	Motumaka Island, Cavalli Group	Northland	cultural	P04	2597600	6686500	Pits/pa	P04/175, P04/39
Campbell & Atkinson 1999	Nukutaunga Island, Cavalli Group	Northland	cultural	P04	2599000	6691000	Pits. Few karaka	P04/225-226
Conning 2000	Waikarakaamu Rd. Bush, central Northland	Northland	cultural	P05	2591500	6651000	Pa. Totara, taraire, puriri forest with occasional karaka, titoki, rimu, kohekohe	P05/198, P05/293
Conning 2000	Taumataratare Stream Bush, central Northland	Northland	cultural	P05	2594000	6647500	Stoneheaps/rows. Puriri, titoki, taraire forest with karaka, kohekohe, rewarewa	P05/710, P05/70
Conning 2000	Poueru Bush, central Northland	Northland	cultural	P05	2595000	6646000	Terraces/stonemounds. Puriri, titoki forest with occasional karaka, whau, totara, rimu	P05/724, P05/726, P05/732, P05/731
Conning 2000	Poueru Cone, central Northland	Northland	cultural	P05	2595300	6647300	Pa/stonefields. Puriri, taraire forest with frequent kohekohe, karaka	P05/367, P05/195
NZAA database	Kerikeri	Northland	cultural	P05	2603900	6665100	Karaka/midden	P05/129
NZAA database	Bay of Islands	Northland	cultural	Q05	2616800	6653200	Karaka/terrace	Q05/1010
Akl. Museum herbarium	Te Mimiha Bay	Northland	cultural	Q05	2634000	6640000	Pa/terraces	Q05/713, Q05/718
Manning 2001	Mount Hikurangi, central Northland	Northland	cultural	Q06	2625600	6621600	Pits. Taraire, towai forest with totara, rimu, kauri, karaka, puriri, pukatea, nikau	Q06, 238
Manning 2001	Hurupaki Cone, central Northland	Northland	cultural	Q06	2626800	6612300	Pa. Taraire, totara forest with towai, rewarewa, karaka frequent	Q06/208

Manning 2001	Lower Whau Valley forest, central Northland	Northland	cultural	Q06	2628100	6611300	Burial/pits/meeting place. Puriri, taraire forest with frequent kohekohe, karaka	Q06/308, Q06/382-384
Manning 2001	Waitangi River, central Northland	Northland	cultural	Q06	2637000	6614600	Pits/terrace/pa. Taraire with common karaka, frequent puriri, kohekohe	Q06/452, Q06/451
Manning 2001	Ngunguru Rd Bush, central Northland	Northland	cultural	Q06	2637000	6616100	Ovens. Taraire, kahikatea with frequent karaka, occasional Puriri, titoki.	Q06/260
Wassilieff 1984	Watkin Powell, Tauwhara Bay, east Northland	Northland	cultural	Q06	2643200	6633300	Pa site. Pohutukawa coastal forest with puriri, taraire, kowhai. Karaka also present	Q06/38
Wassilieff 1984	Matapouri, east Northland	Northland	cultural	Q06	2647300	6624500	Middens. Pohutu. Coastal forest with puriri, kohekohe, karaka, nikau	Q06/409-411
Manning 2001	Simons Rd, central Northland	Northland	cultural	Q07	2614900	6605600	Pits. Taraire, puriri, titoki, kohekohe and occasional karaka	Q07/348
Manning 2001	Maungatapere Mountain, central Northland	Northland	cultural	Q07	2618300	6602000	Pits. Taraire forest with occasional puriri, karaka, totara, kohekohe	Q07/31
Manning 2001	Maungakarakamea Mountain, central Northland	Northland	cultural	Q07	2618600	6594500	Pits/terrace. Totara forest with taraire, kahikatea frequent, occasional pukatea, karaka	Q07/1002, Q07/1003, Q07/501
Manning 2001	Tauaroa Rd., central Northland	Northland	cultural	Q07	2619500	6592700	Agricultural/pits. Taraire, totara forest with rewarewa, karaka, tawa	Q07/503
Manning 2001	Maungatapere, central Northland	Northland	cultural	Q07	2619500	6603600	Near Pukeatua Pa. Taraire dominant with puriri, karaka, kahikatea	Q07/355
Manning 2001	Cemetery Rd, central Northland	Northland	cultural	Q07	2624400	6604700	Pits/midden. Taraire dominant, frequent totara with tawa, karaka, puriri	Q07/412, Q07/374
Manning 2001	Te Hihi Stm. central Northland	Northland	cultural	Q07	2625300	6606200	Pa/burials/pits/terraces. Kahikatea swamp forest, pukatea, karaka, totara, kohekohe	Q07/924, Q07/933
Manning 2001	Otaika Valley Bush, central Northland	Northland	cultural	Q07	2627500	6602500	Pa/pits. Towai puriri forest with occasional kohekohe karaka, rewarewa, matai, miro	Q07/410, Q07/396
Manning 2001	Raumanga Valley, central Northland	Northland	cultural	Q07	2628000	6606300	Pa/pits/middens	Q07/48, Q07/951, Q07/967-968, Q07/918
Manning 2001	Parahaki, Upper Whangarei Harbour	Northland	cultural	Q07	2631500	6609000	Pa/pits/terraces. Karaka, totara riverine forest	Q07/57, Q07/66
Manning 2001	Old Parua Bay Rd Bush, Upper Whangarei Harbour	Northland	cultural	Q07	2633000	6607600	Midden/work area. Towai, totara forest with frequent Puriri. Rewarewa, karaka, kauri	Q07/731
Manning 2001	Waimahanga Walkway, Upper Whangarei Harbour	Northland	cultural	Q07	2633100	6604700	Middens. Coastal shrubland with scattered emergent towai, totara, karaka	Q07/706-708
Manning 2001	Limestone Island, Northland	Northland	cultural	Q07	2633600	6601000	Middens/terraces. Puriri, karaka	Q07/526, Q07/525
DOC 1999	Whakapirau, Kaipara	Northland	cultural	Q08	2622400	6559900	Pa. Regenerating manuka, kanuka with emergent kauri, rimu. Small area of kohekohe, karaka, pur	Q08/78
Wassilieff 1984	Maungaturoto, Kaipara	Northland	cultural	Q08	2635800	6563500	Pa/pits. Kauri, rimu, kahikatea, nikau, tawa, totara, kohekohe, karaka common	Q08/51
Campbell & Atkinson 1999	Tawhiti Rahi Island, Poor Knights Islands	Northland	cultural	R06	2668500	6635800	Terraces/midden/pits/stone work. Karaka abundant	R06/13, R06/24-25, R06/28
Campbell & Atkinson 1999	Aorangi Island, Poor Knights Islands	Northland	cultural	R06	2668600	6634600	Cliff burial/stone heaps/stone work/terrace. Karaka abundant	R06/31, R06/33-34, R06/36
Beauchamp, T. pers. com.	Bream Head. Whangarei	Northland	cultural	R07	2653000	6593000	Terraces/pits. Coastal forest	R07/70
Campbell & Atkinson 1999	Mauitaha Island, Hen & Chickens Group	Northland	cultural	R07	2663600	6588300	Pits/terraces. Karaka rare.	R07/147
Campbell & Atkinson 1999	Warewareware, Hen & Chickens Group	Northland	cultural	R07	2663700	6589500	Pebbles. Many karaka	R07/150
Campbell & Atkinson 1999	Muriwhenua Island, Hen & Chickens Group	Northland	cultural	R07	2663900	6589300	Pebbles. Many karaka	R07/150
Campbell & Atkinson 1999	Pupuha Island, Hen & Chickens Group	Northland	cultural	R07	2664300	6589000	Terraces/pebbles. Karaka rare.	R07/149
Campbell & Atkinson 1999	Taranga Island, Hen & Chickens Group	Northland	cultural	R07	2665500	6580500	Terraces/stone work. Karaka common, abundant regeneration.	R07/36
Campbell & Atkinson 1999	Lady Alice Island, Hen & Chickens Group	Northland	cultural	R07	2667200	6588500	Pa site. Karaka common, regenerating in most communities	R07/105
Campbell & Atkinson 1999	Whatapuke Island, Hen & Chickens Group	Northland	cultural	R07	2669200	6588500	Terraces. Karaka common, mixed tall puriri and kohekohe forest	R07/125
Campbell & Atkinson 1999	Coppermine Island, Hen & Chickens Group	Northland	cultural	R07	2670500	6588600	Terraces. Karaka common	R07/110
FRI herbarium	Mangawhai	Northland	cultural	R08	2660400	6525200	Ditch. Large shrub in small valley	R08/21
Akl. Museum herbarium	Tangaoko Landing, Te Kao	Northland	unknown	N02	2508000	6730000		
Conning & Holland 2000	Te Topito Head, south end	Northland	unknown	N02	2511500	6747700	Secondary forest. Kanuka with, karaka, taraire, kohekohe	
Wassilieff 1984	Paranui, Northland	Northland	unknown	O04	2551000	6681000	Large kauri/podocarp's with karaka, titoki	
Wassilieff 1984	Rotokakahi river, central Northland	Northland	unknown	O05	2540500	6653800	Kahikatea, puriri, tawa, karaka forest	
Wassilieff 1984	Broadwood, central Northland	Northland	unknown	O05	2546200	6660200	In township. kahikatea, taraire, titoki with kohekohe, karaka	
Conning 2000	Horeke Rd east bush, central Northland	Northland	unknown	O05	2569400	6643600	Puriri, karaka, kowhai on rock outcrop	
Conning 2000	To Toke Stm Shrubland, central Northland	Northland	unknown	P05	2571500	6653500	Secondary forest, totara, kahikatea with pukatea, karaka, rimu	
Conning 2000	Mihi Rd bush, central Northland	Northland	unknown	P05	2577500	6653500	Karaka, taraire forest	
Conning 2000	Waikaraka Stm Bush, central Northland	Northland	unknown	P05	2578300	6657500	Puriri, taraire forest on bluffs with karaka, totara	
Conning 2000	Bullman Rd broadleaf remnants, central Northland	Northland	unknown	P05	2585800	6651700	Puriri forest with taraire & occasional rewarewa, kahikatea, karaka	

Conning 2000	Kahutotarao Stm remnant, central Northland	Northland	unknown	P05	2597000	6649700	Titoki, karaka, mahoe forest
Conning 2000	Kaipaha Swamp, central Northland	Northland	unknown	P06	2578000	6634000	Kanuka, totara forest with kahikatea & occasional karaka, kowhai, rimu
Conning 2000	Tauanui Vol. Lake, central Northland	Northland	unknown	P06	2589100	6634600	Taraire, puriri forest with occasional rewarewa karaka, totara, kohekohe
Manning 2001	Mangakahia River, central Northland	Northland	unknown	P07	2604400	6603000	Totara, taraire forest with occasional karaka, kowhai, titoki, kahikatea
Manning 2001	Hanhams Bush, central Northland	Northland	unknown	P07	2605600	6601900	Taraire and totara dominant with kahikatea and occasional karaka, pukatea
Manning 2001	Wairua Falls, central Northland	Northland	unknown	P07	2607400	6604600	Karaka, puriri frequent
Campbell & Atkinson 1999	Cavalli Island, Percy	Northland	unknown	Q05	2632800	6669800	Frequent karaka seedlings & small trees in forest. Saplings common.
Manning 2001	Wairua River, central Northland	Northland	unknown	Q06	2614100	6615000	Totara with frequent kahikatea, taraire, karaka
Manning 2001	Mangere River, central Northland	Northland	unknown	Q06	2618500	6611500	Totara with occasional taraire, karaka, mamaku, kahikatea
Manning 2001	Mirowhakatiki Trig Bush, central Northland	Northland	unknown	Q06	2619300	6616000	Taraire, totara with occasional towai, kohekohe, rewarewa, nikau, karaka, puriri
Manning 2001	Matarau Rd, central Northland	Northland	unknown	Q06	2621400	6617400	Taraire, towai forest with frequent totara, rewarewa, karaka
Manning 2001	Waiotu Riverine, central Northland	Northland	unknown	Q06	2622000	6630200	Totara dominant with matai, kowhai, kahikatea, karaka titoki occasional
Manning 2001	Whakapara River, central Northland	Northland	unknown	Q06	2623100	6626500	Kowhai, totara forest with occasional matai, rimu, karaka, black maire
Manning 2001	Apotu Swamp Shrubland, central Northland	Northland	unknown	Q06	2624500	6618500	Totara forest with frequent kahikatea. Few titoki, karaka, cabbagetree, kanuka
Manning 2001	Corbett Rd Bush, central Northland	Northland	unknown	Q06	2625900	6626000	Taraire with infrequent karaka, tawa
Manning 2001	Mount Parakiore, central Northland	Northland	unknown	Q06	2627000	6615200	Taraire, towai with occasional totara, rewarewa, tawa, karaka
Manning 2001	Waitaua Stream, central Northland	Northland	unknown	Q06	2629500	6613500	Totara forest with titoki, karaka, kahikatea, kohekohe, puriri, taraire
Wassilieff 1984	Whangerei Falls	Northland	unknown	Q06	2631700	6611900	Totara, kohekohe, karaka, taraire forest in gorge
Manning 2001	Puketotara Hill bush, central Northland	Northland	unknown	Q06	2631900	6614400	Taraire, totara with occasional karaka, kohekohe, nikau
Manning 2001	Ngunguru Volcanic Hill, central Northland	Northland	unknown	Q06	2635400	6615000	Taraire totara with frequent towai, karaka
Manning 2001	Wheki Strm Bush, central Northland	Northland	unknown	Q07	2612600	9599300	Totara riverine forest with occasional kowhai, karaka, pukatea, taraire
Manning 2001	Whatititi Rd, central Northland	Northland	unknown	Q07	2613400	6601500	Volcanic broadleaf forest remnants (several) karaka occasional
Wassilieff 1984	Whatitiri, central Northland	Northland	unknown	Q07	2614000	6599800	Puriri, taraire, karaka, nikau forest
Manning 2001	Whatititi, central Northland	Northland	unknown	Q07	2615000	6603000	Taraire dominant with tawa, nikau, karaka, kohekohe, kahikatea occasional
Manning 2001	Waionepe River, central Northland	Northland	unknown	Q07	2615700	6597000	Kanuka, manuka, totara with kahikatea, titoki, karaka, kowhai
Manning 2001	Tatton Rd., central Northland	Northland	unknown	Q07	2616000	6603700	Taraire with karaka, kohekohe, totara, kahikatea, puriri
Manning 2001	Bint Road Bush, central Northland	Northland	unknown	Q07	2616800	6595300	Taraire, totara forest with frequent karaka, kahikatea, kohekohe
Manning 2001	Kauritutahi Stm, central Northland	Northland	unknown	Q07	2616900	6605500	Taraire dominant Titoki, karaka, puriri, karaka
Manning 2001	Mannington Rd Wetland, central Northland	Northland	unknown	Q07	2618800	6604800	Taraire and puriri with occasional tawa, rewarewa, karaka
Manning 2001	Kokopu Block Rd bush, central Northland	Northland	unknown	Q07	2620000	6606300	Taraire forest with karaka, tawa, rewarewa throughout
Manning 2001	Maungatapere walkway, central Northland	Northland	unknown	Q07	2620300	6600000	Near Pukeatua Pa. Taraire, totara forest with rimu, puriri, karaka rewarewa, kahikatea
Manning 2001	Newton Rd, central Northland	Northland	unknown	Q07	2620600	6605300	Taraire, totara with puriri, karaka, kahikatea
Manning 2001	Jackson Rd. Bush, central Northland	Northland	unknown	Q07	2621000	6603300	Taraire riverine forest with pukatea, karaka
Manning 2001	Maunu Mountain, central Northland	Northland	unknown	Q07	2622000	6606000	Taraire forest with occasional kahikatea, nikau, rimu, totara, puriri, karaka, kohekohe
Manning 2001	Hayward Rd Bush, central Northland	Northland	unknown	Q07	2622900	6594100	Kahikatea over taraire with occasional totara, puriri, karaka, nikau
Manning 2001	Millington Rd, central Northland	Northland	unknown	Q07	2623400	6605700	Taraire dominant with rewarewa, tawa, karaka, titoki
Manning 2001	Tauraroa River, central Northland	Northland	unknown	Q07	2623500	6595300	Totara dominant titoki common, occasional karaka, cabbage tree, manuka
Manning 2001	Pukenui forest, Whangarei	Northland	unknown	Q07	2625000	6609000	Whau valley dam area. Taraire towai forest with frequent rewarewa, occasional karaka, miro, puriri
Manning 2001	Pukehinau Bush, central Northland	Northland	unknown	Q07	2625300	6595100	Totara forest with kahikatea, rewarewa, puriri occasional Kauri, pukatea, taraire, karaka
Manning 2001	Waikokopa Stm, central Northland	Northland	unknown	Q07	2633000	6593100	Totara with frequent karaka, titoki, kowhai
Manning 2001	Owhina, Whangarei Hbor	Northland	unknown	Q07	2634700	6603700	Kahikatea coastal forest with frequent puriri, occasional tawa, kohekohe, karaka
Schweikert, K. pers. obs.	Kauri Mountain, Whangarei	Northland	unknown	Q07	2649800	6601700	Pa site 1 km away at grid ref. 510 008
DOC 1999	Topuni, Kaipara	Northland	unknown	Q08	2642500	6553300	Totara, kahikatea, matai with puriri, karaka
Wassilieff 1984	Pakiri, Warkworth	Auckland	unknown	R08	2659000	6453500	Remnant totara, tanekaha, tawa, karaka, rewarewa forest with matai