



CONSERVATION PLAN FOR
MAUAO HISTORIC RESERVE
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APPENDIX 1

**GOALS, OBJECTIVES, AND POLICIES -
FROM THE 1998 MANAGEMENT PLAN**

APPENDIX 1 - GOALS, OBJECTIVES, AND POLICIES - FROM THE 1998 MANAGEMENT PLAN

1.1 Goals

- 1. To meet the spiritual, cultural and historical needs of tangata whenua.**
- 2. To protect the landscape character, ecology and historic values of the reserve.**
- 3. To continue to meet the appropriate recreational and amenity needs of the residents and visitors to the District.**

1.2 Objectives and policies

1.2.1 Goal 1

To meet the spiritual, cultural and historical needs of tangata whenua.

Objective 1

Place of Cultural and Spiritual Significance

To recognise and provide for the special cultural and spiritual relationships that tangata whenua have with Mauao.

Policy

- 4.1.1a Determine what cultural, heritage and traditional rights or ceremonies are associated with Mauao, e.g. Waitangi Day.
- 4.1.1b Determine a mechanism for implementing the above (4.1.1a) consistent with the Reserves Act 1977.
- 4.1.1c Document a consensus as to the events that would initiate rahui *self imposed prohibition* and to make provision, e.g. for conservation purposes.
- 4.1.1d Determine a mechanism for implementing the above consistent with the Reserves Act 1977.
- 4.1.1e To limit the occupancy of Mauao to the public utilities, including the Trig Station, because they are necessary for the health, safety and amenities of the community.
- 4.1.1f To recognise and protect the sanctity of archaeological sites and, in particular to ensure that the tangata whenua determine whether information is released or sought by way of digs (archaeological excavations) on such sites or from silent files.

Objective 2

Heritage Protection

- **To manage the reserve with due recognition to the archaeological significance of Mauao.**
- **To manage the reserve and all sites of cultural significance located within the reserve so that they are protected for the long term.**
- **To carry out specific measures to ensure the long term conservation of the significant sites and areas of Mauao.**
- **To interpret parts of Mauao in consultation with tangata whenua.**
- **To carry out all conservation work in accordance with regard to the guidelines of the ICOMOS New Zealand Charter for the Conservation of Places of Cultural Heritage Value (ICOMOS New Zealand Charter).**

Policy

- 4.1.2a Carry out a detailed historical assessment of Mauao to provide information on the development and use of sites and area. This information will be available for Conservation Plans (see below) and interpretation of the history of Mauao, in consultation with tangata whenua.
- 4.1.2b Prepare a Conservation Plan for the archaeological features and historic areas located in the reserve, commissioned in consultation with the tangata whenua. Such a plan is to include:
- An inventory of all sites, accurately mapped, described and recorded on a plan. This would be limited to those sites that area already a matter of public record and would not include sites about which the tangata whenua does not wish to divulge information.
 - The condition of each site and the presence of vegetation, together with options for its management.
 - An historical assessment of the sites.
 - A review of all documentation and records of existing sites.
 - Detailed policies for the conservation of all sites.
- 4.1.2c A specialist in vegetation management of archaeological sites currently prone to erosion to be consulted during production of a Conservation Plan.
- 4.1.2d A survey of the area's exotic plants and vegetation detailing the types of plants should be carried out, along with documentation of the history. Any

work carried out should make reference to recommendations for these planted areas.

- 4.1.2e Prepare a Conservation Plan for the Stone Steps¹. This would document the history, record their current condition, determine the cultural significance of the steps and enable development of conservation policy and actions to ensure their long term retention.
- 4.1.2f Prepare a Conservation Plan for the Iron Wharf area². This should document the site's history including construction of the wharf, water storage tanks and planting of exotic trees, record the site's condition and layout, establish the cultural significance and develop policy for the long term conservation. The New Zealand Archaeological Association recorded the site's layout in 1981. This information will be useful in the Conservation Plan's preparation.
- 4.1.2g Prepare a Conservation Plan for the Stone Jetty³ documenting the history, including construction of the wharf and its use, recording the structure and developing policy for its long term conservation.
- 4.1.2h Assess the degree to which stock are damaging archaeological sites with special attention to be paid to the midden sites on the south western side. If it is found that erosion of the sites is intensified by stock, alternative management should be examined. This could include allowing areas to revert to native bush.
- 4.1.2i The Pilot Reserve area is a site of significance from the post contact period. An assessment of the whole area should be carried out to determine the extent of significant material still on the site from this period, both built structures and occupation of the site. If the terraced area where the cottage stood has not been modified to any great extent, i.e. the ground surface disturbed to the point that there is no longer any subsurface cultural deposit relating to the occupation of the cottage, the area should be managed as an archaeological site. If the area is shown to be of archaeological interest, it is recommended that no development which is likely to disturb the area is allowed to occur. An explanation of the historic significance of this site should be included in any other interpretative information located on Mauao, together with its relation to other sites.
- 4.1.2j No work should be carried out on Mauao which is likely to destroy, damage or modify any archaeological or historic features. No development (i.e. development of tracks, underground services, fencing, vegetation management such as replanting areas around archaeological features etc) should be undertaken unless an impact assessment of the proposed activity on the archaeological and historic features is carried out by a qualified

¹ Not part of the current project.

² Not part of the current project.

³ Not part of the current project.

archaeologist and tangata whenua are consulted. Any activity will require an Authority to Modify Sites from the New Zealand Historic Places Trust, under Section 11 of the Historic Places Act 1993.

- 4.1.2k Prior to any planting works being carried out on the lower slopes of Mauao, consultation with tangata whenua and an archaeologist is to be undertaken. This consultation will allow for advice on areas of archaeological and cultural sensitivity which should not be planted. Planting should not take place on archaeological features. If sites are to be included in areas for planting it will be necessary to apply to the Historic Places Trust for Authority to Modify Sites, under Section 11 of the Historic Places Act 1993.
- 4.1.2l Further recording and historical research of the disused paths and tracks on the south western slopes of Mauao should be undertaken to reveal any heritage values these tracks may have. When this has been completed, policy should be developed with regard to the long term retention or otherwise of these features in consultation with tangata whenua.

1.2.2 Goal 2

To protect the historical values, landscape character, and ecological values of the reserve.

Objective 1

Vegetation

To restore the “cloak¹ of Mauao” whilst sustaining the ecological integrity of Mauao.

Policy

- 4.2.1a Preserve and protect the existing continuous areas of indigenous vegetation forest and encourage its growth and predominance except where archaeological and other considerations may be paramount.
- 4.2.1b Develop new areas of indigenous vegetation where this will result in the improvement of water quality (springs) and otherwise enhance the habitat value of existing vegetation.
- 4.2.1c Carry out a controlled programme over a period of time to eradicate the *Pinus radiata* and *Ulex europaeus* (gorse) with the main area of the indigenous forest, and replace this loss with indigenous species.
- 4.2.1d Selectively preserve exotic trees in appropriate locations.

¹ Korowai/vegetative cover.

- 4.2.1e Develop waahi rongonui (groves of coastal vegetation).
- 4.2.1f Ensure that all new plantings of indigenous vegetation are of stock that has been propagated from plants that have evolved genetically in the Tauranga ecological district.
- 4.2.1g Allow sheep to graze parts of Mauao to ensure that grass growth is adequately controlled whilst the public's use of the area is not unduly impeded.
- 4.2.1h Review the need for stocking all grassed areas of the reserve and the options for retiring land from grazing. Planting and fencing of retired areas should be carried out only in consultation and tangata whenua and an archaeologist to ensure that the integrity of archaeological sites is not compromised. If planting is to occur on archaeological sites it will be necessary to apply to the Historic Places Trust for authority to modify sites under Section 11 of the Historic Places Act 1993.
- 4.2.1i To control weeds in accordance with the Bay of Plenty Regional Council's Plant Pest Strategy.
- 4.2.1j To eliminate all gorse within the existing grazed areas so as to reduce the fire hazard.
- 4.2.1k To restore and develop additional planting on Mauao.
- (a) Restore and add to the coastal vegetation around the base of Mauao, particularly pohutukawa.
- (b) Care should be taken to ensure good view corridors are maintained.
- 4.2.1l To continue to plant indigenous vegetation through gorse areas.

Objective 2

Fire Control

The Council will take all practical precautions to protect the natural and cultural features of Mauao from fire risk and damage.

Policy

- 4.2.2a The Fire Plan should be used as an action plan in the event of a fire.

Objective 3

Fauna

- **To take all necessary measure to protect and enhance the native fauna on Mauao, including the nesting areas of the grey faced petrel and little blue**

penguin. Consideration will also be given in due course to the release of threatened species on Mauao if consultation determines this is appropriate.

- **To produce and implement an integrated pest control programme on Mauao for predators and browsers, including ongoing control of the rabbit population.**

Policy

- 4.2.3a To continue the annual monitoring programme for the grey faced petrel and implement appropriate protective measures.
- 4.2.3b To complete, as soon as possible, a comprehensive assessment of the density, diversity and distribution of the fauna.
- 4.2.3c To continue the existing opossum, rabbit and cat control programme, to modify it as required in accordance with the Bay of Plenty's Animal Pest Management Strategy, to carry out an annual review, and to monitor progress.
- 4.2.3d To annually monitor and, if necessary, to control the populations of other introduced fauna that may threaten the vegetation, wildlife or archaeological sites.

Objective 4

The Summit

- **To prohibit further development or the provision of utilities of any kind on the summit. Maintenance and improvement of existing facilities is acceptable but must be in accordance with Objective 5 of this Management Plan and approved by Council.**
- **To protect and preserve the summit's historic and archaeological features.**
- **To retain its character as a natural lookout.**
- **To retain its open space character and peaceful atmosphere.**

Policy

- 4.2.4a Redesign (if removal is not practical or appropriate) the existing man-made utilities to blend into the landscape as unobtrusively as possible.

Objective 5

Buildings, Structures and Facilities

- **The following existing buildings, structures and facilities on Mauao should be retained: the Hot Salt Water Pools, the Surf Lifesaving Clubhouse, the Farm**

Service Area, the Public Toilet, and the Camping Ground Facilities. Any changes to existing facilities or proposals for new facilities not included in this Plan must be approved by Council following public consultation, if deemed appropriate by Council.

- **To limit the utilities on Mauao to the existing cairn, reservoir, communications repeaters and overhead wires¹. Navigational structures including lights and beacons may be maintained, improved or relocated to meet navigational requirements. Except for those required to ensure public safety, no additional structures or facilities that provide for activities other than recreation or maintenance of the reserve shall be placed on the reserve.**
- **To continue to allow use of the Pilot Bay Wharf by commercial fishers at the present level.**

Policy

- 4.1.5a To actively seek the removal of the abandoned reservoir from the lower slopes provided that an assessment of environmental effects is undertaken to prove that the actions do not compromise the cultural, spiritual and ecological values of Mauao and it is deemed to be practicable.
- 4.1.5b Other facilities to improve public enjoyment of the reserve, such as seats, direction and information signs, and rubbish bins may be provided. These shall be appropriately designed and sited.

¹ And trig station.

APPENDIX 2

GEOLOGY, SOILS, AND LANDFORM UNITS

APPENDIX 2 - GEOLOGY, SOILS, AND LANDFORM UNITS

GEOLOGY

This section is from Phillips (2003).

Mauao is the remnant of a large lava dome, formed by upwelling and outpouring of viscous rhyolite lava about 4.3 million years ago (Rutherford 1978). Its outline has since been considerably modified by erosion, however, its volcanic origins can still be evidenced by the lava flows that characterize the northern shoreline.

Deep pyroclastic tephra deposits formed the lower slopes of Mauao about 65,000 years ago (Hall 1994) which were subsequently mantled by many airfall volcanic ash deposits from the Okataina, Taupo, Maroa, and Tuhua volcanic centers.

The former island of Mauao later became connected to the mainland by a prograding sand spit (tombolo) that also connected the former island of nearby Hopukioire (Mt Drury) (Hall 1994). The tombolo comprises 50 closely spaced parallel dunes of Plio-Pleistocene sediments. The dunes increase in age from east to west and are thought to have begun forming about 6,000 years ago (Pullar & Cowie 1967; see also Dham 1983). A volcanic ash mantle from the Kaharoa eruption of AD 1314 provides evidence that the tombolo had formed completely when Polynesians first arrived at Mauao (Hogg *et al.* 2003). Conclusive archaeological evidence of Polynesian settlement has yet to be identified below Kaharoa Ash.

SOILS

Information was collated from various reports and geological and soils maps.

Most of the steep slopes are covered with Otanewainuku series soils, consisting of acidic orthic-allophanic soils derived from a thin rhyolitic tephra. There are also large areas of Katikati series soils on the lower north-eastern and south-western slopes, as well as in the crater, these are from very thin rhyolitic tephra on loess and weathered rhyolitic tephra (Rijkse and Cotching 1993). Soils in the Recreation Reserve have been modified, by man, from their original Ohope sand; however, this constitutes a relatively small area.

The Katikati sandy loams and Katikati hill soils are present on the broad terrace formations on the lower southwestern and northeastern slopes and on the level summit. These soils are classified as Typic Orthic Allophanic soils derived from thin rhyolitic tephra (Taupo pumice and tuhua tephra). They are characterized by a black gritty sandy loam A Horizon and a yellow brown silt loam B horizon (Rijkse 1995).

The Katikati soils are generally well drained and are used extensively in other parts of Tauranga district for the cultivation of subtropical crops such as kiwifruit and citrus. They would have been suitable for the cultivation of traditional Polynesian crops during the Maori occupation of Mauao.

LANDFORMS - GENERAL

Mauao is a low mountain (252 m) composed of Pleistocene minden rhyolites (Healy *et al.* 1964). The easy gradient of the lower slopes becomes progressively steeper further upslope, the undulating summit being generally surrounded by rocky precipitous cliffs. Mauao is bounded by sea on three sides; to the north and west it is exposed to the open sea, with Tauranga Harbour to the south. On its eastern side It is connected by a low sand isthmus to the flats and low hills east of Tauranga. The foreshore is generally rocky, with small shell beaches in the north east and sand beaches in the south west. It should also be noted that there are several springs, including one geothermal spring.

Information from Healy, Schofield and Thompson (1964) indicated that landforms could not be derived from differences in the underlying geology. A field survey was undertaken in 1999 and topographical differences were used as the basis for the differentiation of landforms. Landforms were mapped onto an enlarged colour photocopy of an aerial photograph (1:3595; 1999) and notes were collated on the features that characterise each landform unit.

The definitions below were used for field mapping and the landform unit pattern is mapped in Figure 8.

LANDFORM UNITS

There are 10 landform units on Mauao and these are described¹ below and mapped in Figure 8:

1. Rocky shore

A rocky shore is present around most of the coastal margin of Mauao. The substrate varies from boulders to basal rock headlands

2. Beaches

- (a) sand beach
- (b) shell beach

Sand beaches are present on the southern, harbour facing shores, with shell beaches on the northern, open seaward shores. The beaches are relatively small in extent compared to the extent of rocky shore.

3. Coastal bank

- (a) rock
- (b) debris mantled

A coastal bank is present below the track along the seaward margin, with a debris mantled variant more common than rock bank. A rock bank is present at the northern end of Mauao, exposed to the open sea.

¹ For more information see Wildland Consultants 1999.



Legend

7a Landform unit
(refer to text)

Figure 8. Landform units



Scale: 1:3,500
Date: 17/03/04
Cartographer: s 7(2)(a) - Privacy

4. Gully system

A gully system is present along the toeslope of Mauao, above the coastal track. It is generally steep (c.20° on average) comprising of a series of small gullies and dividing 'ridges'.

5. Gentle slopes

Gently sloping areas (generally 5-10°) immediately above the gully system at the northern and southern ends of Mauao.

6. Terraced hillslope (cultural)

- (a) higher density terracing
- (b) lower density terracing

Relatively large areas of hillslope terraced by Polynesians for cultivation and settlement. The terracing present in some areas is more prominent and denser than others.

7. Moderately steep to steep slopes

- (a) with extensive slumping
- (b) hummocky surface

Moderately steep to steep slopes (approximately 10-35°) are the predominant landform of Mauao. Boulders are common on the surface, particularly on the eastern slopes. An area in the east shows evidence of extensive slumping.

8. Very steep slopes

- (a) rock bluffs/outcrops
- (b) debris-mantled

Immediately below the summit there is a rim of rock bluffs and outcrops with a slope generally greater than 35°. On the northern face, debris mantled steep slopes extend down to adjoin the gully system. The most extensive area of rock bluffs and outcrops is present in this area.

9. Summit

- (a) hollow
- (b) rim

The summit has been divided into an outer rim, which is relatively flat and undulating, with a hollow in the centre, which is generally of lower elevation than the rim and more sheltered.

10. Roads and tracks

APPENDIX 3

**VEGETATION AND HABITAT
DESCRIPTIONS**

APPENDIX 3 - VEGETATION AND HABITAT DESCRIPTIONS

GENERAL

A detailed vegetation map has been prepared. Refer to Figure 9. The broad pattern is of a strip of pasture on the lower slopes adjacent to the coast with secondary indigenous vegetation (or a mixture of indigenous and exotic species) extending from the pasture margin to the summit. On the western side indigenous vegetation extends from the sea to the summit, with well developed pohutukawa forest present in this area. There are small patches of pohutukawa treeland scattered along the northern and southern shorelines, and some patches of exotic treeland and forest on the southern and eastern margins. A large area of secondary vegetation on the northern and north-western slopes was burnt in a fire in December 1997 and again in January 2003 and is being replanted, with intensive weed control also underway.







N

Legend
 Vegetation unit (refer to text)
Extent of Fire (year)
 1997
 2003

Figure 9. Vegetation and Habitats - 2003



Wildland
 CONSULTANTS
Scale: 1:3,500
Date: 17/03/04
Cartographer: s 7(2)(a) - Privacy

List of Vegetation and Habitat Types - Refer to Figure 9 for the extent of each unit.

Vegetation Class	Vegetation/Habitat Type
Forest	1. <u>Pohutukawa</u> forest
Treeland	2. <u>Pohutukawa</u> treeland
	3. <u>Pohutukawa-rewarewa/akepiro-mingimingi-hangehange-manuka-karamu-mamaku</u> treeland.
	4. <u>Macrocarpa</u> /karaka-pohutukawa treeland
	5. <u>Sycamore</u> -karaka-radiata pine treeland
	6. Radiata pine-eucalyptus-(sycamore)/pohutukawa-poplar treeland
	7. Poplar-paulownia-silky oak-bead tree treeland
	8. <u>Poplar</u> treeland
	9. <u>Poplar</u> shelterbelt
	Treefernland
11. (<u>Pohutukawa</u>)-(rewarewa)/ <u>mamaku</u> -mahoe treefernland	
Scrub	12. <u>Pohutukawa</u> /mingimingi-akapino-hangehange scrub
	13. (<u>Pohutukawa</u>)-(kanuka)-(rewarewa)-(totara)/mahoe-whauwhaupaku-manuka-karamu-howthorn-mingimingi scrub
	14. <u>Totara</u> -mahoe-hawthorn scrub
	15a. Mahoe-mingimingi-hangehange-karamu scrub
	15b. <u>Mapou</u> -mingimingi-mahoe-karamu scrub
	16. <u>Manuka</u> -kanuka-mingimingi-(pohutukawa) scrub
	17. <u>Kawakawa</u> -whau-mamaku scrub
	18. <u>Gorse</u> -manuka-Spanish heath-pampas scrub
	19. <u>Pohutukawa/gorse-pampas</u> scrub
	20. <u>Gorse</u> -Spanish heath-Japanese honeysuckle-pampas-rarahu-smilax scrub
Shrubland	21. <u>Kawakawa</u> -pohuehue/pohuehue-blackberry shrubland
	22. <u>Manuka</u> -(pohutukawa)-(akeake)-(mingimingi) shrubland
	23. <u>Pohutukawa</u> /mahoe-mingimingi-hawthorn-kawakawa-gorse shrubland
	24. <u>Gorse-pampas</u> tussock-shrubland
	25. <u>Gorse</u> -woolly nightshade/kikuyu grass shrubland
Planted Areas	26. <u>Totara</u> treeland
	27. <u>Ngaio</u> -akeake-pohutukawa/kikuyu grass-gorse treeland
	28. <u>Ngaio</u> scrub ¹
	29. Whau-karamu-ngaio-(tarata)-(manuka)-(pohutukawa)-(taupata)/ <u>kikuyu grass</u> -cocksfoot shrubland
30. <u>Pampas/paspalum-gorse-kikuyu</u> grass tussock-grassland	
Vineland	31. <u>Pohuehue-rarahu-Isolepis nodosa</u> fern-vineland
	32. <u>Pohuehue-rarahu</u> kawakawa-mingimingi-mahoe-blackberry-fennel fern-vineland
	33. <u>Japanese honeysuckle</u> -gorse-rarahu vineland
	34. Rarahu-blackberry-Japanese honeysuckle vine-fernland
Fernland	35. <u>Pohutukawa/rarahu</u> fernland
Tussockland and Rockland	36. <u>Pohutukawa-taupata/Isolepis nodosa</u> tree-tussockland
37. <u>Pampas-gorse</u> shrub-tussockland and rockland	
Grassland	38. <u>Kikuyu grass</u> -ratstail grassland
	39. <u>Ratstail</u> grassland
	40. <u>Gorse-paspalum</u> -pampas shrub-grassland
	41. (<u>Manuka</u>)/cocksfoot-paspalum-bidibid grassland
Miscellaneous	42. Summit road, 4WD track and walking tracks
	43. Water reservoir
	44. Rocky foreshore
	45. Sand beach
	46. Shell beach
	47. Sealed road
	48. Jetty

Detailed descriptions are provided below of each of the vegetation/habitat types mapped in Figure 9.

FOREST

1 Pohutukawa forest

Pohutukawa (c.20 m tall on average), generally the sole canopy component of this forest type, is dominant on the upper slopes of the eastern face of Mauao and extending around to the southern face and onto the lower slopes of the western face. The understorey, however, is considerably more diverse and three sub-types are described below.

- 1a The small remnants of pohutukawa forest on the eastern slope have a dense middle tier (2-5 m) of hangehange (*Geniostoma rupestre* var. *ligustrifolium*) in association with ponga (*Cyathea dealbata*) and mahoe (*Meliclytus ramiflorus* subsp. *ramiflorus*), in contrast to an open shrub tier (0.3 m-2 m) of scattered akepiro (*Olearia furfuracea*), kakaha (*Astelia banksii*) and karamu (*Coprosma lucida*). Pukupuku (*Doodia media*) and *Adiantum cunninghamii* dominate the ground cover (<0.3 m) with mahoe and hangehange seedlings common along with seedlings of climbing asparagus (*Asparagus scandens*).
- 1b Mamaku (*Cyathea medullaris*), hangehange and mahoe dominate the middle tier of the larger area of pohutukawa forest south of the eastern slope. The shrub tier is dominated by hangehange in association with taurepo (*Rhabdothamnus solandri*), kakaha and karamu; ground cover comprises pukupuku and *Adiantum cunninghamii*. Overall the understorey is both dense and diverse, other species present including akepiro, mingimingi (*Leucopogon fasciculatus*), kiokio (*Blechnum novaezealandiae*) *Uncinia uncinata*, huruhuruwhenua (*Asplenium oblongifolium*) and turutu (*Dianella nigra*).
- 1c Pohutukawa dominant forest on the lower slopes on the western side has a middle tier and shrub tier generally characterised by karamu, hangehange and kawakawa, however both the composition and density of species in these tiers varies throughout this area. There are small local areas where taurepo is dominant. Other indigenous species present in the middle tier and shrub tier include kawakawa, akepiro, mapou, ponga, mamaku, mingimingi and whauwhaupaku (*Pseudopanax arboreus* var. *arboreus*). The ground cover comprises pukupuku and *Adiantum cunninghamii*, with other indigenous species including puniu (*Polystichum vestitum*), *Oplismenus imbecillis*, *Microlaena stipoides*, *Carex testacea* and seedlings of hangehange, kawakawa and mahoe. Two kahikatea (*Dacrycarpus dacrydioides*) saplings were noted.

The understorey varies on the western toeslope above the coastal track. Toward the north it is generally open and exposed to salt spray and wind. Local areas of kawakawa up to 0.5 m tall are present in the shrub tier. *Microlaena avenoides*, *Carex testacea*, ratstail (*Sporobolus africanus*) and kikuyu grass (*Pennisetum clandestinum*) dominate the groundcover with a localised area of *Baumea juncea* in association with *Isolepis nodosa*, kakaha and scattered pampas (*Cortaderia jubata*). There is also a localised area where

mapou forms a dense low scrub in association with manuka (*Leptospermum scoparium*) and rarahu (*Pteridium esculentum*) and occasional *Baumea juncea*, grading into fernland dominated by rarahu in association with *Baumea juncea* and scattered *Isolepis nodosa*.

To the south the middle tier and shrub tier are densely populated by kawakawa, with pukupuku, *Carex testacea*, *Oplismenus imbecillis* and *Adiantum cunninghamii* characterising the ground cover.

The understorey is generally open on the bank immediately adjacent to the foreshore below the coastal track. Understorey composition varies in association with substrate type. Boulder banks are present in the northwest and are sparsely vegetated with scattered small patches of *Isolepis nodosa*, *Baumea juncea* or oioi (*Leptocarpus similis*). Debris-mantled banks are present south of the boulder banks and are the more common substrate type. Understorey composition is variable within this substrate type, although the ground cover is generally dominated by varying mixtures of exotic grasses including paspalum (*Paspalum dilatatum*), kikuyu grass and ratstail. The shrub tier is more variable, an area of open taupata (*Coprosma repens*) in association with houpara grading into dense kawakawa in association with whau.

TREELAND

2 Pohutukawa treeland

Pohutukawa dominant treelands (c.18-20 m in height) are present on coastal banks below the coastal walking track at the northern and southern ends of Mauao. They are described below as two sub-types

2a Pohutukawa treeland present on coastal bank below the walkway on the northern side of Mauao is exposed to the sea and wind. A few radiata pine are present in the canopy. There is no middle tier or shrub tier, and the ground cover is generally devoid of vegetation save occasional small areas of *Isolepis nodosa*, *Baumea juncea*, *Cyperus ustulatus* and kikuyu grass. Upslope from the track, the ground cover is generally dominated by kikuyu grass with occasional taupata and pampas in the shrub tier

2b Pohutukawa treeland present at the southern end of Mauao has a dense shrub tier dominated by kawakawa. The ground cover is generally bare with occasional pukupuku and exotic grasses, particularly kikuyu grass

3 Pohutukawa-rewarewa/akepiro-mingimingi-hangehange-manuka-karamu-mamaku treeland.

Emergent pohutukawa and rewarewa (*Knightia excelsa*) (c.18 m in height) are scattered throughout with some local concentrations over dense scrub (c.3-4 m canopy). The scrub comprises varying mixes of akepiro, mingimingi, hangehange, manuka, karamu and mamaku. Small pockets dominated by pampas and gorse or mamaku are present, and occasional emergent kanuka were also noted. Kakaha is the most abundant shrub tier component; other species present include ponga,

hangehange and koromiko (*Hebe stricta* var. *macroura*). There are several large rock outcrops within this vegetation type on which kakaha and akepiro are particularly abundant. Pukupuku is the most common ground cover species, although leaf litter is the main ground cover component.

4 Macrocarpa/karaka-pohutukawa treeland

Macrocarpa is emergent over a canopy of karaka in association with pohutukawa. The canopy is generally 16-18 m high, with a variable density becoming more open toward the upper slopes. The understory is open and species poor. Planted phoenix palms (*Phoenix canariensis*) are present in the middle tier, with kawakawa numerous on the lower margin in the shrub tier. Where the canopy is dense the ground cover is bare. Further upslope where the canopy is open there are patches of rarahu fernland, pampas and scattered shrubs including taupata. The ground cover is dominated by exotic grasses, particularly kikuyu grass, with small clumps of pukupuku.

5 Sycamore-karaka-radiata pine treeland

Sycamore and karaka form a relatively open canopy c.20 m in height in association with radiata pine on the southern side of Mauao near the old pilots wharf. Several exotic tree species are present as minor components of the canopy, including Lombardy poplar (*Populus* sp.) tree of heaven (*Ailanthus altissima*), macrocarpa (*Cupressus macrocarpa*) and brush wattle (*Albizia lophantha*). The middle tier and shrub tier are relatively sparse, although there are some dense localised areas of kawakawa, and cotoneaster (*Cotoneaster glaucophyllus*) and barberry (*Berberis glaucocarpa*) are present in low numbers. The ground cover is either dominated by exotic species such as kikuyu grass, cocksfoot (*Dactylis glomerata*), cleavers (*Galium aparine*) and climbing asparagus, or, in local areas where the canopy is dense, predominantly absent.

6 Radiata pine-eucalyptus-(sycamore)/pohutukawa-poplar treeland

Radiata pine and eucalyptus in association with sycamore (the tallest up to 25 m in height) are emergent over pohutukawa and poplar. Other subcanopy species include macrocarpa and karaka. Some dense kawakawa shrub stands are associated with denser areas of pohutukawa. Mingimingi and pohuehue (*Muehlenbeckia complexa*) are also present in the shrub tier. In both open areas and under trees, grassland characterised by kikuyu grass, cocksfoot, ratstail and bidibid (*Acaena* sp.) predominates. There are several felled and wind thrown trees.

7 Poplar-paulownia-silky oak-bead tree treeland

A small area of planted exotic trees dominated by poplar, paulownia, silky oak and bead tree (14-20 m tall). There is no understory and the ground cover is dominated by kikuyu grass.

8 Poplar treeland

A planted poplar treeland c.18 m in height. The shrub tier is dominated by kawakawa in association with mamaku, karamu and pampas. Bare ground is present under the

kawakawa, with pasture growing where the shrub tier thins. Other species present include pukupuku and turawera (*Pteris tremula*).

9 Poplar shelterbelt

A planted poplar (*Populus* sp.) shelterbelt 20 m or more in height is located on the slope below the water reservoir.

TREEFERNLAND

10 Mamaku treefernland

Mamaku treefernland (c.8 m in height) is present on the summit and upper southern slopes of Mauao. Two sub-types are described below:

10a Mamaku treefernland on the summit has a dense shrub tier of hangehange and mingimingi in association with karamu and ponga. The ground cover generally comprises leaf litter with *Adiantum cunninghamii* and kiokio.

10b Mamaku treefernland on the southern slopes has a shrub tier characterised by hangehange in association with kawakawa and ponga, other species present including rangiora (*Brachyglottis repanda* s.s.), mingimingi, mahoe, akepiro and koromiko. The ground cover generally comprises pukupuku and *Adiantum cunninghamii* with other common elements including kowaowao (*Phymatosorus pustulatus*), puniu, huruhuruwhenua and *Uncinia uncinata*. Hangehange seedlings and saplings are abundant. Numerous large pine tree stumps were observed.

11 (Pohutukawa)-(rewarewa)/mamaku-mahoe treefernland

Emergent pohutukawa and rewarewa are thinly scattered over dense mamaku in association with mahoe. The canopy is generally between c.8-10 m tall. Taurepo dominates the shrub tier in association with hangehange and kiokio. Ground cover comprises leaf litter, with pukupuku, *Adiantum cunninghamii*, and local kawakawa, mingimingi and *Uncinia uncinata*.

SCRUB

12 Pohutukawa/mingimingi-akepiro-hangehange scrub

Scattered large pohutukawa (c.20 m in height) are emergent over a dense canopy of mingimingi, akepiro and hangehange c.3-4 m tall. Other canopy components include mamaku, whauwhaupaku and mahoe. Kakaha is common in the understory. There is good regeneration with seedlings and saplings of rewarewa, pohutukawa, mapou and whauwhaupaku noted. Ground cover generally comprises pukupuku and *Adiantum cunninghamii*. Other ground cover species include *Uncinia uncinata*, kowaowao and turutu.

- 13 (Pohutukawa)-(kanuka)-(rewarewa)-(totara)/mahoe-whauwhaupaku-manuka-karamu-hawthorn-mingimingi scrub.

Occasional pohutukawa, kanuka, totara (*Podocarpus totara*) and rewarewa are emergent over a variable canopy generally comprised of mahoe, manuka, whauwhaupaku, karamu, hawthorn and mingimingi c.6 m tall. Hawthorn tends to be most abundant in scrub adjacent to the pasture area, and houhere is locally abundant in the same area. Mamaku and karaka are minor components of the canopy, karaka particularly so in the canopy adjacent to the margin. Some of the totara may have been planted but it is now establishing naturally. On the lower slopes kanuka is replaced by mapou and the canopy becomes similar to vegetation type 15b. On the lower slope there are numerous local infestations of Japanese honeysuckle (*Lonicera japonica*) smothering canopy species.

Kawakawa dominates both the middle and shrub tiers, with hangehange, ponga, akepiro and koromiko also present. Bare ground and pukupuku dominate the ground cover in association with Japanese honeysuckle. Rarahu is dominant along the forest margin.

- 14 Totara-mahoe-hawthorn scrub

Totara in association with mahoe and hawthorn form a dense scrub of variable height, averaging c.5 m tall. Other canopy components include mamaku, mapou and whauwhaupaku. The shrub tier is variable but typically comprises kawakawa, hangehange, mingimingi and ponga. The ground cover is dominated by pukupuku in association with *Adiantum cunninghamii*; hangehange and kawakawa seedlings and saplings were commonly observed. Rarahu is dominant along the forest margin bordering the pasture.

- 15a Mahoe-mingimingi-hangehange-karamu scrub

Secondary scrub dominated by a mix of mahoe, mingimingi, hangehange and karamu is a prominent feature of Mauao, particularly on the highly visible eastern slopes. Canopy height is variable, but is generally between 3-4 m. There are a few scattered, large pohutukawa emergent over the canopy. Other species present in the canopy include karaka, totara, mamaku and koromiko. Mamaku is locally abundant, particularly adjacent to pohutukawa, and in depressions. Wattles occur locally. The composition of the shrub tier generally reflects the canopy, but also includes ponga, kawakawa and larger ferns such as turawera and huruhuruwhenua. Rarahu, pampas, Spanish heath (*Erica lusitanica*) and gorse are locally abundant where the canopy thins. Pukupuku and *Adiantum cunninghamii* are co-dominant in the ground cover, however pukupuku becomes more dominant in more open areas. Other common components of the ground cover include *Oplismenus imbecillis*, kowaowao and seedlings of mahoe. Weeds are a common feature of this vegetation type, particularly Japanese honeysuckle on the margins and climbing asparagus throughout.

Scrub on the lower north-western slope is of lower stature, c.2-3 m tall on average. It is generally less diverse and of younger successional age than the eastern scrub. Dead rarahu is abundant in the understorey, which is less developed, and the shrub tier lacks

the diversity of ferns. Ground cover is similar and seedlings and saplings of mapou, mahoe and hangehange were noted.

15b Mapou-mingimingi-mahoe-karamu scrub

This vegetation borders part of the pohutukawa forest on the lower western slopes. It is generally similar to type 15 above, however mapou is the most abundant canopy component in association with mingimingi, mahoe and karamu. The canopy is generally c.4 m in height, with occasional emergent rewarewa and kanuka. There is a small dense stand of mamaku and another of kanuka. The shrub tier contains mingimingi, hangehange, kakaha and abundant dead rarahu, and mapou saplings were also commonly noted. Canopy gaps are characterised by a dense layer of rarahu. Ground cover mainly comprises leaf litter with some pukupuku and *Adiantum cunninghamii*.

16 Manuka-kanuka-mingimingi-(pohutukawa) scrub

A large part of this type was burnt in January 2003 and the burnt area is mapped within vegetation types 47 and 48.

Scrub (up to c.2 m in height) dominated by manuka in association with kanuka, mingimingi, and occasional young pohutukawa, forms the predominant vegetation cover of the summit. It is generally around 3 m in height and has recently been cleared of gorse, Spanish heath and pampas. This clearance has resulted in the creation of numerous canopy gaps, particularly near the summit road. Numerous seedlings and saplings of hangehange, akepiro, rewarewa and pohutukawa were observed. The ground cover is sparse and generally comprises leaf litter with scattered *Morelotia affinis*, *Paesia scaberula*, *Baumea juncea* and occasional *Gonocarpus incanus*.

17 Kawakawa-whau-mamaku scrub

A small patch of scrub c.5 m tall dominated by kawakawa, with one individual of both whau and mamaku present. The understorey has been grazed out by stock and is generally bare.

18 Gorse-manuka-Spanish heath-pampas scrub

A large part of this type was burnt in January 2003 and the burnt area is mapped within vegetation type 49.

Highly modified scrub dominated by gorse in association with manuka, Spanish heath, manuka and pampas. Occasional karamu, sapling pohutukawa, and akepiro are also present in the canopy. The ground cover is dominated by exotic species including inkweed (*Phytolacca octandra*) and Japanese honeysuckle.

19 Pohutukawa/gorse-pampas scrub

Gorse in association with pampas forms a dense scrub with occasional emergent pohutukawa dominate an old landslide scar on a toeslope on the western side of Mauao. The vegetation is generally dominated by exotic species including inkweed, paspalum and black nightshade. The area has been recently sprayed.

20 Gorse-Spanish heath-Japanese honeysuckle-pampas-rarahu-smilax scrub

A highly modified dense scrub c.1-2 m tall, dominated by gorse in association with Spanish heath, Japanese honeysuckle, pampas, rarahu and smilax (*Asparagus asparagoides*). Pohuehue is a minor canopy component. The ground is bare except within canopy gaps, where cover is dominated by a mix of kikuyu grass, paspalum, bidibid and pukupuku.

SHRUBLAND

21 Kawakawa-pohuehue/pohuehue-blackberry shrubland

A small area of kawakawa and pohuehue (c.2 m tall) surrounded by blackberry and pohuehue. The ground is bare in areas where the canopy is dense, and covered by exotic grasses including kikuyu grass and paspalum in open areas.

22 Manuka-(pohutukawa)-(akeake)-(mingimingi) shrubland

A large part of this type was burnt in January 2003 and the burnt area is mapped within vegetation types 48 and 49.

A recently partially cleared area previously dominated by gorse. The resultant vegetation comprises scattered manuka with a few pohutukawa, akeake and mingimingi. The ground cover is predominantly leaf litter with occasional exotic grasses, particularly ratstail. Some seedling pohutukawa and rewarewa and *Pomaderris phyllicifolia* were noted in the ground cover.

23 Pohutukawa/mahoe-mingimingi-hawthorn-kawakawa-gorse shrubland

An area of open vegetation of variable composition (ranging from c.2-20 m tall), generally comprising mahoe, mingimingi, hawthorn, kawakawa and gorse. There are several large pohutukawa present and several dense patches of rarahu. Kikuyu grass dominates the ground cover in open areas with pukupuku common on steeper banks below pohutukawa.

24 This type was burnt in January 2003 and is no longer mapped as a separate unit. It has been incorporated into vegetation type 49.

25 Gorse-woolly nightshade/kikuyu grass shrubland

Shrubland (1-2 m tall) characterised by gorse in association with woolly nightshade has developed over pasture. Kikuyu grass dominates canopy gaps. The density of the shrub canopy generally precludes the establishment of a ground cover. Other species noted include woolly mullein (*Verbascum thapsus*), inkweed, cocksfoot and Scotch thistle (*Cirsium vulgare*).

PLANTED AREAS

26 Totara treeland

A small grove of planted totara (12 m tall) on the northern side of the summit. The shrub tier is sparse, characterised by mingimingi with a few individuals of hangehange, mahoe and mamaku. Pukupuku is the most abundant ground cover species.

27 Ngaio-akeake-pohutukawa/kikuyu grass-gorse treeland

Planted ngaio (2-4 m tall) with scattered akeake and pohutukawa. The canopy is open and the understorey dominated by exotic species, particularly gorse and blackberry in the shrub tier and kikuyu grass, paspalum and fleabane in the ground cover.

28 Ngaio scrub

28a An area of planted ngaio 1.5-2.5 m tall. The understorey is sparse and of low diversity. Kikuyu grass dominates the ground cover. Other common species include paspalum, gorse, purple top and woolly mullein.

28b As per 28a but with a component of pohutukawa in the canopy

29 Whau-karamu-ngaio-(tarata)-(manuka)-(pohutukawa)-(taupata)/kikuyu grass-cocksfoot shrubland

A planted area comprising whau, karamu and ngaio in association with tarata, manuka, pohutukawa and taupata. In some areas the canopy is quite dense, however it is mostly open shrubland c.1-2 m tall. Kikuyu grass dominates the ground cover with lesser quantities of cocksfoot.

30 Pampas/paspalum-gorse-kikuyu grass tussock-grassland

Pampas forms an open canopy over paspalum, kikuyu grass and gorse seedlings on the lower slope of the northern area accidentally burnt in December 1997. The vegetation is essentially of the same nature as vegetation type 36, below. However the area has been recently planted, most commonly with ngaio, harakeke and pohutukawa, after spraying and slashing of gorse and pampas.

VINELAND

31 Pohuehue-rarahu-Isolepis nodosa fern-vineland

Pohuehue and rarahu form a dense, low (0.5-1 m tall) cover in association with *Isolepis nodosa*. Tall fescue (*Schoenodorus phoenix*), cleavers and bidibid are common in gaps.

32 Pohuehue-rarahu kawakawa-mingimingi-mahoe-blackberry-fennel fern-vineland

Dense vegetation (c.1 m tall) characterised by pohuehue and rarahu in association with kawakawa, mingimingi, mahoe, blackberry and fennel. Other minor components of the canopy include karamu, hangehange and akatataramoa (*Rubus schmidelioides*). Mahoe, kawakawa and mingimingi are locally dominant, forming a canopy up to 2.5 m tall, with pukupuku dominant in the ground cover. Generally however, the ground cover is either bare or dominated by exotics including inkweed, tall fescue, woolly mullein and paspalum in open areas.

33 Japanese honeysuckle-gorse-rarahu vineland

A highly modified area dominated by Japanese honeysuckle which is smothering the underlying shrubs. Gorse and rarahu occur locally. There are no species in the understorey due to the density of the canopy.

34 Rarahu-blackberry-Japanese honeysuckle fern-vineland

A small area which was fenced to exclude grazing stock, prior to 1999. Rarahu, blackberry (*Rubus fruticosus* agg.) and Japanese honeysuckle dominate this site.

FERNLAND

35 Pohutukawa/rarahu fernland

Occasional pohutukawa are emergent over a dense cover of rarahu. Pampas and kawakawa are also present. The ground is generally bare.

TUSSOCKLAND AND ROCKLAND

36 This type was burnt in January 2003 and is no longer mapped as a separate unit. It has been incorporated into vegetation type 49.

37 Pampas-gorse shrub-tussockland and rockland

Rock outcrops and bluffs are a prominent feature on upper slopes. Pampas in association with gorse dominates a large area on the northern slopes of Mauao that was burnt in December 1997 by an accidental fire. Indigenous species are uncommon within this vegetation type, but most abundant on the extensive rocky outcrops and bluffs. Indigenous species noted include pohutukawa, karamu, akeake (*Dodonaea viscosa*), kakaha, koromiko, turutu, and *Pomaderris phyllicifolia*. The ground cover is dominated by exotic species, the grasses paspalum and ratstail being most common. The indigenous grass *Rytidosperma gracile* was also commonly seen around rock outcrops. The predominantly exotic areas of this vegetation type were recently sprayed and slashed in preparation for planting.

GRASSLAND38 Kikuyu grass-ratstail grassland

Pasture dominated by kikuyu grass in association with ratstail is a dominant feature of the flatter eastern, southern and south-western lower slopes of Mauao. Pohuehue and pukupuku are present in localised areas, generally associated with boulders or steep banks. A few indigenous trees are present, including several planted totara along the margin of the summit access road. Sprayed areas of gorse are common adjacent to areas of secondary scrub and forest, particularly on the eastern slopes. Sheep graze the pasture.

39 This type was burnt in January 2003 and is no longer mapped as a separate unit. It has been incorporated into vegetation type 49.

40 This type was burnt again in January 2003 and is no longer mapped as a separate unit. It has been incorporated into vegetation type 47.

41 (Manuka)/cocksfoot-paspalum-bidibid grassland

An open grassy clearing dominated by cocksfoot and paspalum in association with bidibid. Scattered manuka are present throughout, and *Paesia scaberula*, rarahu and kiokio are locally dominant next to the mamaku treefernland.

42 Meadow rice grass-gorse grassland

Burnt vegetation has been removed and now dominated by a low cover (10 – 20 cm) of grasses including meadow rice grass (*Microlaena stipoides*) as well as gorse (*Ulex europaeus*) seedlings which form a dense sward in places. Also bracken (*Pteridium esculentum*), lotus (*Lotus pedunculatus*), scarlet pimpernel (*Anagallis arvensis*), scattered inkweed (*Phytolacca octandra*), and catsear (*Hypochoeris radicata*) with occasional pampas (*Cortaderia selloana*), *Paesia scaberula*, *Doodia australis*, and turutu *Dianella nigra*. A few mamaku that survived the fire have been left.

43 Meadow rice grass-gorse-bracken-grassland

Burnt shrubs were removed in August/September 2003 and the area now comprises low cover (5–20 cm) of gorse seedlings, bracken, meadow rice grass, and manuka seedlings. Other grasses including ratstail (*Sporobolus africanus*) and Yorkshire fog (*Holcus lanatus*) and herbs such as inkweed (*Phytolacca octandra*), Australian fireweed (*Senecio bipinnatisectus*), lotus, sweet vernal (*Anthoxanthum odoratum*), and scarlet pimpernel are present with occasional boneseed (*Chrysanthemoides monilifera*), toatoa (*Haloragis erecta*), maruru (*Ranunculus reflexus*), woolly mullein (*Verbascum thapsus*), milkweed (*Euphorbia peplus*), and *Geranium solanderi*. A few pohutukawa (*Metrosideros excelsa*) and pampas shrubs have resprouted following the fire and kumarahou (*Pomaderris ericifolia*) seedlings and manuka (*Leptospermum scoparium*) seedlings are also present.

44 (Burnt shrubs)/exotic grasses and herbs herb-grassland

This extensive area was burnt in January 2003 and the vegetation cover is variable. On the upper slopes meadow rice grass is locally common with other species present including *Pelargonium inodorum*, creeping bent (*Agrostis stolonifera*), gorse seedlings,

scarlet pimpernel, lotus, lophead, white clover (*Trifolium repens*), fleabane (*Conyza albida*), *Geranium solanderi*, Australian fireweed, tall fescue (*Schedonorus phoenix*), *Euchiton audax*, and ratstail. Dead stems of gorse, manuka and pampas (some resprouting) are locally common. Lower down the slopes is a dense cover of meadow rice grass, Australian fireweed, bracken, fleabane, gorse and ryegrass. Other species present include climbing dock (*Rumex saggitatus*), climbing asparagus (*Asparagus scandens*), woolly nightshade (*Solanum mauritianum*), toatoa, scarlet pimpernel and black nightshade (*Solanum nigrum*). Boneseed seedlings occur locally throughout the burn scar and are locally common.

Track margins have been planted in places with mainly whaririki (*Phormium cookianum*) and some taupata (*Coprosma repens*) and ngaio (*Myoporum laetum*) amongst meadow rice grass and bracken. *Drosera peltata* subsp. *Auriculata* is common throughout and seradella (*Ornithopus perpusillus*) (planted) is also present. Akepiro (*Olearia furfuracea*) is sprouting along the main road near the summit.

Near the margins of the fire scar at the sides and along the lower slopes of the mountain burnt shrubs are common including manuka and gorse above the main track to the summit. On the north-eastern side of the mountain the ground cover comprises bracken, exotic grasses and exotic herbs including scarlet pimpernel, fleabane and Australian fireweed. Gorse seedlings and meadow rice grass are locally common and manuka seedlings are scattered throughout.

Below the summit on the western side are a number of burnt shrubs and scattered burnt pampas (some regenerating), bracken, *Pelargonium inodorum*, and exotic grasses and herbs including *Haloragis erecta*, sweet vernal, scarlet pimpernel, fleabane, Yorkshire fog, perennial ryegrass, ratstail, milkweed and cocksfoot (*Dactylis glomerata*). The groundcover density varies from 10 – 100%. Meadow rice grass is locally common and veld grass (*Ehrharta erecta*), and kikuyu grass (*Pennisetum clandestinum*) are present along track margins. Other weeds present include prickly puha (*Sonchus asper*), Scotch thistle (*Cirsium vulgare*), black nightshade, creeping dock, and woolly nightshade. Along the road margins are scattered live plants of pohutukawa, *Olearia furfuracea*, manuka, *Coprosma robusta*, rewarewa (*Knightia excelsa*), and tutu (*Coriaria arborea* var. *arborea*) with a number of resprouting burnt cabbage tree (*Cordyline australis*), ngaio (*Myoporum laetum*) and mahoe (*Melicytus ramiflorus* subsp. *Ramiflorus*).

On the lower northern slopes on the outer margin of the burn scar scattered live shrubs including karamu, ngaio and pohutukawa are present.

MISCELLANEOUS

45 Summit road, 4WD track and walking tracks

The tracks are generally bare, except for the walking tracks and 4WD track through the pasture on the eastern slopes. These tracks are dominated by vegetation type 37a, kikuyu grass-ratstail grassland. The summit road also has exotic grasses on the margins and down the centre of the road in places.

- 46 Water reservoir
- 47 Rocky foreshore
- 48 Sand beach
- 49 Shell beach
- 50 Sealed road
- 51 Jetty

The rocky foreshore generally lacks terrestrial vegetation. There are, however, some small patches of *Samolus repens*, *Sarcocornia quinqueflora*, *Disphyma australe* and *Dichondra repens* at the high tide mark and on some rock outcrops.

GORSE AND WILDING PINE SURVEY 2003

A walk-through survey was undertaken on 25 September 2003. It should be noted that this survey was not comprehensive, rather known weed sites were inspected and the results were then compared with the 1998 survey (Wildland Consultants 1998).

The distribution of gorse and pines on Mauao has changed significantly from the 1998 survey. This is largely due to the fire in January 2003, which burnt a large area, almost the same extent as affected by the 1997 fire on the western slopes, and beyond this on the eastern slopes. Most of the 1997 burn was covered in reasonably dense gorse, with regenerating indigenous species. Most of that is now gone, although small local patches remain on the margins. It appears that gorse control has been undertaken on much of the grassed areas, with the result that the areas indicated previously as being up to 100 percent gorse are now grass or have a limited infestation of gorse. Within forest, gorse is limited to sites of high light exposure and areas where there has been disturbance such as felling of pine trees, or along road margins. Some sites with previously up to 40 percent cover had been invaded by Japanese honeysuckle. The summit has been partly cleared as a result of the fire and also some clearing of scrub has taken place for the purposes of exposing the archaeological features. Some areas of gorse have been removed, although this is largely along tracks, and gorse regrowth is common.

Discussions with TCC staff indicated that control of wilding pines had been carried out and it was evident that many had been removed. There was some regrowth, c.1.5 m tall that would not have been present in the previous survey, indicating that pines are continuing to establish. It would be advisable to remove seedlings and saplings, before they reach maturity. Outside of burnt areas and some sites along road margins most of the trees noted in the 1998 report were still present.

APPENDIX 4

**LIST OF INDIGENOUS SPECIES
RECORDED ON MAUAO**

APPENDIX 4 - LIST OF INDIGENOUS SPECIES RECORDED ON MAUAO

* = Historic record (P. de Lange pers. comm.)

4.1 Naturally occurring indigenous species

Gymnosperms

Phyllocladus trichomanoides tanekaha

Monocot. trees and shrubs

Cordyline australis ti kouka

Dicot. trees and shrubs

<i>Brachyglottis repanda</i>	rangiora
<i>Carmichaelia australis</i>	makaka, maukoro
<i>Coprosma lucida</i>	karamu
<i>Coprosma repens</i>	taupata
<i>Coprosma robusta</i>	karamu
<i>Coriaria arborea</i> var. <i>arborea</i>	tutu
<i>Corynocarpus laevigatus</i>	karaka
<i>Dodonaea viscosa</i>	akeake
<i>Entelea arborescens</i>	whau
<i>Gaultheria antipoda</i>	tawiniwini
<i>Geniostoma rupestre</i> var. <i>ligustrifolium</i>	hangehange
<i>Hebe stricta</i>	koromiko
<i>Hoheria populnea</i> var. <i>lanceolata</i>	houhere, lacebark
<i>Knightia excelsa</i>	rewarewa
<i>Kunzea ericoides</i> var. <i>ericoides</i>	kanuka
<i>Leptospermum scoparium</i>	manuka
<i>Leucopogon fasciculatus</i>	mingimingi
<i>Macropiper excelsum</i> var. <i>excelsum</i>	kawakawa
<i>Melicytus ramiflorus</i> subsp. <i>ramiflorus</i>	mahoe
<i>Metrosideros excelsa</i>	pohutukawa
<i>Myoporum laetum</i>	ngaio
<i>Myrsine australis</i>	mapou
<i>Olearia furfuracea</i>	akepiro
<i>Olearia pachyphylla</i> *	
<i>Olearia rani</i>	heketara
<i>Pittosporum crassifolium</i>	karo
<i>Pittosporum eugenioides</i>	tarata
<i>Pittosporum tenuifolium</i> subsp. <i>tenuifolium</i>	kohuhu
<i>Pomaderris phyllicifolia</i>	
<i>Pseudopanax arboreus</i> var. <i>arboreus</i>	whauwhaupaku, five finger

<i>Pseudopanax lessonii</i>	houpara
<i>Rhabdothamnus solandri</i>	taurepo
<i>Vitex lucens</i>	puriri
<i>Weinmannia racemosa</i>	kamahi
Dicot. lianes	
<i>Calystegia sepium</i>	
<i>Calystegia soldanella</i>	
<i>Clematis paniculata</i>	puawananga
<i>Muehlenbeckia complexa</i>	pohuehue
<i>Parsonsia capsularis</i>	akakiore
<i>Rubus schmidelioides</i>	akataramoa
Lycopods and psilopsids	
<i>Lycopodium deuterodensum</i>	puakarimu
<i>Lycopodium varium</i>	iwituna
<i>Psilotum nudum</i>	
<i>Tmesipteris tannensis</i>	
Ferns	
<i>Adiantum cunninghamii</i>	huruhuru tapairu
<i>Adiantum hispidulum</i>	
<i>Asplenium flaccidum</i>	makawe
<i>Asplenium oblongifolium</i>	huruhuruwhenua
<i>Asplenium polyodon</i>	pekato
<i>Blechnum novae-zealandiae</i>	kiokio
<i>Blechnum filiforme</i>	panako
<i>Cyathea dealbata</i>	ponga
<i>Cyathea medullaris</i>	mamaku
<i>Dicksonia squarrosa</i>	wheki
<i>Doodia media</i>	pukupuku
<i>Histiopteris incisa</i>	matata
<i>Hymenophyllum demissum</i>	irirangi
<i>Hymenophyllum dilatatum</i>	
<i>Hymenophyllum sanguinolentum</i>	piripiri
<i>Lygodium articulatum</i>	mangemange
<i>Paesia scaberula</i>	matata
<i>Phymatosorus pustulatus</i>	kowaowao
<i>Polystichum richardii</i>	puniu
<i>Pteridium esculentum</i>	rarahu
<i>Pteris macilenta</i>	
<i>Pteris tremula</i>	turawera
<i>Pyrrosia eleagnifolia</i>	
<i>Trichomanes reniforme</i>	raurenga

Orchids

<i>Corybas oblongus</i>	
<i>Corybas</i> sp. (<i>C. rivularis</i> agg.)	
<i>Earina autumnalis</i>	
<i>Microtis unifolia</i>	maikaika
<i>Pterostylis alobula</i>	
<i>Pterostylis banksii</i>	tutukiwi
<i>Thelymitra longifolia</i>	maikuku

Grasses

<i>Deyeuxia avenoides</i>	
<i>Microlaena stipoides</i>	
<i>Oplismenus imbecillis</i>	
<i>Poa anceps</i> subsp. <i>anceps</i>	
<i>Rytidosperma gracile</i>	
<i>Zoysia pauciflora</i>	

Sedges

<i>Baumea juncea</i>	
<i>Carex breviculmis</i>	
<i>Carex testacea</i>	
<i>Cyperus ustulatus</i>	
<i>Isolepis cernua</i>	
<i>Isolepis nodosa</i>	wiwi
<i>Lepidosperma laterale</i>	
<i>Leptocarpus similis</i>	oioi
<i>Morelotia affinis</i>	
<i>Schoenus apogon</i>	
<i>Schoenus tendo</i>	
<i>Tetraria capillaris</i>	
<i>Uncinia uncinata</i>	kamu, matau a Maui

Rushes

<i>Juncus gregiflorus</i>	wi
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Monocot. herbs (other than orchids, grasses, sedges and rushes)

<i>Astelia banksii</i>	kakaha
<i>Dianella nigra</i>	turutu
<i>Lemna minor</i>	

Composite herbs

<i>Gnaphalium audax</i>	
<i>Gnaphalium gymnocephalum</i>	
<i>Lagenifera pumila</i>	

<i>Pseudognaphalium luteoalbum</i>	pukatea
<i>Senecio hispidulum</i>	
<i>Senecio lautus</i>	

Dicot. herbs (other than composites)

<i>Centella uniflora</i>	
<i>Dichondra repens</i>	
<i>Disphyma australe</i>	horokaka
<i>Drosera peltata</i> subsp. <i>auriculata</i>	
<i>Gonocarpus incanus</i>	piripiri
<i>Haloragis erecta</i> subsp. <i>erecta</i>	toatoa
<i>Oxalis exilis</i>	
<i>Oxalis rubens</i>	
<i>Pelargonium inodorum</i>	kopata
<i>Peperomia urvilleana</i>	
<i>Ranunculus reflexus</i>	maruru
<i>Samolus repens</i>	
<i>Sarcocornia quinqueflora</i>	ureure
<i>Selliera radicans</i>	
<i>Wahlenbergia violacea</i>	

4.2 Planted indigenous species

Gymnosperms

<i>Agathis australis</i>	kauri
<i>Dacrycarpus dacrydioides</i>	kahikatea
<i>Dacrydium cupressinum</i>	rimu
<i>Podocarpus totara</i>	totara

Monocot. trees and shrubs

<i>Cordyline australis</i>	ti kouka
<i>Phormium tenax</i>	harakeke
<i>Rhopalostylis sapida</i>	nikau

Dicot. trees and shrubs

<i>Coprosma grandifolia</i>	kanono
<i>Coprosma repens</i>	taupata
<i>Coprosma robusta</i>	karamu
<i>Corynocarpus laevigatus</i>	karaka
<i>Dodonaea viscosa</i>	akeake
<i>Entelea arborescens</i>	whau
<i>Griselinia littoralis</i>	broadleaf
<i>Hebe stricta</i>	koromiko
<i>Hebe</i> sp. (<i>H. parviflora</i> agg.)	
<i>Hoheria populnea</i> var. <i>lanceolata</i>	houhere, lacebark

<i>Leptospermum scoparium</i>	manuka
<i>Melicytus novae-zelandiae</i>	
<i>Metrosideros excelsa</i>	pohutukawa
<i>Myoporum laetum</i>	ngaio
<i>Myrsine australis</i>	mapou
<i>Olearia paniculata</i>	akirako
<i>Pittosporum crassifolium</i>	karo
<i>Pittosporum eugenoides</i>	tarata
<i>Pseudopanax lessonii</i>	houpara
<i>Vitex lucens</i>	puriri

Dicot. lianes

<i>Muehlenbeckia complexa</i>	pohuehue
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4.3 Adventives

Gymnosperms

<i>Pinus pinaster</i>	maritime pine
<i>Pinus radiata</i>	radiata pine
<i>Cupressus macrocarpa</i>	macrocarpa

Dicot. trees and shrubs

<i>Acacia dealbata</i>	silver wattle
<i>Acacia longifolia</i>	Sydney golden wattle
<i>Acacia sophorae</i>	Sydney golden wattle
<i>Acer pseudoplatanus</i>	sycamore
<i>Ailanthus altissima</i>	tree of heaven
<i>Albizia lophantha</i>	brush wattle
<i>Berberis glaucocarpa</i>	barberry
<i>Buddleia davidii</i> (Wilcox and Ecroyd 1984)	buddleia
<i>Chamaecytisus palmensis</i>	tree lucerne
<i>Chrysanthemoides monolifera</i>	boneseed
<i>Cotoneaster glaucophyllus</i> f. <i>serotina</i>	cotoneaster
<i>Cotoneaster simonsii</i> (Wilcox and Ecroyd 1984)	khasia berry
<i>Crataegus monogyna</i>	hawthorn
<i>Erica lusitanica</i>	Spanish heath
<i>Euonymus japonicus</i>	Japanese spindle tree
<i>Hakea salicifolia</i>	
<i>Hakea sericea</i>	prickly hakea
<i>Impatiens sodenii</i>	shrub balsam
<i>Jasminum mesnyi</i>	primrose jasmine
<i>Ligustrum lucidum</i>	tree privet
<i>Ligustrum sinense</i>	Chinese privet
<i>Lupinus arboreus</i>	lupin
<i>Lycium ferrocissimum</i>	African boxthorn
<i>Metrosideros kermadecensis</i>	Kermedec Island pohutukawa

<i>Paulownia tomentosa</i>	paulownia
<i>Populus alba</i> cv. Nivea	silver poplar
<i>Quercus ilex</i>	oak
<i>Rhamnus alaternus</i>	Italian buckthorn
<i>Rosa rubiginosa</i>	sweet brier
<i>Rubus</i> sp. (<i>R. fruticosus</i> agg.)	blackberry
<i>Solanum mauritianum</i>	woolly nightshade
<i>Teucrium fruticans</i>	teucrium
<i>Ulex europaeus</i>	gorse

Dicot. lianes

<i>Dipogon lignosus</i>	mile a minute
<i>Hedera helix</i>	ivy
<i>Lonicera japonica</i>	Japanese honeysuckle
<i>Passiflora edulis</i> (Wilcox and Ecroyd 1984)	passionfruit
<i>Senecio mikanioides</i>	German ivy
<i>Senecio petasitis</i>	velvet groundsel
(<i>Vitis</i> sp.?)	

Monocot. trees and shrubs

<i>Phoenix canariensis</i>	Phoenix palm
<i>Tracycarpus fortunei</i>	fan palm

Grasses

<i>Agrostis capillaris</i>	browntop
<i>Anthoxanthum odoratum</i>	sweet vernal
<i>Aristida ramosa</i>	Australian wire grass
<i>Briza minor</i>	shivery grass
<i>Bromus diandrus</i>	ripgut brome
<i>Cortaderia jubata</i>	pampas
<i>Cortaderia selloana</i>	pampas
<i>Cyonodon dactylis</i>	Indian doab
<i>Dactylis glomerata</i>	cooksfoot
<i>Holcus lanatus</i>	Yorkshire fog
<i>Lolium perenne</i>	rye grass
<i>Miscanthus nepalensis</i>	Himalaya fairy grass
<i>Paspalum conjugatum</i> (Gardiner 1995)	
<i>Pennisetum clandestinum</i>	Kikuyu grass
<i>Poa annua</i>	annual poa
<i>Poa pratensis</i>	Kentucky bluegrass
<i>Sporobolus africanus</i>	ratstail

Sedges

<i>Carex divulsa</i>
<i>Cyperus congestus</i>
<i>Cyperus eragrostis</i>

Monocot. herbs (other than orchids, grasses, sedges and rushes)

<i>Arum italicum</i>	Italian arum
<i>Asparagus asparagoides</i>	smilas
<i>Asparagus scandens</i>	climbing asparagus
<i>Colocasia esculenta</i>	taro
<i>Hedycharium gardnerianum</i>	wild ginger
<i>Ixia maculata</i>	ixia
<i>Narcissus pseudonarcissus</i>	daffodil
<i>Tradescantia fluminensis</i>	tradescantia

Composite herbs

<i>Cirsium vulgare</i>	Scotch thistle
<i>Conyza albida</i>	fleabane
<i>Crepis capillaris</i>	hawksear
<i>Erigeron karvinskianus</i>	Mexican daisy
<i>Gnaphalium coarctatum</i>	cudweed
<i>Hypochoeris radicata</i>	catsear
<i>Leontodon taraxacoides</i>	hawkbit
<i>Leucanthemum vulgare</i>	oxeye daisy
<i>Mycelis muralis</i>	wall lettuce
<i>Senecio bipinnatisectus</i>	Australian fireweed
<i>Senecio jacobaea</i>	ragwort
<i>Senecio sylvaticus</i>	wood groundsel
<i>Sonchus asper</i>	prickly puha
<i>Sonchus oleraceus</i>	puha
<i>Taraxacum officinale</i>	dandelion

Dicot. herbs (other than composites)

<i>Acaena agnipila</i> (Wilcox and Ecroyd 1984)	Australian sheep's bur
<i>Acaena novae-zelandiae</i>	piripiri, bidibid
<i>Acanthus mollis</i>	acanthus
<i>Anagallis arvensis</i>	scarlet pimpernel
<i>Aphanes arvensis</i>	parsley piert
<i>Dianthus ameria</i>	Deptford pink
<i>Dipsacus fullonum</i>	wild teasel
<i>Epilobium ciliatum</i>	willow herb
<i>Foeniculum vulgare</i>	fennel
<i>Fumaria muralis</i>	scrambling fumitory
<i>Galium aparine</i>	bedstraw
<i>Geranium sp.</i>	geranium
<i>Gomphocarpus fruticosus</i>	swan plant
<i>Hypericum perforatum</i>	St John's wort
<i>Lactuca serriola</i>	prickly lettuce
<i>Linum bienne</i>	
<i>Lotus pedunculatus</i>	lotus
<i>Marrubium vulgare</i>	horehound

<i>Medicago nigra</i>	bur medick
<i>Ornithopus perpusillus</i>	wild seradella
<i>Physalis peruviana</i>	cape gooseberry
<i>Phytolacca octandra</i>	inkweed
<i>Plantago lanceolata</i>	plantain
<i>Plantago major</i>	broad-leaved plantain
<i>Polycarpon tetraphyllum</i>	allseed
<i>Prunella vulgaris</i>	selfheal
<i>Ranunculus repens</i>	creeping buttercup
<i>Ranunculus scleratus</i>	celery-leaved buttercup
<i>Rumex acetosella</i>	sheep's sorrel
<i>Rumex obtusifolius</i>	dock
<i>Rumex saggitatus</i>	climbing dock
<i>Sagina procumbens</i>	pearlwort
<i>Sigesbeckia orientalis</i> (Wilcox and Ecroyd 1984)	
<i>Silene gallica</i>	catchfly
<i>Solanum chenopodioides</i>	velvety nightshade
<i>Solanum linnaeanum</i>	Apple of Sodom
<i>Solanum marginatum</i>	white-edged nightshade
<i>Solanum tuberosum</i>	potato
<i>Soliva valdiviana</i>	Onehunga weed
<i>Stellaria media</i>	chickweed
<i>Trifolium repens</i>	white clover
<i>Tropaeolum majus</i>	garden nasturtium
<i>Verbascum thapsus</i>	woolly mullein
<i>Verbena bonariensis</i>	purpletop

APPENDIX 5

**INDIGENOUS SPECIES POTENTIALLY
SUITABLE FOR PLANTING ON MAUAO**

APPENDIX 5 - INDIGENOUS SPECIES POTENTIALLY SUITABLE FOR PLANTING ON MAUAO

A list of indigenous vascular plant species potentially suitable for establishment on Mauao (but not listed in the planting schedules in the text) is provided below. Flammability classes are provided for many tree and shrub species at the end of this appendix. The species listed are generally only suitable for planting in low numbers.

Key

- 1 = Sheltered sites
- 2 = Salt spray zone
- 3 = Rocky outcrops at base of Mauao
- 4 = Gullies on sheltered side of Mauao
- 5 = Sand dunes (limited habitat available)
- 6 = Exposed faces

Gymnosperms

<i>Dacrycarpus dacrydioides</i> (1)	kahikatea
<i>Dacrydium cupressinum</i> (1)	rimu
<i>Podocarpus totara</i> (1)	totara
<i>Prumnopitys ferruginea</i> (1)	miro
<i>Prumnopitys taxifolia</i> (1)	matai

Monocot. trees and shrubs

<i>Cordyline banksii</i> (1)	ti ngahere, forest cabbage tree
<i>Rhopalostylis sapida</i> (4)	nikau

Dicot. trees and shrubs

<i>Alectryon excelsus</i> var. <i>excelsus</i> (1)	titoki
<i>Aristotelia serrata</i> (1)	makomako, wineberry
<i>Beilschmiedia tawa</i> (1)	tawa
<i>Brachyglottis repanda</i> s.s. (1)	rangiora
<i>Carmichaelia australis</i> (1)	makaka, maukoro
<i>Carmichaelia williamsii</i> (6)	
<i>Carpodetus serratus</i> (1)	putaputaweta
<i>Coprosma acerosa</i> (5)	
<i>Coprosma acerosa</i> x <i>C. repens</i> (3)	
<i>Coprosma grandifolia</i> (1)	kanono
<i>Coprosma lucida</i> (1)	karamu
<i>Coprosma rhamnoides</i> (1)	
<i>Coriaria arborea</i> var. <i>arborea</i> (1)	tutu
<i>Dysoxylum spectabile</i> (1)	kohekohe
<i>Entelea arborescens</i> (1)	whau

<i>Fuchsia excorticata</i> (1)	kotukutuku
<i>Fuchsia perscandens</i> (1)	
<i>Gaultheria antipoda</i> (1)	tawiniwini
<i>Geniostoma rupestre</i> var. <i>ligustrifolium</i> (1)	hangehange
<i>Griselinia lucida</i> (1)	puka
<i>Hedycarya arborea</i> (1)	porokaiwhiri
<i>Hoheria populnea</i> var. <i>lanceolata</i> (1)	houhere, lacebark
<i>Knightia excelsa</i> (1)	rewarewa
<i>Kunzea ericoides</i> var. <i>ericoides</i> (1)	kanuka
<i>Leptecophylla juniperina</i> subsp. <i>juniperina</i> (1)	prickly mingimingi
<i>Leucopogon fasciculatus</i> (1)	mingimingi
<i>Litsea calicaris</i> (1)	mangeao
<i>Macropiper excelsum</i> var. <i>excelsum</i> (1)	kawakawa
<i>Melicytus ramiflorus</i> subsp. <i>ramiflorus</i> (1)	mahoe
<i>Myrsine australis</i> (1)	mapou
<i>Nestegis apetala</i> (1)	
<i>Olearia furfuracea</i> (1)	akepiro
<i>Olearia pachyphylla</i> (historic record) (1, 6)	
<i>Olearia rani</i> (1)	heketara
<i>Pimelea arenaria</i> (5)	
<i>Pisonia brunoniana</i> (1)	
<i>Pittosporum tenuifolium</i> subsp. <i>tenuifolium</i> (1)	kohuhu
<i>Pomaderis kumerahou</i> (1)	
<i>Pomaderris phyllicifolia</i> (1)	
<i>Pseudopanax arboreus</i> var. <i>arboreus</i> (1)	whauwhaupaku, five finger
<i>Pseudopanax crassifolius</i> (1)	horoeka, lancewood
<i>Pseudopanax crassifolius</i> × <i>P. lessonii</i> (1)	
<i>Rhabdothamnus solandri</i> (1)	taurepo
<i>Schefflera digitata</i> (1)	pate
<i>Solanum aviculare</i> var. <i>aviculare</i> (incl. <i>S. a.</i> var. <i>albiflorum</i> and <i>S. cheesemanii</i>) (1)	poroporo
<i>Weinmannia racemosa</i> (1)	kamahi

Monocot. lianes

<i>Freycinetia banksii</i> (1)	kiekie
<i>Ripogonum scandens</i> (1)	kareao, supplejack

Dicot. lianes

<i>Calystegia soldanella</i> (5)	panahi
<i>Clematis cunninghamii</i> (1)	ngakau-kiore
<i>Clematis paniculata</i> (1)	puawananga
<i>Metrosideros diffusa</i> (1)	rata
<i>Metrosideros fulgens</i> (1)	rata
<i>Metrosideros perforata</i> (1)	aka
<i>Muehlenbeckia complexa</i> (5)	pohuehue
<i>Parsonia capsularis</i> (1)	akakiore
<i>Parsonia heterophylla</i> (1)	
<i>Rubus australis</i> (1)	

<i>Rubus cissoides</i> (1)	tataramoa
<i>Rubus schmidelioides</i> (1)	akatataramoa

Ferns

<i>Cyathea dealbata</i> (1)	ponga
<i>Cyathea medullaris</i> (1)	mamaku
<i>Dicksonia squarrosa</i> (1)	wheki
<i>Marratia salicina</i> var. <i>salicina</i> (1, 4)	para, kingfern

Sedges

<i>Desmoschoenus spiralis</i> (5)	pingao
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Monocot. herbs (other than orchids, grasses, sedges and rushes)

<i>Arthropodium cirratum</i> (1)	rengarenga
<i>Astelia banksii</i> (1)	kakaha
<i>Libertia grandifolia</i> (1)	mikoikoi

Dicot. herbs (other than composites)

<i>Euphorbia glauca</i> (5)	
<i>Lepidium oleraceum</i> (5)	
<i>Tetragonia tetragonioides</i> (5)	kokihi

Relative Flammability of Indigenous Plant Species

The following material was obtained from a pamphlet produced by Forest Research in conjunction with the National Rural Fire Authority and the New Zealand Fire Service Commission.

Flammability Classes

These flammability classes are intended as a guide only. They were derived from expert opinion, and represent a state-of-knowledge summary that will need to be refined in the light of future observations. Species flammability also varies as a result of genetic and environmental factors, so that the flammability of a particular species will depend on age and situation. For example, flammability may increase as a result of drought or other critical fire weather conditions, or mature vegetation could carry greater amounts of dead material, adding to the potential severity of any fire.

- *Low*

Suitable for green breaks or defensible space, but when in the immediate vicinity of structures, there should be at least a 3-4 m break between the crowns to reduce fuel continuity.

Low Flammability Species

<i>Fuchsia excorticata</i>	kotukutuku
<i>Pseudopanax crassifolius</i>	horoekea/lancewood
<i>Pseudopanax arboreus</i>	five finger
<i>Coprosma robusta</i>	karamu
<i>Coprosma grandifolia</i>	raurekau/kanono
<i>Geniostoma ligustrifolium</i>	hangehange
<i>Coprosma australis</i>	raurekau
<i>Coprosma repens</i>	taupata
<i>Carpodetus serratus</i>	putaputaweta
<i>Corynocarpus laevigatus</i>	karaka
<i>Griselinia littoralis</i>	papauma/broadleaf
<i>Griselinia lucida</i>	puka
<i>Macropiper excelsum</i>	kawakawa/peppertree
<i>Solanum aviculare</i>	poroporo

- *Low/Moderate*

Not recommended for planting in green breaks. If planted in defensible space, elevated dead material and litter should be removed regularly, greater than 4 m should be left between tree crowns, and trees or shrubs in this category should not be within 10 m of structures.

Low/Moderate Flammability Species

<i>Hebe salicifolia</i> and <i>H. stricta</i>	koromiko
<i>Melicytus lanceolatus</i>	mahoe wao
<i>Melicytus ramiflorus</i>	mahoe-whiteywood
<i>Aristotelia serrata</i>	makomako/wineberry
<i>Coriaria arborea</i>	tutu
<i>Myoporum laetum</i>	ngaio
<i>Pittosporum crassifolium</i>	karo
<i>Pittosporum eugenioides</i>	tarata/lemonwood
<i>Hoheria</i> spp.	hoheria/lacebark
<i>Knightia excelsa</i>	rewarewa
<i>Nothofagus menziesii</i>	tawhai/silver beech
<i>Phyllocladus glaucus</i>	toatoa
<i>Plagianthus regius</i>	manatu/ribbonwood
<i>Weinmannia racemosa</i>	kamahi

- *Moderate*

Most of these species produce heavy accumulations of flammable litter and elevated dead material, and/or have flammable green foliage. Not recommended for green breaks or for planting in defensible space.

Moderate Flammability Species

<i>Beilschmiedia tawa</i>	tawa
<i>Cordyline australis</i>	ti kouka/cabbage tree
<i>Pittosporum tenuifolium</i>	kohuhu
<i>Dacrydium cupressinum</i>	rimu
<i>Metrosideros umbellata</i>	southern rata
<i>Agathis australis</i>	kauri
<i>Phormium</i> spp.	flax
<i>Podocarpus dacrydioides</i>	kahikatea/white pine
<i>Weinmannia silvicola</i>	tawhero/towhai

- *Moderate/High*

Species may have flammable green foliage and/or produce high levels of litter and elevated fuel. Not recommended for green breaks or defensible space.

Moderate/High Flammability Species

<i>Podocarpus totara</i>	totara
<i>Dodonaea viscosa</i>	akeake
<i>Cyathea</i> and <i>Dicksonia</i> spp.	tree ferns
<i>Cyathodes fasciculata</i>	mingimingi

- *High*

Burn readily at Low/Moderate forest fire danger conditions.

High Flammability Species

<i>Kunzea ericoides</i>	kanuka
<i>Leptospermum scoparium</i>	manuka

APPENDIX 6

FAUNA

APPENDIX 6 - FAUNA

6.1 Avifauna present or likely to visit

Note: List excludes species flying overhead and unlikely to land.

Native

<i>Anthus novaeseelandiae</i> ssp. <i>novaeseelandiae</i>	pihoihoi; New Zealand pipit
<i>Ardea novaehollandiae</i>	white-faced heron
<i>Chrysococcyx lucidus</i>	pipiwhauraroa; shining cuckoo
<i>Circus approximans</i>	kahu; Australasian harrier;
<i>Egretta sacra</i>	reef heron
<i>Eudyptula minor iredalei</i>	Northern blue penguin
<i>Falco noivaeseelandiae</i>	New Zealand falcon
<i>Gerygone igata</i>	riroriro; grey warbler
<i>Hirundo tahitica</i> ssp. <i>neoxena</i>	welcome swallow
<i>Larus dominicanus</i> ssp. <i>dominicanus</i>	karoro; black-backed gull
<i>Larus novaehollandiae</i> ssp. <i>scopulinus</i>	tarapunga; red-billed gull
<i>Nestor meridionalis septentrionalis</i>	North Island kaka
<i>Ninox novaeseelandiae</i>	ruru; morepork
<i>Phalacrocorax melanoleucos</i>	kawaupaka; little shag
<i>Phalacrocorax varius</i> ssp. <i>varius</i>	karuhiruhi; pied shag
<i>Porphyrio porphyrio</i>	pukeko
<i>Prothemadera novaeseelandiae</i> ssp. <i>novaeseelandiae</i>	tui
<i>Pterodroma macroptera</i>	oi; grey-faced petrel
<i>Rhipidura fuliginosa</i> ssp. <i>placabilis</i>	piwakawaka; North Island fantail
<i>Stern striata</i>	white-fronted tern
<i>Todiramphus sanctus</i>	kotare; sacred kingfisher
<i>Vanellus miles</i>	spur-winged plover
<i>Zosterops lateralis</i>	silveryeye; tauhou

Introduced

<i>Acridotheres tristis</i>	myna
<i>Alauda arvensis</i>	skylark
<i>Callipepla californica</i>	California quail
<i>Carduelis carduelis</i>	goldfinch
<i>Carduelis chloris</i>	greenfinch
<i>Columba livia</i>	rock pigeon
<i>Emberiza citrinella</i>	yellowhammer
<i>Fringilla coelebs</i>	chaffinch
<i>Gymnorhina tibicen</i>	Australian magpie
<i>Passer domesticus</i>	house sparrow
<i>Phasianus colchicus</i>	pheasant
<i>Platycercus eximius</i>	eastern rosella
<i>Prunella modularis</i>	dunnock; hedge sparrow

<i>Sturnus vulgaris</i>	starling
<i>Turdus merula</i>	blackbird
<i>Turdus philomelos</i>	song thrush

6.2 Mammals present or likely visitors

Native

<i>Arctocephalus forsteri</i>	New Zealand fur seal
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Introduced

<i>Erinaceus europaeus</i>	hedgehog
<i>Felis catus</i>	house cat (domestic and feral)
<i>Mus musculus</i>	house mouse
<i>Mustela erminea</i>	stoat
<i>Mustela furo</i>	ferret
<i>Mustela nivalis</i>	weasel
<i>Oryctolagus cuniculus</i>	rabbit
<i>Rattus norvegicus</i>	Norway rat
<i>Rattus rattus</i>	ship rat
<i>Sus scrofa</i>	pig
<i>Trichosurus vulpecula</i>	brush-tailed possum

APPENDIX 7

**TANGATA WHENUA ISSUES - FROM
THE 1998 MANAGEMENT PLAN**

APPENDIX 7 - TANGATA WHENUA ISSUES - FROM THE 1998 MANAGEMENT PLAN

NGAITERANGI/NGATI PUKENGA, FISHER 1995

Tangata whenua issues report

Mana affected by vesting of maunga in the Crown.

Vision Statement

“Our vision therefore is one that sees the mana of the tangata whenua of Tauranga Moana restored by the return of Mauao to tangata whenua ownership. It is one that sees Mauao continuing to meet the spiritual and cultural needs of the tangata whenua, as well as the recreational and amenity needs of the wider Tauranga community, but without compromising the cultural values of the tangata whenua. Our vision is also one that sees the Tauranga community valuing Mauao as a taonga of exceptional significance to the region and working to actively promote and protect that status” (p4)

Issues

- Claims by tangata whenua to the ownership of Mauao.
- The future use of, and access to, Mauao - should continue to meet needs.
- The practical application of partnership in the management of Mauao - tangata whenua must be actively involved in all levels of decision-making.
- The need to understand and promote the unique and special relationship that tangata whenua have with Mauao - this special relationship must be encapsulated in the management plan, and in the actual management of Mauao.
- Respecting the cultural heritage value of Mauao to the tangata whenua of Tauranga Moana.
- Recognition of the amenity/commodity value of Mauao; the tensions that may exist between those values and cultural heritage values; and managing those tensions.
- The need to preserve and enhance the cultural heritage, amenity/commodity, and environmental/conservation values of Mauao.
- There must be a commitment to the management of Mauao.
- Management goals and objectives must be realistic and workable and must seek to give effect to the aspirations of tangata whenua.

Discussion

Management Plan should be “portable” across different administration and ownership regimes.

The principle of partnership extends to the practical application of the management functions, including decision-making, in respect of the maunga. The inclusion of the tangata whenua of Tauranga Moana as a legitimate and active partner in the management of Mauao is one simple but powerful acknowledgment of the special affinities of Ngaiterangi, Ngati Ranginui, and Ngati Pukenga with Mauao (p8).

“...Tangata whenua do not consider that they should be regarded as one of a number of different sections of the public with an interest in Mauao” (p8) - RMA provisions cited.

“For both tangata whenua it is essential that the wider Tauranga community understands and appreciates the deep attachment that the tangata whenua of Tauranga Moana have with Mauao. The maunga is steeped in legend; it occupies a very significant place in the tribal histories of the tangata whenua, and is one of the principal ways by which tribal identity and rohe is confirmed.” (p9)

- Favour information pavilion at the base of Mauao as a way of conveying information to the general public. Not a tourist information centre.
- No signage drawing attention to archaeological features - fear of desecration.
- Protection of shell middens from damage.
- Any current or proposed amenity/commodity activities that put at risk the heritage and conservation values of Mauao must be discontinued (p11).
- Management and implementation goals and objectives must be realistic and workable, and must seek to give effect to the aspirations of the tangata whenua. Ngaiterangi and Ngati Pukenga believe that, in general, these aspirations are in conflict with those of the wider Tauranga community if we accept that one of the underpinning principles to the management of Mauao is preservation and enhancement. (p11).

Recommendations on Issues

“... Ngaiterangi and Ngati Pukenga believe that restoration of the mana of the tangata whenua can be achieved in part by the TCC actively involving the tangata whenua of Tauranga Moana in the management of Mauao at all levels.” (p11)

Desired structure - joint Mauao Management Committee - 6 tangata whenua /4 TCC.

- Role to oversee implementation of the Mauao Management Plan.
- Carry out specific management functions (including decision-making, control of activities).
- Make recommendations to TCC.

- Information pavilion at the base of Mauao - hand out information, self guiding or guided walking tours.
- No signage on archaeological sites.
- Conservation of middens.
- Archaeological surveys of Mauao are not favoured. However, where work is to be undertaken to mitigate damage to existing sites, or where maintenance work of other than a routine or minor nature is to be undertaken (e.g. excavating for carriageway repairs), an archaeological assessment and report is to be carried out. For major programmes (e.g. flora/fauna reinstatement and vegetation removal) a cultural assessment of appropriate sections of Mauao must be undertaken in conjunction with the tangata whenua.” (p15)

“It is accepted that the retention of the existing grassed (pasture) areas are appropriate in terms of management. Exotic vegetation in these areas should, however, be removed and replaced with native vegetation.”

Restoration of puna required.

Vehicle access to the summit or around Mauao is to be prohibited except for approved maintenance and other approved purposes. The objective here is that Mauao is for pedestrian traffic only. Toilets and refreshment facilities, or any other structures, are to be prohibited on Mauao. The exception is any structure that informs and enhances the cultural and spiritual sanctity of the maunga.

Ngaiterangi and Ngati Pukenga would like to have a tourism management plan for Mauao developed by Council in partnership with the tangata whenua of Tauranga Moana. Properly maintained walking tracks, observation points, and information on areas of interest will act as an appropriate means of pedestrian management.

“Mauao is tired and has been neglected. As a taonga it needs to be cared for.”

NGATI RANGINUI - PIAHANA 1995

Tangata whenua Issues Report

The following issues are representative of the concerns of Ranginui.

- Recognition of the status and position of Te Waka Takitimu and the associated heritage and cultural rights of Ngati Ranginui as tangata whenua.
- Restoration of Mauao consistent with its mana.
- The extent and nature of management rules and functions transferred to tangata whenua.
- The protection of historical sites.

- The reinstatement of Mauao as a historical reserve.
- The restoration of cultural and heritage relationships and give practical effect to use rights.

“To state: “Ko Mauao te Maunga” is tantamount to “I am Mauao” - that the essential ancestral aspects of an individual’s identity is inextricably tied to Mauao.” (p2)

“... the amenity value of a calm, peaceful, place of retreat, reminisce and reflection should be promoted.” (p3)

Reserves Act does not meet or facilitate tangata whenua aspirations to exercise greater authority and control over Mauao.

The environment is sufficiently volatile to act as an obstacle to joint participation and management of Mauao (relationship between tangata whenua due to competing Wai claims for Mauao).

Reinstate Maori nomenclature.

Ranginui, for example, might have the responsibility for restoring and enhancing the summit area, with the opportunity to negotiate agreements to develop concepts and complete work in that area. Tangata whenua seek to re-establish natural relationships with Mauao based on their culture.

Tangata whenua envisage the removal of all exotic vegetation on Mauao and the reinstatement of native vegetation with the aim of restoring the mountain to its pre-European state. This is with the exception of areas of pasture which tangata whenua accept are appropriate in terms of current management. (Ngati Ranginui want a programme of eradication of exotics where they threaten or inhibit re-colonisation of indigenous vegetation). A programme of restoration and beautification would include the creation of a native forest reserve as a conservation, recreational, and educational feature. This programme of restoration would focus on the existing forest area on the upper slopes extending to other areas where appropriate to soften the delineation between forest and pasture areas.

As part of the restoration programme, Ngati Ranginui see the opportunity to establish new sites of cultural significance with specific protections and established work programmes. These sites would come to develop their own identity and act as mnemonics to hapu history, identity, and events. These sites may include the following:

- Waahi Tiraha - places set aside including the dominant stands of pohutukawa, ponga, rewarewa, and areas with specimens of rakau.
- Waahi Rongonui - re-established coastal groves of trees and shrubs including puriri, rata, tarata, ti kouka, raukawa, kohurangi, koromiko, rangiora, akiraho tanguru, harakeke, and ngaio.
- Waahi Ngawari – “living reserves” where families are able to be ‘in the embrace of the mountain’. These areas may include the foreshore area from Stoney Point to Pilot bay or a re-developed camping ground.

- Waahi Whakatai – the summit. Ngati Ranginui would like this to remain as an open space with restoration of surfaces dissected by vehicle road way.
- Taumata – lookouts and vantage points.

Ngati Ranginui would like to establish and enhance the flora of Mauao consistent with local coastal habitats as part of a restoration plan aimed at enhancing plant diversity and preferably incorporate plantings of the following species:

Koromiko, karo, kiekie, horoeka, tete a weka, kohekohe, kowharawhara, kaikomako, harakeke, raukawa, tanguru, nikau, puka, titoki, towhai, maire, akiraho, neinei, rata, mapou, turepo, mahoe, puriri, ngaio, kawakawa, rangiora, wharangi, tawapou, and puahou.

Other specific recommendations from Ngati Ranginui are as follows:

- That the lower north and eastern face around the fenceline on the south face to a level between 40-50 m is planted with coastal shrubs and herbs.
- That pohutukawa should predominate within the lower coastal fringes (to 20-30 m) with the long-term effect on an avenue of pohutukawa.
- That the two gullies immediately above the camping ground to the seaward side of the fenceline aligned with Ocean Beach Road are forested to create ‘fingers’ of coastal forest extending to the existing tree line.
- That open spaces on the inner harbour side below Summit Road are maintained and that gully to the Pilot Bay side of Kinonui’s pa is planted.
- That the karaka groves above the old stone jetty and Pilot wharf are extended.
- The progressive removal of exotic vegetation from the area of trees adjacent to Stoney Point and the extension of the stands of karaka with the inclusion of puriri.
- The restoration of the gully immediately above Pilot Bay wharf to the summit with a view to planting a more diverse range of trees and shrubs.
- The screening of the reservoir and removal of a line of trees immediately below it.
- The establishment of wide fire breaks where gorse and scrub butts up to native stands.

It is anticipated that a programme of upgrading walkways would be developed where walkways would compliment the natural features of Mauao and avoid ‘scarring’ and where existing ‘scarring’ is mitigated with plantings of low to medium height indigenous vegetation. Ngatierangi and Ngati Pukega oppose the development of new walkways with the exception of those that are considered necessary in terms of management. Ngati Ranginui would like to see Summit Road downgraded to a pedestrian path with plantings along the roadside on the lower slopes to consolidate the edge. Ngati Ranginui have also suggested that paths are closed during fires season to reduce fire hazards.

Tangata whenua also foresee the reinstatement of degraded waterways and springs in conjunction with vegetation reinstatement and Ngati Ranginui envisage the creation of ponding areas to enable collection and use.

It is expected that the management plan would include actions to contain and then eliminate animal pests including possums, rabbits, and feral cats from Mauao. Tangata whenua would also like to see the elimination of pest plants from Mauao, however anticipate that the removal of gorse may need to be phased over a longer period in view of its usefulness as a

nurse crop for native seedlings. Removal of pest plants from the upper slopes may also need to be phased over a longer period.

It is anticipated that the management plan will preserve and enhance the outstanding environmental and conservation values of Mauao with the long-term view of the reinstatement of the Historical Reserve status.

Historically, policy methodology has focussed on the perceived needs of tangata whenua (to have their history, settlement story told) rather than the expressed need (to regain authority, mana and an intrinsic relationship with their ancestral mountain) (p.13).

”The summit requires interpretative work, and restoration of surfaces dissected at the summit by vehicle roadway. This should be maintained as an open space, utilising the environment for natural shade and shelter from the wind.” (p14)

Also favour information pavilion idea.

- Pouwhenua and tuahu.
- No further archaeological excavations.
- Protect middens.
- Remove bath water troughs from near Kinonui Pa.
- Downgrade roadways.

APPENDIX 8

MODIFICATION OF

ARCHAEOLOGICAL SITES

APPENDIX 8 - MODIFICATION OF ARCHAEOLOGICAL SITES

Any modification of archaeological sites, regardless of scale, requires formal approval from the NZ Historic Places Trust (NZHPT). Several of the proposed projects outlined in this Conservation Plan will require a prior authority from NZHPT. The following sections set out legal requirements and information about the process to be followed to obtain an appropriate consent.

HISTORIC PLACES ACT 1993 (HPA)

Site Definition

Under the HPA an archaeological site is defined as:

“Any place in NZ that (a) either—

- (i) was associated with human activity that occurred before 1900; or
 - (ii) is the site of the wreck of any vessel where that wreck occurred before 1900; and
- (b) is or may be able through investigation by archaeological methods to provide evidence relating to the history of NZ”.

The archaeological features within Mauao Historic Reserve meet the HPA definition of an archaeological site.

Site Protection

Section 10 of the HPA provides blanket protection for all archaeological sites. It is illegal to damage, modify or destroy an archaeological site, without an Authority from the NZHPT.

Authority Applications

Any person wishing to undertake work that may damage, modify or destroy an archaeological site, or to investigate a site by excavation, must first obtain an Authority from the NZHPT for that work.

A current application form should be obtained from the NZHPT office in Tauranga.

The HPA sets out the information required and process that the NZHPT must follow, when considering an Archaeological Authority application.

The 4 main parts of an Authority application are:

1. Details of the archaeological site and its archaeological values.

2. Description of activity taking place and the effect that activity will have on the archaeological site.
3. Details of consultation with tangata whenua, including an assessment of any Maori values of the site and the effect of the work on those values.
4. Proposed mitigation.

The Conservation Plan for Mauao Historic Reserve should be supplied to the NZHPT as the supporting documentation for all authority applications.

The relevant projects that require NZHPT authority have been discussed with Rachel Darmody, Bay of Plenty Regional Archaeologist for NZHPT, during the course of the preparation of the Conservation Plan. The key elements in applying for the authorities will be to demonstrate that a suitably qualified archaeologist will be used to supervise the proposed work, and that the recommendations contained in the Conservation Plan will be followed.

How long does it take? Once the NZHPT has received a completed application, a decision is usually made within 4 to 6 weeks. The NZHPT must make a decision within 3 months, unless further information is required.

The authority, if granted, must be exercised within a five year period. Authorities should be sought for work on Mauao when the program of work has been finalised.

What does it cost? At present there is no charge for Authority applications.

Types of Authorities There are 3 main types of Authorities under the HPA:

1. **Section 11:** to damage, modify or destroy the whole or any part of an archaeological site or sites.
2. **Section 12:** this differs from section 11 in that it applies to all archaeological sites (recorded or not) within a specified area of land, or any class of sites within an area.
3. **Section 18:** This Authority is for research purposes (eg. university projects). It may also be used to obtain more information about a site prior to a section 11 or section 12 application.

A Section 11 authority is the appropriate type of authority to be sought for the proposed work

contained in the Conservation Plan for Mauao Historic Reserve

What happens next?

On receiving an application the NZHPT's Regional Archaeologist assesses the archaeological information provided. This may involve visiting the site and discussing the plans with the applicant and affected parties. In the case of the Mauao authorities, the field visit and general discussion has already taken place.

The NZHPT's Pouarahi-Maori Heritage Advisor looks at the consultation that has been carried out with Tangata Whenua including views that have been expressed and by whom. This involves talking to the relevant tangata whenua/Hapu and sometimes a site visit is needed.

The Regional Archaeologist and Heritage Advisor then agree on recommendations, which are forwarded to the NZHPT's Senior Archaeologist.

The Senior Archaeologist makes the final recommendation to the NZHPT's CEO, who signs the Authority.

If granted

If the NZHPT decides to grant an Authority, mitigation is normally required for the damage to the site. The Authority sets out conditions that must be complied with. These may include:

- **Monitoring** by an archaeologist of any work that affects the site.
- **Investigation and recording information** relating to the site (may include a section 15 investigation for significant sites). Under **section 15** of the HPA, the NZHPT can require an archaeological investigation of a site, if it is likely to provide significant information relating to the historical and cultural heritage of NZ.
- Following **tikanga Maori protocols**, which may include site monitoring.

Affected parties may appeal the granting of an Authority.

If declined

The NZHPT has the ability to decline an Authority. The applicant either accepts or appeals the decision.

What is an appeal?

Under section 20 of the HPA affected parties may appeal the NZHPT's decision within 15 working days of the decision. This is done through the Environment Court.

Section 17

This section of the HPA requires the NZHPT to approve the archaeologist who will be responsible for carrying out the archaeological work, under the conditions of an Authority.

Time limits

Authorities are non-transferable and expire five years after the date of issue.

APPENDIX 9

GLOSSARY OF PLANT NAMES

APPENDIX 9 - GLOSSARY OF PLANT NAMES

akataramoa	<i>Rubus schmidelioides</i>
akeake	<i>Dodonea viscosa</i>
akepiro	<i>Olearia furfuracea</i>
barberry	<i>Berberis glaucocarpa</i>
bead tree	<i>Melia azedarack</i>
bidibid	<i>Acaena novae-zealandiae</i>
black nightshade	<i>Solanum nigrum</i>
blackberry	<i>Rubus fruticosus</i> agg.
brush wattle	<i>Albizia lophantha</i>
catsear	<i>Hypochoeris radicata</i>
cleavers	<i>Galium aparine</i>
climbing asparagus	<i>Asparagus scandens</i>
cocksfoot	<i>Dactylis glomerata</i>
cotoneaster	<i>Cotoneaster glaucophyllus</i> f. <i>serotina</i>
eucalyptus	<i>Eucalyptus</i> sp.
fleabane	<i>Conyza albida</i>
gorse	<i>Ulex europeus</i>
harakeke	<i>Phormium tenax</i>
hangehange	<i>Geniostoma rupestre</i> var. <i>ligustrifolium</i>
hawthorn	<i>Crataegus monogyna</i>
houhere	<i>Hoheria populnea</i>
houpara	<i>Pseudopanax lessonii</i>
huruhuruwhenua	<i>Asplenium oblongifolium</i>
inkweed	<i>Phytolacca octandra</i>
Japanese honeysuckle	<i>Lonicera japonica</i>
kahikatea	<i>Dacrycarpus dacrydioides</i>
kakaha	<i>Astelia banksii</i>
kanuka	<i>Kunzea ericoides</i> var. <i>ericoides</i>
karaka	<i>Corynocarpus laevigatus</i>
karamu	<i>Coprosma robusta</i>
karo	<i>Pittosporum crassifolium</i>
kawakawa	<i>Macropiper excelsum</i> var. <i>excelsum</i>
kikuyu grass	<i>Pennisetum clandestinum</i>
kiokio	<i>Blechnum novae-zealandiae</i>
koromiko	<i>Hebe stricta</i>
kowaowao	<i>Phymatosorus pustulatus</i>
Lombardy poplar	<i>Populus canadensis</i>
macrocarpa	<i>Cupressus macrocarpa</i>
mahoe	<i>Melicytus ramiflorus</i> subsp. <i>ramiflorus</i>
mamaku	<i>Cyathea medullaris</i>
manuka	<i>Leptospermum scoparium</i>
mapou	<i>Myrsine australis</i>
mingimingi	<i>Leucopogon fasciculatus</i>
ngaio	<i>Myoporum laetum</i>
oioi	<i>Leptocarpus similis</i>
pampas	<i>Cortaderia selloana</i>

paspalum	<i>Paspalum distichum</i>
paulownia	<i>Paulownia tomentosa</i>
phoenix palm	<i>Phoenix canariensis</i>
pohuehue	<i>Muehlenbeckia complexa</i>
pohutukawa	<i>Metrosideros excelsa</i>
ponga	<i>Cyathea dealbata</i>
poplar	<i>Populus sp.</i>
pukupuku	<i>Doodia media</i>
puniu	<i>Polystichum richardii</i>
purpletop	<i>Verbena bonariensis</i>
radiata pine	<i>Pinus radiata</i>
rangiora	<i>Brachyglottis repanda</i>
rarahū	bracken; <i>Pteridium esculentum</i>
ratstail	<i>Sporobolus africanus</i>
rewarewa	<i>Knightia excelsa</i>
Scotch thistle	<i>Cirsium vulgare</i>
silky oak	<i>Grevillea robusta</i>
similax	<i>Asparagus asparagoides</i>
Spanish heath	<i>Erica lusitanica</i>
Sycaomore	<i>Acer pseudoplatanus</i>
tall fescue	<i>Festuca arundinacea</i>
tarata	<i>Pittosporum eugenioides,</i>
taupata	<i>Coprosma repens</i>
taurepo	<i>Rhabdothamnus solandri</i>
totara	<i>Podocarpus totara</i>
tree of heaven	<i>Ailanthus altissima</i>
turawera	<i>Pteris tremula</i>
turutu	<i>Dianella nigra</i>
whau	<i>Entelea arborescens</i>
whauwhaupaku	<i>Pseudopanax arboreus</i>
woolly mullein	<i>Verbascum thapsus</i>
woolly nightshade	<i>Solanum mauritianum</i>