

# Native plants of the Eastbourne hills

Status and conservation management



Department of Conservation  
*Te Papa Atawhai*

# Native plants of the Eastbourne hills

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Cover photo: View across Gollans Valley from above Days Bay. Photo: Jeremy Rolfe.

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# 1. Introduction

## 1.1 PURPOSE OF THIS REPORT

This report provides baseline information about the vegetation and plant species of the Eastbourne hills including references to other previously unpublished work. This has been prepared for use by anyone involved in conservation management of the area such as MIRO, the Department of Conservation, the Wellington Regional Council and Hutt City Council. It is also intended to provide, for those groups, some indicative guidelines about conservation management of the hills to protect their significant biological values.

## 1.2 LAND MANAGEMENT RESPONSIBILITY

Land management responsibilities for the Eastbourne Hills are shown in Figure 1. The Hutt City Council administers the majority of the forested area of hills surrounding Mount Hawtrey. The Hutt City District Plan describes management rules relating to the entire city including the hills. The Wellington Regional Council has proposed the establishment of East Harbour Regional Park covering most of the Eastbourne Hills (Figure 1).

The Department of Conservation administers Lowry Bay Scenic Reserve at the north eastern end of the Eastbourne hills above Lowry Bay and Mahina Bay (Figure 1). The reserve occupies almost 280 hectares of steep hill country with numerous streams and gullies (Wassilieff *et al.* 1986). The vegetation of the reserve is mainly beech forest (hard and black beech) and regenerating scrub (of gorse, manuka, mahoe and pines). Kamahi scrub occurs on the upper slopes (especially around Lowry Trig) and terrestrial northern rata are also present. The reserve supports over 210 native plant species and also good numbers of the land snail *Wainuia* sp. There is good bird life present in the reserve.

At the southern end of the Eastbourne hills are the Pencarrow Lakes (Kohangapiripiri and Kohangatera). Administrative responsibility for these lakes is shared. The beds of Lake Kohangatera and the northern two-thirds of Lake Kohangapiripiri are administered by the Department of Conservation, the southern third of Kohangapiripiri is administered by Hutt City Council (HCC). All the lake edges are esplanade reserve administered by the HCC, except for the lower third of Kohangapiripiri which is managed for drainage purposes by the HCC. Areas of wetland outside of the esplanade reserves are managed by the Wellington Regional Council except for a small area at the top end of the Kohangatera catchment that is privately owned. The plant list in Appendix 1 does not include plants found at Pencarrow Lakes. The remainder of the land in the Eastbourne hills is in private ownership.

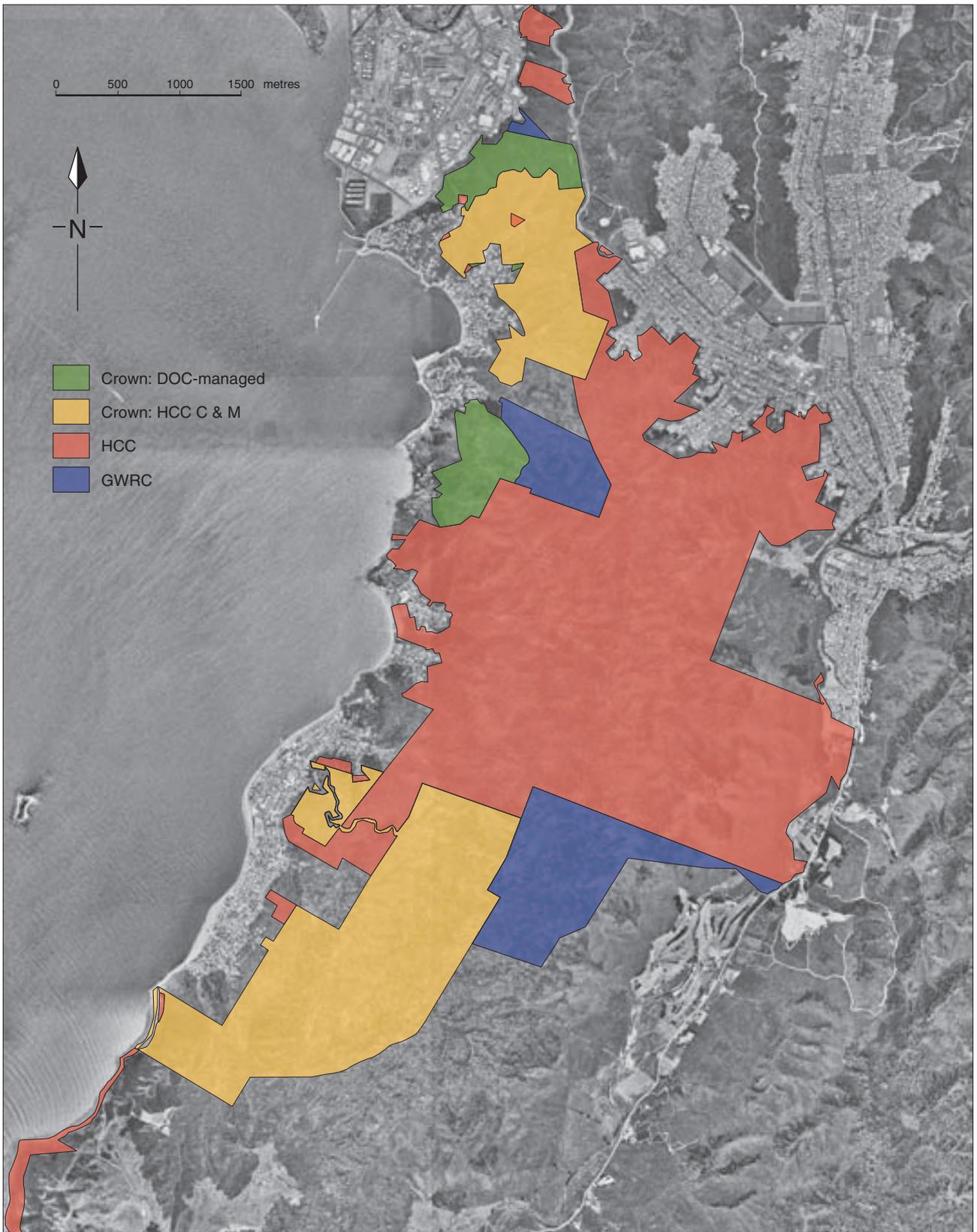


Figure 1. Land management responsibilities in the Eastbourne hills.

The Mainland Island Restoration Organisation (MIRO) has been established as a committee of the East Harbour Environment Association. MIRO does not own or administer land in the Eastbourne hills. However, since it was established in 1999 it has been actively involved in most aspects of conservation management of the area. Similarly, the Eastbourne Forest Rangers were established in 1933. They patrol the hills to ensure people stay on the track and do not light fires, and also undertake track maintenance, bridge building and weed control.

## 2. Native plants of the Eastbourne hills

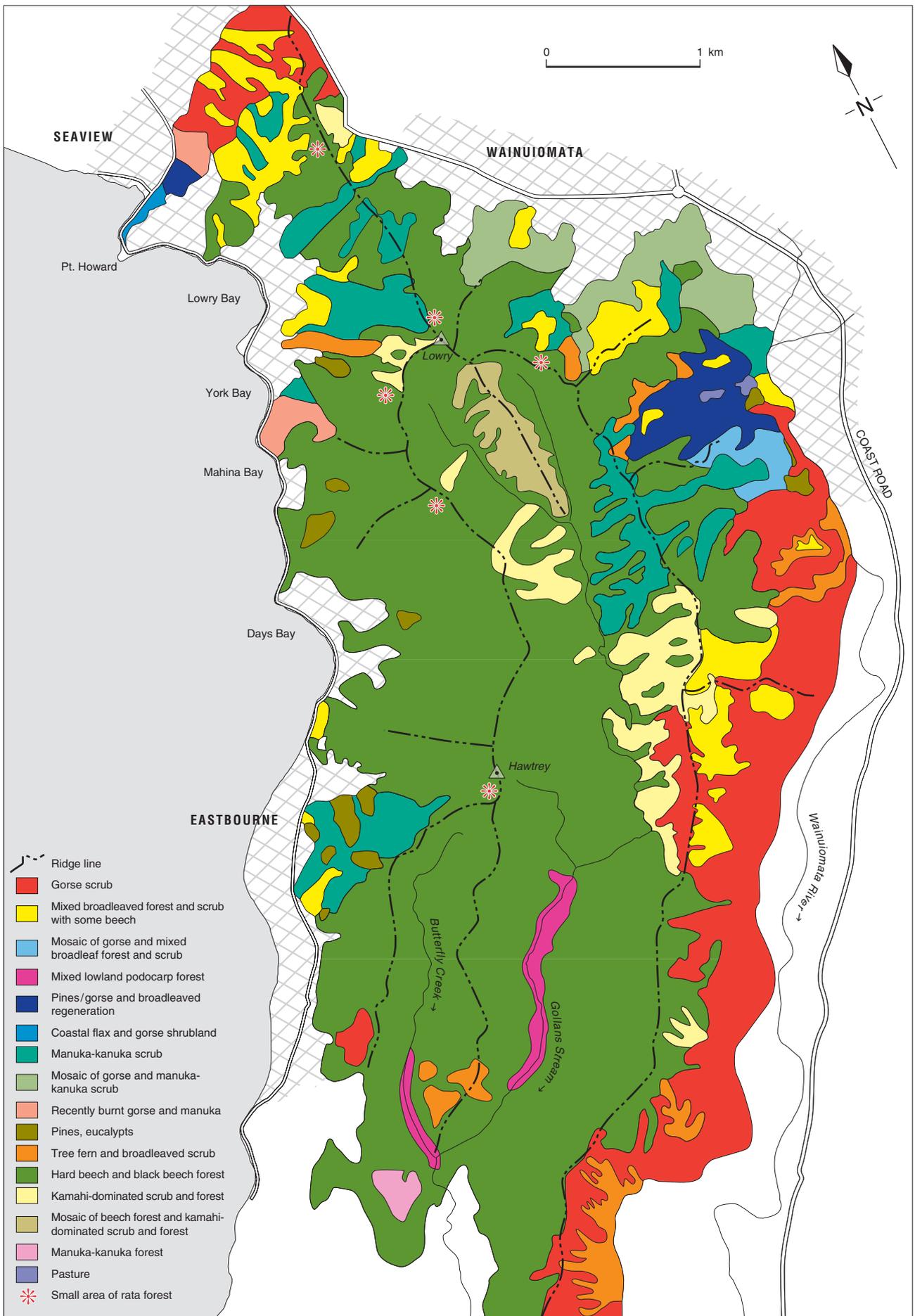
The Eastbourne hills are an important area for indigenous biodiversity in the Wellington region. This has been known for a long time, ever since botanists such as Aston explored the area at the start of the last century. The hills support a diverse mix of native plant communities, containing some of New Zealand's rarest and most endangered plant species. In addition, the forest is an important bird refuge supporting most of the region's forest bird species including tui, bellbird, grey warbler, fantail, silvereve, rifleman, pied tit, shining cuckoo, New Zealand pigeon, whitehead and morepork. Other bird species generally found only in larger tracts of forest, such as long-tailed cuckoo and New Zealand falcon, are also present in the Eastbourne hills (Parrish 1984). The regionally rare kaka has also been recorded in the area recently.

Over the years much plant survey work has been carried out in the Eastbourne hills and surrounds by botanists such as A.P. (Tony) Druce, Greta Stevenson, Patrick Brownsey, Tom Moss, Tony Silbery, Peter de Lange, David Clelland and many members of the Wellington Botanical Society. In addition to that, many students at Victoria University of Wellington have carried out studies in the Eastbourne hills, in particular Butterfly Creek (e.g., Butler 1950 and Moynihan 1975).

The results of that work are presented here along with notes about conservation management of the area. It is not a complete description of every plant species, nor is it a conservation management plan for the area. Instead, it is an overview of the significant components of the flora of the hills and a brief description of some of the principal conservation activities required for protection of the Eastbourne hill vegetation.

Information contained in this report has been obtained from the Department of Conservation's national flora database (BIOWEB) and from species lists compiled for the area (see Appendix 3). New information about the plant species and communities of the Eastbourne hills may be sent to the Department of Conservation in Wellington Conservancy to be included on that database.

Figure 2 (opposite). Vegetation of the Eastbourne hills in 1984. (Map adapted from Clelland 1984.)



## 2.1 VEGETATION TYPES

Vegetation typing by the Wellington District Office of the Department of Lands and Survey (Clelland 1984) identified the predominant association as being lowland beech forest (see Figure 2). Small pockets of regenerating forest, mahoe dominated shrublands, general shrublands and vegetation dominated by exotic species including willows and gorse were also identified. There is also one area of lowland podocarp forest (rimu/tawa) identified in the stream to the east of Butterfly Creek. Clelland identified Mount Hawtrey Bush as the largest insular area of forest in the Wellington region at 2100 ha. The only larger forested areas in Wellington Conservancy are Tararua, Rimutaka and Aorangi Forest Parks (administered by the Department of Conservation), and Akatarawa, Pakuratahi, Kaitoke and Wainuiomata Forests (administered by the Wellington Regional Council).

Key forest types identified for the Mount Hawtrey Bush (taken from Clelland 1984) include in descending order of percentage coverage:

- Beech forest (mosaic of all ages of hard and black beech)
- Gorse scrub
- Mixed broadleaved forest and scrub with some beech forest
- Manuka-kanuka scrub and forest
- Tree fern and broadleaved scrub
- Kamahi dominated scrub and forest
- Mixed lowland podocarp forest with some areas of pukatea forest
- Pines/gorse and broadleaved regeneration
- Coastal flax and gorse shrubland
- Pines, eucalypts and Pasture
- Burnt gorse and manuka scrub
- Rata forest

## 2.2 SPECIES OF NATIONAL CONSERVATION CONCERN

Fourteen plant species of national conservation concern have been recorded from the Eastbourne hills (see Table 1). The Department of Conservation made the most recent assessment of New Zealand's nationally threatened plant species in 2004 using a new threat classification system (Molloy *et al.* 2002). Some of these species are now believed to be extinct in the Eastbourne hills. For example, the sand daphne (*Pimelea* aff. *arenaria*) has not been recorded in the last 20 years and is likely to have gone from coastal areas. Another coastal plant, pingao, has now been restored to the area in restoration plantings along the coast in Eastbourne and at Days Bay.

Two orchid species, *Linguella puberula* and *Plumatocbilus tasmanica* (both formerly in the genus *Pterostylis*), may be present despite not being recorded in recent history. The red mistletoe was once more abundant

having been recorded from the Mackenzie Track in 1942 but is now known from only one site where it grows on black beech.

Photographs of all species of national conservation found in the Eastbourne hills are provided in Appendix 5.

TABLE 1. NATIONALLY THREATENED, DECLINING AND UNCOMMON SPECIES RECORDED FROM THE EASTBOURNE HILLS

LATIN NAME (asterisk denotes coastal species)	COMMON NAME	NATIONAL STATUS <sup>1</sup>	RECORD AND REFERENCE
<i>Botrychium australe</i>	Parsley fern	Sparse	Mount Hawtrey Bush (Clelland 1984) and Butterfly Creek (Brownsey 1982)
<i>Brachyglottis kirkii</i>	Kirk's tree daisy	Serious decline	Lowry Bay (Kelly 1965) and Mount Hawtrey Bush (Clelland 1984)
<i>Adelopetalum (Bulbophyllum) tuberculatum</i>	Bulb leaf orchid	Sparse	Butterfly Creek (Anonymous)
<i>Corunostylis nuda</i>		Sparse	Days Bay (Aston 1911) and Muritai Park, Eastbourne (Warden A.D. 1974).
* <i>Desmoschoenus spiralis</i>	Pingao	Gradual decline	Days Bay (de Lange, P.J.) and Point Webb and Rona Bay (Freegard and Weeber 1986)
<i>Drymoanthus flavus</i>		Serious decline	Eastbourne hills (St George, I.)
<i>Hypolepis dicksonioides</i>	Giant hypolepis	Sparse	Mount Hawtrey Bush (Clelland 1984) and Butterfly Creek to Gollans (Moss, T.)
<i>Mida salicifolia</i>	Willow-leaved maire	Gradual decline	Eastbourne to Wainui and Butterfly Creek (Mead, A. 1974) Owen Spearpoint, 2002 (Wellington Regional Council)
<i>Peraxilla tetrapetala</i>	Red mistletoe	Gradual decline	Muritai, Eastbourne (Gibbs 1986; Druce, A.P.) and Mackenzie Track, Butterfly Creek (Ashcroft 1942)
* <i>Pimelea</i> aff. <i>arenaria</i>	Sand daphne	Serious decline	Muritai, Eastbourne (Aston 1906)
<i>Plumatobtilus tasmanica</i>	Bearded greenhood orchid	Serious decline	Days Bay (Druce, A.P. 1950)
<i>Pterostylis puberula</i>	Dwarf greenhood orchid	Nationally Critical	Days Bay (Druce, A.P.)
<i>Ranunculus macropus</i>	Swamp buttercup	Gradual decline	Mount Hawtrey Bush (Clelland 1984) and Butterfly Creek (Chinnock 1957)
<i>Streblus banksii</i>	Large leaved milk tree	Sparse	Lowry Bay (Horne, J.C.)

1. de Lange et al. 2004.

## 2.3 REGIONALLY THREATENED SPECIES

Nationally threatened species are the focus for much conservation effort in New Zealand. However, there are many species that are rare or endangered in regions of New Zealand while being common elsewhere. Regionally threatened species are those that are in danger of regional extinction and are those listed in the Department of Conservation's regional plant conservation strategy (Sawyer 2004). Ten regionally threatened plant species have been recorded in the Eastbourne hills (Table 2).

One of those species is *Libertia edgariae*, first listed as *Libertia* aff. *grandifolia* by A.P. Druce in his checklist of New Zealand vascular plants. The species is now growing in cultivation at Percy Scenic Reserve, in Petone. It is a small, narrow-leaved species similar to *L. micrantha* except it has the floral and fruiting morphology of *L. grandiflora* (but much smaller in all parts) and is rhizomatous like *L. peregrinans*. It is probably closest to *L. grandiflora* but is now classified as a new species that is locally endemic to Wellington Conservancy (Blanchon *et al.* 2002).

TABLE 2. REGIONALLY THREATENED SPECIES RECORDED FROM THE EASTBOURNE HILLS

LATIN NAME (Asterisk denotes coastal species)	COMMON NAME	REGIONAL STATUS <sup>2</sup>	RECORD AND REFERENCE
<i>Botrychium bifforme</i>	Fine-leaved parsley fern; patotara	Susceptible	Butterfly Creek (Chinnock 1969)
<i>Carex diandra</i>		Data deficient	Eastbourne, on coast to south (Moss, T. 1983)
* <i>Coprosma acerosa</i>	Sand coprosma	Gradual decline	Eastbourne (Peebles 1944) and Gollans Valley to Butterfly Creek (Wellington Botanical Society 1984)
* <i>Einadia allanii</i>		Serious decline	Days Bay, beyond Muritai (Aston 1906).
<i>Gonocarpus incanus</i>		Sparse	Mount Hawtrey (Clelland 1984) and between Days Bay and Eastbourne (Moss, T.)
<i>Libertia edgariae</i>		Range restricted.	Numerous sites throughout Eastbourne hills. (Blanchon <i>et al.</i> 2002).
* <i>Melicytus</i> aff. <i>obovatus</i>		Regionally Critical	Point Howard (Druce, A.P.; Atkinson; de Lange, P.J.)
<i>Morelotia affinis</i>		Sparse	Days Bay (Aston 1907) and Butterfly Creek, near Kowhai Street (Ogle, C.C.)
<i>Pterostylis cardiostigma</i>	Greenhood	Sparse	Lowry Bay, Days Bay (Cooper 1980) and Mount Hawtrey Bush (Clelland 1984)
<i>Schizaea bifida</i>	Forked comb fern	Regionally Critical	Williams Park, Days Bay (Moss, T.) and Eastbourne (Brownsey, P.)

2. Sawyer 2004.

## 2.4 PLANTS OF LOCAL SIGNIFICANCE

Some species are of local significance perhaps because they are only known from one or two locations in the area or are naturally rare species throughout the conservancy but also occur in the Eastbourne hills. Nine species are identified as of local significance in the Eastbourne hills (See Table 3).

*Pittosporum divaricatum*, one of Wellington City's rarest plants, occurs in the Eastbourne hills. It is not a threatened species regionally or nationally but is uncommon throughout the entire region.

TABLE 3. PLANT SPECIES OF LOCAL SIGNIFICANCE RECORDED FROM THE EASTBOURNE HILLS

LATIN NAME	COMMON NAME	SIGNIFICANCE	RECORD AND REFERENCE
<i>Adiantum diaphanum</i>	Small maidenhair	Locally rare in Wellington	Days Bay (Brownsey, P. 1986)
<i>Bulbophyllum pygmaeum</i>	Bulb leaf orchid	Rarely recorded in Wellington region	Days Bay (Workers Education Association) Butterfly Creek to Gollans Valley (Wellington Botanical Society 1984)
<i>Drymoanthus adversus</i>		An uncommon plant in Wellington and Hutt City	Eastbourne hills (Workers Education Association)
<i>Lindsaea linearis</i>		Locally rare in Wellington and in decline	Butterfly Creek track, above Kowhai Street (Ogle, C.C.) and Lowry Bay Scenic Reserve (Wassilieff, Clark & Gabites 1986)
<i>Metrosideros robusta</i>	Northern rata	One of the region's most significant populations of the species	Eastbourne hills (Knightbridge, P.)
<i>Nestegis montana</i>	Narrow leaved maire	Very rare in Wellington City—one of 3 known sites. However, quite common on the ridges in the Eastbourne hills, at least as juveniles (Chris Moray pers. comm.)	Muritai, Eastbourne (Enright 1998)
<i>Pittosporum divaricatum</i>		Widespread throughout the region but never found in abundance	Eastbourne hills (Druce, A.P. and Ogle, C.C.)
<i>Syzygium maire</i>	Swamp maire	Locally rare due to destruction and modification of much of the regions wetlands	Lowry Bay Scenic Reserve (Wassilieff Clark and Gabites 1986) and Mount Hawtrey Bush (Clelland 1984) and Butterfly Creek (Ogle 1985).
<i>Teleoschistes flavicans</i>		A rare lichen often found in association with rare native grasses	York Bay, Eastbourne (de Lange, P.J. 1991)

## 2.5 SIGNIFICANCE OF THE PLANTS AND FUNGI OF THE EASTBOURNE HILLS

### 2.5.1 Vascular plants

Any area the size of the Eastbourne hills covered by continuous indigenous vegetation is important. In addition, the flora of the Eastbourne hills is significant for a number of reasons. In particular, 33 species of native orchid have been recorded there. This is one of the richest orchid floras of any area of equivalent size in Wellington. It accounts for 50% of the species that are found in the entire Wellington Conservancy.

Two hundred and sixty four species of native vascular plant have been recorded from the Eastbourne hills. *Libertia edgariae* is regarded as the only species endemic to the area. *Brachyglottis kirkii* var *kirkii* reaches its southernmost distribution limit in the area.

An uncommon occurrence in the Eastbourne hills is the three species of maire (*Nestegis montana*, *N. cunninghamii* and *N. lanceolata*). In the Wairarapa there are two sites where they grow almost within touching distance and several other sites where the three species are scattered in the same locality (Pat Enright pers. comm.). While it is not related to *Nestegis* the willow leaved maire (*Mida salicifolia*) has also been recorded in the Eastbourne hills and was recently found in an exclosure plot (Owen Spearpoint pers. comm.)

Another significant aspect of the Eastbourne hills is the fact that northern rata is found growing both epiphytically and terrestrially and is the only place in Wellington where this occurs. Most northern rata individuals establish as epiphytes, but some individuals start out terrestrially, typically in large light gaps and on ridge tops and spurs. This is believed to be an adaptation caused by the high light levels at ground level. The same terrestrial establishment of northern rata occurs in other places in New Zealand such as the Stony River in Taranaki and many of the coastal northern rata along the Heaphy track in the Kahurangi National Park on the northern West Coast of the South Island. Terrestrially established northern rata also occur at Mount Bruce, along ridgelines in the Matemateaongas and Ureweras in North Island. They are also quite common in the Coromandel especially where there has been disturbance and the large trees, that would otherwise facilitate epiphytic establishment, are now absent.

Like other emergent species, northern rata could be thought of as a long-lived pioneer tree species requiring high light levels for regeneration (as created after reasonably large disturbances) or as an epiphyte in high light canopy sites (Knightbridge and Ogden 1998). Northern rata is valuable in this forest system because of the food it produces that is used by native birds and the shelter it provides to understorey plants.

### **2.5.2 Mosses**

Eighty-six species of moss have been recorded from the Butterfly Creek part of the Eastbourne hills (see Appendix 1). None of those species are known to be nationally threatened or endemic to the region.

### **2.5.3 Fungi**

One hundred and five species of fungi have been recorded from the Eastbourne Regional Park (see Appendix 1). Many of those occurrences are the type locality for the taxon because Greta Stevenson did much of her early mycological work in the Eastbourne hills. None of those species are known to be nationally threatened or endemic to the region.

## 3. Conservation management

There is a need for on-going conservation management in the Eastbourne hills. The fact that a number of plant species have already gone extinct locally indicates that the vegetation and ecology of the area is under threat. Threats include browsing by possums, deer, pigs and goats, overuse by visitors and fires. Other wild animals such as stoats are also a threat to the forest's ecology as they kill native birds that pollinate and disperse native seed. Rats are also a serious pest in the Eastbourne hills. Pest plants are also altering the structure and composition of the native plant communities.

A variety of conservation actions may be required to prevent further decline in the vegetation. Past studies have made recommendations about management. For example, Clelland (1984) noted: *Wider recognition of the importance of Mount Hawtrey Bush is needed to bring about its protection. It should be reserved and held under unified control and management.* Clelland recommended regular control of possums, regular litter removal and the establishment of a formed track in Gollans Valley. Key aspects of a conservation management programme for the Eastbourne hills are described below (some of which have already been implemented).

### 3.1 SURVEY

While there exists already a wealth of knowledge about the native plant species that occur in the Eastbourne hills there is still much to be recorded. How widespread are the threatened species? How accurate is the description of plant communities for the hills? What other species or plant communities have yet to be found? Do all the threatened species still occur in the area? What weed species are invading the area (see Appendix 2)?

Additional survey work is required to re-map the plant community types in the Eastbourne hills (every 10 years) and to search for plant species (native and exotic) that have not been recorded there before. Survey work will be required to determine the range of native species or the abundance of some species (especially nationally and regionally threatened plant species).

### 3.2 MONITORING

One of the largest components of a management programme for the Eastbourne hills will be on-going monitoring of the state of plant and animal communities. The first objective of that monitoring will be simply to detect change. What changes are occurring in the species composition

of plant communities? Are exotic plant species spreading into the area? Are the ranges of native species changing? Are populations of species expanding or contracting in size? Are native species naturally colonising and regenerating?

Another aspect of monitoring is determining the effectiveness of management. That is, how effective has possum control been? How good have weed control operations been? Is banding trees such as northern rata or mistletoe hosts useful? What effect has weed and possum control had on native plant and animal communities?

To establish a robust and effective monitoring programme for the Eastbourne hills a good understanding of the current state of the communities will be required (see Section 3.1 above). A monitoring programme for the Eastbourne hills could incorporate a range of indicators and criteria that should be measured regularly. Those indicators and criteria could include:

- Range and abundance and condition of *Metrosideros robusta* (northern rata) using rata view method (de Monchy & Ogle 1999) and digital analysis of foliage technique (Handford 2000). Initiated by MIRO and now continued with support from the Wellington Regional Council
- Continued use of Foliar Browse Index lines (originally put in by Phil Knightbridge, recently re-measured) (Knightbridge 1996, Wiles 2001)
- Range and abundance of *Brachyglottis kirkii* var. *kirkii* (sensitive to possum browse)
- Exclosure plots to determine the effects of browse pressure on the vegetation (see Allen, Payton & Knowlton 1984). For example, a plot has been established on the west face of Gollans Stream by Stan Hunt and the Wellington Regional Council (this plot still requires botanical survey)
- Range and abundance and regeneration of nationally and regionally threatened plant species and local endemic species (e.g., *Peraxilla tetrapetala*, *Libertia edgariae*)
- Fruitfall plots for species such as hinau (Handford 2000). To date this has been done with MIRO volunteers such as Stan Hunt working with the Wellington Regional Council (Robin Blake)
- Bird counts throughout the hill country (see Abel 2000)

### 3.3 PROTECTION

Protection of the biological and ecological values of the Eastbourne hills first requires some understanding of the threats that exist. That may be as simple as the threat of fire burning the vegetation or possums eating trees. It may also be the threat of wasps decimating invertebrate populations and competing with nectivorous species or the threat of subdivision of private lands. The following is a discussion of some of the key activities associated with protection of the indigenous vegetation of the Eastbourne hills.

### **3.3.1 Wild animal control**

One of the greatest threats to the indigenous biodiversity of the Eastbourne hills is the collective effect of exotic wild animals such as stoats, rats, possums, wasps, deer and goats. Each species acts, in its own way, to affect the structure, composition and/or function of the forest ecosystem. Northern rata, for example, is known to be severely impacted upon by possums leading to poor regeneration and ultimately the local demise of the species. An on-going programme of animal pest control will be required to ensure the detrimental effects of pests on the vegetation and animal communities are minimised. Possum control operations by trapping have already taken place across the entire Eastbourne hills. While hunting of large mammals may be a problem so close to human habitation there is still a need to minimise the effects of these animals on the ecology of native plant communities.

Animal pest management in the Eastbourne hills must be integrated and broad. Controlling possums maybe beneficial but the combined impact of controlling all animal pests will be significantly better. Management of many browsing and predatory mammals is now seen as vital to maintaining the ecology of forest ecosystems.

In addition bands have been placed on trees such as northern rata and host trees of native mistletoe to prevent possum damage. This occurred in the late 1980's and early 1990's. These bands must be checked regularly to ensure they are large enough to allow for tree growth.

### **3.3.2 Weed control**

A significant threat to the indigenous plant communities of the Eastbourne hills is from exotic plant species. Some species, such as *Asparagus scandens* (climbing asparagus), *Selaginella kraussiana* (African club moss) and boneseed (*Chrysanthemoides monilifera*) are spreading into the hills whilst others, such as gorse, are already well established. Boneseed, especially, is invading more open areas and in some places has reached the top of the western scarp (Chris Moray pers. comm.). Weed control will require on-going work for many years as sites must be re-visited, long after initial management has been done, to check for regrowth. On-going surveillance will also be necessary to ensure that new weed species are not colonising the hills. Gardens of houses bordering the reserves in most cases will be the first areas to be colonised and therefore surveillance should be undertaken here as a priority. Photographs of some weed species are provided in Appendix 6.

### **3.3.3 Fencing**

While it may not be necessary to build a fence around the entire Eastbourne hills, there may be areas where fences are still needed or must be maintained to prevent stock intrusion. For example, on the edges of Gollans Stream where stock may still access the Eastbourne hills there is a fence that must be inspected regularly and maintained.

### **3.3.4 Fire control**

Prevention and control of fire is a major task required to protect the Eastbourne hills. Fire control and prevention is already done to a high standard. Few fires burn more than a few hours due to the expertise of Hutt Valley Bush Fire volunteers and because of the use of helicopters.

Fire through the Eastbourne Forest could set back the natural vegetation succession and may, with the incursion of exotic weed species, result in a new successional trajectory. The time for regeneration after a fire to establish a forest of similar structure and composition is of the order of 400 years (Druce 1961). It is believed there have been localised fires in the Eastbourne hills on numerous occasions in the past (Chris Moray pers. comm.) and that these were probably part of a natural fire history where they were several decades apart.

### **3.3.5 Legal**

Much of the Eastbourne hills are already legally protected. However, buffer areas may be added to that core zone. That addition may be by purchase of adjoining land or through covenant (by agreement with QEII or Department of Conservation). Options for legal protection are described in "*Voluntary protection of nature on private property*" produced by the Department of Conservation, and supported by Local Government New Zealand, Forest Heritage Fund, Nga Whenua Rahui, Federated Farmers of New Zealand (Inc) and the Queen Elizabeth the Second National Trust. In particular strips of privately owned land behind properties extend some way into the bush and are not covenanted. There are mechanisms in the Hutt City District Plan to covenant and protect areas and rules can also be placed on vegetation clearance through the subdivision process.

## **3.4 RESTORATION**

### **3.4.1 Natural regeneration**

Natural regeneration is one of the most effective forms of restoration. Allowing natural succession to take place in the Eastbourne hills will be possible for much of the area. This will require continued vigilance for weed encroachment and fire as both could detrimentally affect the succession process.

### **3.4.2 Additional plantings**

In addition to allowing natural regeneration to run its course some species may be planted in the Eastbourne hills. This may serve a number of functions:

- To speed up the regeneration process (e.g. by attracting native bird species that will disperse native seed into the area);
- To prevent weed establishment in open areas;

- To bolster and enhance existing populations of some species (e.g. *Peraxilla tetrapetala*, *Melicytus* aff. *obovatus* and *Mida salicifolia*).
- To buffer existing vegetation by planting along bush margins.

### 3.4.3 Introductions

The thought of reintroduction of species back to the Eastbourne hills may seem premature. For some species, such as the huia, it is already too late. Other bird species that could be considered in the future include North Island robin, kaka (those seen in the hills are likely to be visitors), native parakeets, weka, kiwi and kokako. Before this will be possible, a high standard of pest control will have to be reached and sustained for a number of years, if not indefinitely. However, there are native plant species that could be considered for translocation and establishment in the near future. A number that could be introduced, or additional plants used to bolster small existing populations, include:

#### *Into forest areas*

*Brachyglottis kirkii* var. *kirkii*, *Dactylanthus taylori* (wood rose), *Ileostylus micranthus*, *Mida salicifolia*, *Peraxilla tetrapetala*

#### *Into coastal areas*

*Coprosma acerosa*, *Pimelea arenaria*, *Tetragonia tetragonioides*

## 3.5 RESEARCH

There exist many opportunities for research in the Eastbourne hills (see also 2.2 Monitoring above). The proximity of the Eastbourne hills to Victoria and Massey Universities makes them an attractive proposition for students. Students at Victoria University of Wellington have already completed a number of studies (e.g., Butler 1950; Moynihan 1975).

Some of the key research themes for the Eastbourne hills include:

#### *Taxonomic*

For example, *Libertia edgariae* in the Eastbourne hills was recently identified as a new taxon. Further taxonomic research may yet be undertaken on other species that occur in the hills, such as *Melicytus* aff. *obovatus*.

#### *Biogeographical*

Determine the distribution of native plant species (particularly the nationally and regionally threatened plant species and key forest dominant species). Use that information in research to explain distribution patterns in the Eastbourne hills.

### ***Ecological***

Determine the ecological requirements of plant and animal species especially those that are dominant components of the community and those that are threatened with local extinction. Determine what species of plant and animal have gone locally extinct that could be safely introduced. To determine the threat posed by native “weeds” to the indigenous plant and animal communities.

### ***Research by management***

Research by management may be a useful way to improve conservation management techniques in the Eastbourne hills while continuing with a conservation programme. This will require monitoring programmes to assess the effectiveness of management and use the results of monitoring in designing future conservation management. This will also involve ensuring that the results of research by management is obtained from other parts of New Zealand where similar work is being undertaken (such as at the Department of Conservation mainland islands). Other examples of this type of research include evaluation of the effectiveness of animal pest and weed control techniques.

## **3.6 PUBLIC AWARENESS AND COMMUNITY INVOLVEMENT**

Maintaining public awareness of the ecological importance of the Eastbourne hills is needed if support for their on-going protection is to be achieved. Public awareness and community involvement may not seem as important as the physical aspects of conservation management. However, many aspects of this work will be vital to maintaining support for animal pest and weed control operations.

Activities may include:

- Regular public meetings to allow people to learn about the biology, ecology and conservation needs and management and to encourage involvement in protection of the area.
- Publication of information about the biological importance of the Eastbourne hills such as a guide to the native plants.
- Establishment of conservation programmes that give opportunities for local people (schools, groups or individuals) to participate in management or research.
- Installation of interpretation boards (e.g., explaining the composition, structure and function of rata forest).

Contact details for many of the key people and agencies involved in conservation management of the Eastbourne hills are provided in Appendix 4.

## 4. Conclusions

The Eastbourne hills are one of the most biologically important areas in the Wellington region and therefore the focus of the MIRO group on the Eastbourne hills is well justified. An integrated conservation management work programme is also justified to protect the significant biological values of the area. Integration of conservation work programmes of the various agencies with interests in the management of the hills will be beneficial in the long term. The future of all indigenous plants and animals of the Eastbourne hills is now largely dependent on the conservation management that can be provided by people.

## 5. Acknowledgements

Questions about the Eastbourne hills by Jan and Arnold Heine and the Bagnall family encouraged me to prepare this report. It is based on a paper about the significance of the Eastbourne Hills that I presented to the East Harbour Environment Association. I also acknowledge other members of MIRO (Mainland Island Restoration Organisation) who have focused conservation management attention on this significant natural area.

Barbara Polly provided the checklist of mosses for Butterfly Creek and Geoff Ridley the list of fungi from East Harbour Regional Park. Pat Enright and Peter Beveridge helped compile the native plant check lists. Colin Ogle, Jeremy Rolfe and Nick Singers provided images of native and exotic plant species.

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Paul Hughes and Jeremy Rolfe prepared the maps used in the report, and Jeremy Rolfe formatted and produced the booklet.

# Appendix 1

## NATIVE PLANT RECORDS FOR EASTBOURNE HILLS

### Vascular plant species

This plant list has been taken from one first prepared by A.P. (Tony) Druce and Tony Silbery in 1993—Species list identified between Eastbourne and Point Howard, including Butterfly Creek and Gollans Valley above their junction. It was first published in 1994 in *Butterfly Creek: A visitors guide to the forests between Eastbourne and Wainuiomata* by the Eastbourne Forest Rangers. Additions have been made from other sources such as herbarium records and plant checklists (see Appendix 3).

The result is a list of 264 native species. The following species have not been included in this list as they were recorded from the Eastbourne coast rather than the hills: *Acaena pallida*, *Einadia allanii*, *Elymus multiflorus*, *Coprosma acerosa*, *Desmoschoenus spiralis* and *Pimelea* aff. *arenaria*.

*Elatostema rugosum* (parataniwha) was recorded by Iris Coulter in 1972 from Wainui ridge to York Bay. It was also recorded from a creek behind York Bay (Tony Silbery pers. comm.) but was considered a garden escape by A.P. Druce. However, if the record is of a naturally occurring population it would be the most southerly record of the species in the country. Similarly *Phyllocladus trichomanoides* (tanekaha) was recorded near York Bay by Tony Silbery but again was considered a garden escape (Tony Silbery pers. comm.).

For information about all of these species, see the website of the New Zealand Plant Conservation Network ([www.nzpcn.org.nz](http://www.nzpcn.org.nz)).

LATIN NAME	COMMON AND/OR MAORI NAME	SOURCE OF RECORD IF NOT DRUCE & SILBERY
<b>Gymnosperm trees and shrubs (5)</b>		
<i>Dacrycarpus dacrydioides</i>	Kahikatea	
<i>Dacrydium cupressinum</i>	Rimu	
<i>Podocarpus totara</i>	Totara	
<i>Prumnopitys taxifolia</i>	Matai	
<i>Stachypitys (Prumnopitys) ferrugineus</i>	Miro	
<b>Monocotyledenous trees and shrubs (3)</b>		
<i>Cordyline australis</i>	Cabbage tree	
<i>Cordyline banksii</i>	Forest cabbage tree	
<i>Rhopalostylis sapida</i>	Nikau	

LATIN NAME	COMMON AND/OR MAORI NAME	SOURCE OF RECORD IF NOT DRUCE & SILBERY
<b>Dicotyledenous trees and shrubs (78)</b>		
<i>Alectryon excelsus</i> var. <i>excelsus</i>	Titoki	
<i>Aristotelia serrata</i>	Wineberry	
<i>Beilschmiedia tawa</i>	Tawa	
<i>Brachyglottis repanda</i>	Rangiora	
<i>Brachyglottis kirkii</i> var. <i>kirkii</i>	Kirk's tree daisy	
<i>Carmichaelia australis</i>	Native broom	
<i>Carpodetus serratus</i>	Putaputaweta	
<i>Coprosma areolata</i>	Thin-leaved coprosma	
<i>Coprosma colensoi</i>		Enright & John 1998
<i>Coprosma foetidissima</i>	Stinkwood	
<i>Coprosma grandifolia</i>	Large leaved coprosma	
<i>Coprosma lucida</i>	Shining karamu	
<i>Coprosma microcarpa</i>	Small-seeded coprosma	
<i>Coprosma repens</i>	Taupata	
<i>Coprosma rhamnoides</i>		
<i>Coprosma rigida</i>		Enright & John 1998
<i>Coprosma robusta</i>	Karamu	
<i>Coprosma rotundifolia</i>	Round-leaved coprosma	
<i>Coprosma tenuicaulis</i>	Swamp coprosma	
<i>Coprosma taylorae</i>		
<i>Coriaria arborea</i>	Tutu	
<i>Corynocarpus laevigatus</i>	Karaka	
<i>Cyatbodes juniperina</i>	Mingimingi	
<i>Dodoneaea viscosa</i>	Akeake	Enright & John 1998
<i>Dracophyllum longifolium</i>	Turpentine shrub, grass tree, Inaka	
<i>Dysoxylum spectabile</i>	Kohekohe	
<i>Eleaocarpus dentatus</i>	Hinau	
<i>Elaeocarpus bookerianus</i>	Pokaka	
<i>Fuchsia exorticata</i>	Tree fuchsia	
<i>Gaultheria antipoda</i>	Snowberry	
<i>Geniostoma rupestre</i> var. <i>ligustrifolium</i>	Hangehange	
<i>Griselinia lucida</i>	Braodleaf, Puka	
<i>Hebe stricta</i> var. <i>atkinsonii</i>	Koromiko	
<i>Hedycarya arborea</i>	Pigeonwood, Porokaiwhiri	

LATIN NAME	COMMON AND/OR MAORI NAME	SOURCE OF RECORD IF NOT DRUCE & SILBERY
<i>Helicbrysum aggregatum</i>		Enright & John 1998
<i>Knighitia excelsa</i>	Rewarewa	
<i>Kunzea ericoides</i>	Kanuka	
<i>Laurelia novae-zelandiae</i>	Pukatea	
<i>Leptospermum sccoparium</i>	Manuka	
<i>Leucopogon fasciculatus</i>	Patotara	
<i>Lophomyrtus bullata</i>	Ramarama	
<i>Lophomyrtus obcordata</i>	New Zealand myrtle, rohutu	Clelland 1984; Wellington Botanical Society 1973 and 1984
<i>Macropiper excelsus</i> var <i>excelsum</i>	Kawakawa	
<i>Melicope simplex</i> × <i>ternata</i>		Enright & John 1998
<i>Melicope ternata</i>	Wharangi	Enright & John 1998
<i>Melicytus</i> aff. <i>obovatus</i>		Druce, A.P.
<i>Melicytus micranthus</i>	Swamp mahoe	Clelland 1984
<i>Melicytus ramiflorus</i>	Mahoe	
<i>Metrosideros robusta</i>	Northern rata	
<i>M. robusta</i> × <i>M. excelsa</i>	Rata x Pohutakawa hybrid	
<i>Mida salicifolia</i>	Willow leaved maire	Mead, A. 1974, Spearpoint, O. 2002
<i>Myoporum laetum</i> var <i>laetum</i>	Ngaio	
<i>Myrsine australis</i>	Red matipo, Mapou	
<i>Myrsine salicina</i>	Toro	
<i>Nestegis cunninghamii</i>	Black maire	
<i>Nestegis lanceolata</i>	White maire	
<i>Nestegis montana</i>	Narrow leafed maire	
<i>Notofagus solandri</i> var. <i>solandri</i>	Black beech	
<i>Notofagus truncata</i>	Hard beech	
<i>Olearia arborescens</i>	Common tree daisy, Glossy tree daisy	Enright & John 1998
<i>Olearia paniculata</i>	Golden akeake, Akiraho	
<i>Olearia rani</i>	Heketara	
<i>Ozobamnus leptophylla</i>	Tauhinu	
<i>Pennantia corymbosa</i>	Kaikomako	
<i>Peraxilla tetrapetala</i>	Red mistletoe	
<i>Pittosporum divaricatum</i>		

LATIN NAME	COMMON AND/OR MAORI NAME	SOURCE OF RECORD IF NOT DRUCE & SILBERY
<i>Pittosporum eugenoides</i>	Lemonwood, Tarata	
<i>Pittosporum tenuifolium</i>	Black matipo, kohuhu	
<i>Pseudopanax arboreus</i>	Fivefinger, Whauwhaupaku	
<i>Pseudopanax crassifolius</i>	Lancewood, Horoeka	
<i>Pseudowintera axillaris</i>	Pepper tree, Horopito	
<i>Schefflera digitata</i>	Seven finger, pate	
<i>Solanum laciniatum</i>	Bullbul, Poroporo	
<i>Sophora microphylla</i>	Kowhai	Clelland 1984; Enright & John 1998
<i>Streblus heterophyllus</i>	Milk tree	
<i>Streblus banksii</i>	Large leaved milk tree	Horne, C.J. 1996
<i>Syzygium maire</i>	Swamp maire, maire tawake	
<i>Weinmannia racemosa</i>	Kamahi	
<b>Monocotyledonous lianes (2)</b>		
<i>Freycinetia banksii</i>	Kiekie	
<i>Ripogonum scandens</i>	Supplejack	
<b>Dicotyledonous lianes (11)</b>		
<i>Clematis forsteri</i>	Forster's clematis	
<i>Clematis paniculata</i>	Bush clematis, Puawhananga	
<i>Metrosideros colensoi</i>	Climbing rata, Akatea	
<i>Metrosideros diffusa</i>	White climbing rata	
<i>Metrosideros fulgens</i>	Winter rata	
<i>Metrosideros perforata</i>	Climbing rata	
<i>Muehlenbeckia australis</i>	Muehlenbeckia, Pohue	
<i>Parsonsia heterophylla</i>	Native jasmine, Akakiore	
<i>Passiflora tetrandra</i>	New Zealand passion vine, Kohia	
<i>Rubus australis</i>	Swamp lawyer, Tataramoa	
<i>Rubus cissoides</i> var.	Bush lawyer, Tataramoa	
<b>Psilopsids and Lycopods (5)</b>		
<i>Lycopodium varium</i>	Lycopodium, clubmoss	
<i>Lycopodium volubile</i>	Lycopodium, Climbing club moss	
<i>Tmesipteris elongata</i>	Chain fern, Fork fern	Enright & John 1998
<i>Tmesipteris tannensis</i>	Chain fern, Fork fern	

LATIN NAME	COMMON AND/OR MAORI NAME	SOURCE OF RECORD IF NOT DRUCE & SILBERY
<b>Ferns (62)</b>		
<i>Adiantum cunninghamii</i>	Maidenhair	
<i>Adiantum diapbanum</i>	Small maidenhair	Brownsey, P. 1986
<i>Anarthropteris lanceolata</i>	Lance fern	Brownsey, P.
<i>Asplenium bulbiferum</i>	Hen and chicken fern	
<i>Asplenium flabellifolium</i>	Necklace fern	
<i>Asplenium bulbiferum</i> × <i>A. flaccidum</i>		Enright & John 1998
<i>Asplenium flaccidum</i>	Hanging spleenwort	
<i>Asplenium gracillimum</i>		Enright & John 1998
<i>Asplenium bookerianum</i>	Hooker's spleenwort, Perching spleenwort	Brownsey, P.
<i>Asplenium oblongifolium</i>	Shining spleenwort	
<i>Asplenium polyodon</i>	Sickle spleenwort	
<i>Blechnum novaezelandiae</i>		
<i>Blechnum chambersii</i>	Rereti	
<i>Blechnum discolor</i>	Crown fern, Piupiu	
<i>Blechnum filiforme</i>	Thread fern, Panako	
<i>Blechnum fluviatile</i>	Kiwikiwi	
<i>Blechnum membranaceum</i>		
<i>Blechnum minus</i>	Swamp kiokio	
<i>Blechnum procerum</i>	Small kiokio	
<i>Blechnum vulcanicum</i>	Korokio	
<i>Botrychium australe</i>	Parsley fern	
<i>Botrychium biforme</i>	Fine-leaved parsley fern	Chinnock 1969
<i>Ctenopteris heterophylla</i>	Comb fern	
<i>Cyathea dealbata</i>	Silver fern, Ponga	
<i>Cyathea medullaris</i>	Black tree fern, Mamaku	
<i>Dicksonia squarrosa</i>	Wheki	
<i>Grammitis billarderi</i>		
<i>Grammitis ciliata</i>		
<i>Histiopsis incisa</i>	Water fern	
<i>Hymenophyllum bivalve</i>	Filmy fern, Mauku	Brownsey, P.
<i>Hymenophyllum demissum</i>	Drooping filmy fern, Mauku, Piripiri, Irirangi	
<i>Hymenophyllum dilatatum</i>	Filmy fern, Mauku	
<i>Hymenophyllum flabellatum</i>	Fan-like filmy fern, Mauku	
<i>Hymenophyllum flexuosum</i>	Filmy fern, Mauku	

LATIN NAME	COMMON AND/OR MAORI NAME	SOURCE OF RECORD IF NOT DRUCE & SILBERY
<i>Hymenophyllum multifidum</i>	Much-divided filmy fern, Mauku	
<i>Hymenophyllum rarum</i>	Filmy fern, Mauku	
<i>Hymenophyllum revolutum</i>	Filmy fern, Mauku	Brownsey, P.
<i>Hymenophyllum sanguinolentum</i>	Filmy fern, Mauku	
<i>Hymenophyllum scabrum</i>	Rough filmy fern, Mauku	Brownsey, P.
<i>Hypolepis ambigua</i>		Brownsey, P.
<i>Hypolepis dicksonioides</i>	Giant hypolepis	
<i>Hypolepis lactea</i>		Brownsey, P.
<i>Hypolepis rufobarbata</i>	Stcky pig fern	Brownsey, P.
<i>Lastreopsis glabella</i>	Smooth shield fern	
<i>Lastreopsis bispida</i>	Hairy fern	
<i>Lastreopsis velutina</i>	Velvet fern	
<i>Leptopteris hymenophylloides</i>	Crepe fern	
<i>Lindsaea linearis</i>		
<i>Lindsaea trichomanoides</i>		
<i>Paesia scaberula</i>	Fragrant fern, Mata	
<i>Pellaea rotundifolia</i>	New Zealand cliff brake, Round-leaved fern	
<i>Phymatosorus pustulatus</i>	Hound's tongue	
<i>Phymatosorus scandens</i>	Fragrant fern	
<i>Pneumatopteris pennigera</i>	Pakau	
<i>Polystichum richardii</i>	Prickly shield fern, Pikopiko	
<i>Pteridium esculentum</i>	Bracken, Rarahu	
<i>Pteris macilenta</i>	Sweet fern	Brownsey, P.
<i>Pyrrosia eleagnifolia</i>	Leather leaf fern	
<i>Rumobra adiantiformis</i>	Leathery shield fern	Brownsey, P.
<i>Schizaea bifida</i>	Forked comb fern	Moss, T. 1966
<i>Trichomanes reniforme</i>	Kidney fern, Raurenga	
<i>Trichomanes venosum</i>	Veined bristle fern, veined filmy fern	
<b>Monocotyledenous herbs (Orchids) (33)</b>		
<i>Acianthus sinclairii</i>		
<i>Adelopetalum (Bulbophyllum) tuberculatum</i>	Bulb leaf orchid	

LATIN NAME	COMMON AND/OR MAORI NAME	SOURCE OF RECORD IF NOT DRUCE & SILBERY
<i>Caladenia alata</i>	Pink fingers, pink orchid	
<i>Caladenia lyalli</i>	White fingers, white orchid	Smith, G. 1974
<i>Corunostylis nuda</i>		
<i>Corybas cheesmanii</i>	Spider orchid	
<i>Cyrtostylis reniformis</i>	Gnat orchid	
<i>Drymoanbus adversus</i>		
<i>Drymoanbus flavus</i>		
<i>Earina autumnalis</i>	Easter orchid	
<i>Earina mucronata</i>	Spring orchid, Peka a waka	
<i>Gastrodia cunninghamii</i>		Enright & John 1998
<i>Gastrodia minor</i>		Enright & John 1998
<i>Ichthyostomum</i> ( <i>Bulbophyllum</i> ) <i>pygmaeum</i>	Piripiri	
<i>Linguella (Pterosylis)</i> <i>puberula</i>	Greenhood orchid, Tutukiwi	
<i>Microtis unifolia</i>	Onion leaf orchid	
<i>Nematoceras (Corybas)</i> <i>macrantha</i>	Spider orchid	
<i>Nematoceras (Corybas)</i> <i>triloba</i>	Spider orchid	
<i>Petalochilus (Caladenia)</i> <i>chlorostylus</i>		Enright & John 1998
<i>Petalochilus (Caladenia)</i> <i>minor</i>		Kelly 1965
<i>Plumatochilus tasmanica</i>	Greenhood orchid, Tutukiwi	
<i>Pterostylis alobula</i>	Greenhood orchid, Tutukiwi	
<i>Pterostylis banksii</i>	Greenhood orchid, Tutukiwi	
<i>Pterostylis cardiostigma</i>	Greenhood orchid, Tutukiwi	
<i>Pterostylis graminea</i>	Greenhood orchid, Tutukiwi	
<i>Pterostylis montana</i> "Wellington"	Greenhood orchid, Tutukiwi	
<i>Pterostylis trullifolia</i>	Greenhood orchid, Tutukiwi	
<i>Simpliglottis (Cbiloglottis)</i> <i>cornuta</i>	Green bird orchid	

LATIN NAME	COMMON AND/OR MAORI NAME	SOURCE OF RECORD IF NOT DRUCE & SILBERY
<i>Singularybas (Corybas) oblongus</i>	Spider orchid	
<i>Tbelymitra nervosa</i>	Sun orchid, Maikuku	
<i>Tbelymitra longifolia</i>	Sun orchid, Maikuku	
<i>Tbelymitra pauciflora</i>	Sun orchid, Maikuku	
<i>Winika cunninghamii</i>	Ladies slipper	
<b>Grasses (8)</b>		
<i>Cortaderia fulvida</i>	Toetoe	
<i>Cortaderia toetoe</i>	Toetoe	Enright & John 1998
<i>Dichelachne crinata</i>		
<i>Echinopogon ovatus</i>		Enright & John 1998
<i>Microlaena avenacea</i>	Bush rice grass	
<i>Poa anceps ssp. anceps</i>		
<i>Rytidosperma gracile</i>		
<i>Rytidosperma unarede</i>		
<b>Sedges (15)</b>		
<i>Carex diandra</i>		
<i>Carex dissita</i>		
<i>Carex forsteri</i>		
<i>Carex lambertiana</i>		
<i>Carex solandri</i>		
<i>Carex virgata</i>		
<i>Gabnia pauciflora</i>	Cutty grass	
<i>Gabnia setifolia</i>	Cutty grass	
<i>Lepidosperma australe</i>		
<i>Morelotia affinis</i>		
<i>Uncinia angustifolia</i>	Hook sedge, Matau	
<i>Uncinia banksii</i>	Hook sedge, Matau	
<i>Uncinia rupestris</i>	Hook sedge, Matau	
<i>Uncinia scabra</i>	Hook sedge, Matau	
<i>Uncinia uncinata</i>	Hook sedge, Matau	
<b>Rushes and allied plants (4)</b>		
<i>Juncus planifolius</i>		
<i>Luzula banksiana</i>		
<i>Luzula picta</i>		
<i>Luzula subclavata</i>		

LATIN NAME	COMMON AND/OR MAORI NAME	SOURCE OF RECORD IF NOT DRUCE & SILBERY
<b>Monocotyledonous herbs, other than orchids, grasses, sedges, rushes and allied plants (10)</b>		
<i>Artropodium cirratum</i>	Renga lily, Rengarenga	
<i>Astelia fragrans</i>		
<i>Astelia solandri</i>	Perching astelia	
<i>Collospermum bastatum</i>	Collospermum	
<i>Collospermum microspermum</i>		
<i>Dianella nigra</i>	Blue berry, Piopio	
<i>Libertia edgariae</i>		Enright & John 1998
<i>Libertia ixiooides</i>	Native iris, Mikoikoi	
<i>Pbormium cookianum</i>	Flax	
<i>Pbormium tenax</i>	Flax	Enright & John 1998
<b>Dicotyledonous herbs, Composites (8)</b>		
<i>Gnaphalium audax</i>	Cudweed	
<i>Gnaphalium involucratum</i>		
<i>Helicbrysum filicaule</i>		
<i>Lagenifera pumila</i>		
<i>Raoulia tenuicaulis</i>	Mat daisy, Tutahuna	
<i>Senecio glomeratus</i>	Woolly fireweed	
<i>Senecio bispidulus</i>		
<i>Senecio minimus</i>		
<b>Dicotyledonous herbs, other than composites (20)</b>		
<i>Acaena anserinifolia</i>	Bidibidi, Piripiri	
<i>Cardamine</i> sp. ( <i>C. debilis</i> agg.) ("Glossy Leaf" of Pritchard 1957)		
<i>Cardamine</i> sp. ( <i>C. debilis</i> agg.) ("Long Style" of Pritchard 1957)		
<i>Drosera peltata</i> subsp. <i>auriculata</i>	Sundew, Wahu	
<i>Epilobium alsinoides</i>	Willow herb	
<i>Epilobium nummularifolium</i>	Willow herb	
<i>Epilobium pubens</i>	Willow herb	
<i>Epilobium rotundifolium</i>	Willow herb	
<i>Geranium microphyllum</i>	Geranium	
<i>Gonocarpus incanus</i>		
<i>Gonocarpus micranthus</i>		
<i>Haloragis erecta</i> subsp. <i>erecta</i>		

LATIN NAME	COMMON AND/OR MAORI NAME	SOURCE OF RECORD IF NOT DRUCE & SILBERY
<i>Hydrocotyle moschata</i>		
<i>Hydrocotyle pterocarpa</i>		Moss, T.
<i>Linum monogynum</i> var. <i>monogynum</i>	True flax	
<i>Pelargonium inodurum</i>		
<i>Ranunculus macropus</i>		Clelland 1984
<i>Ranunculus reflexus</i>	Bush buttercup	
<i>Wahlenbergia colensoi</i>	New Zealand harebell and bluebell	
<i>Wahlenbergia gracilis</i>	New Zealand harebell and bluebell	

### Moss species list (for Butterfly Creek area only)

This list was originally prepared by M.J. Butler (Butler 1950). It was subsequently revised by Barbara Polly but has never been published.

+ observed 2.5.1992

\* specimen in WELT

- Acrocladium chlamydophyllum*
- \* *Acrophyllum dentatum*
- + *Acrophyllum quadrifarium*
- + *Breutelia pendula*
- + *Bryum billardieri*
- + *Calomnion complanatum*
- Calyptrochaeta brownii*
- + *Calyptrochaeta cristata*
- + *Camptochaete arbuscula*
- Camptochaete ramulosa*
- + *Campylopus clavatus*
- + *Campylopus introflexus*
- + *Catagonium politum*
- + *Cerarodon purpureus*
- + *Cladomnion ericoides*
- + *Cratoneuroopsis relaxa*
- Cyathophorum bulbosum*
- Cyrtopus setosus*
- \* *Dichelodontium nitidum*
- + *Dicnemon calycinum*
- + *Dicranoloma billardieri*
- \* *Dicranoloma dicarpum*
- Dicranoloma menziesii*
- + *Dicranoloma plurisetum*
- \* *Dicranoloma robustum*
- \* *Ditrichum cylindrocarpum*

- + *Ditrichum flexicaule*
- Echinodium hispidum*
- \* *Fissidens asplenioides*
- Fissidens letocladus*
- Fissidens oblongifolius*
- + *Fissidens rigidulus*
- Funaria hygrometrica*
- + *Glyphothectium sciuroides*
- Homalia pulchella*
- + *Hymenodon pilifer*
- \* *Hypnodendron arcuatum*
- + *Hypnodendron kerrii*
- Hypnodendron marginatum*
- Hypnum cupressiforme*
- + *Hypnum cupressiforme* var. *chrysogaster*
- Hypopterygium commutatum*
- Hypopterygium filisulaeforme*
- + *Hypopterygium rotulatum*
- Lembophyllum divulsum*
- + *Leptodon smithii*
- Leptostomum inclinans*
- Leptostomum macrocarpum*
- Leptotheca gaudichaudii*
- + *Leucobryum candidum*
- + *Lopidium concinnum*
- + *Macreomitrium gracile*
- \* *Macromitrium longipes*
- \* *Macromitrium prorepens*
- Macromitrium pusillum*
- \* *Neckera laevigata*
- + *Neckera pennata*
- + *Orthorrhynchium elegans*
- + *Papillaria crocea*
- Philonotis tenuis*
- \* *Plagiomnium novae-zelandiae*
- \* *Pogonatum subulatum*
- + *Ptychomnion aciculare*
- \* *Racopilum convolutaceum*
- + *Rhizogonium bifarium*
- Rhizogonium distichum*
- Rhynchostegium laxatum*
- + *Rhynchostegium tenuifolium*
- Sauloma tenella*
- + *Sematophyllum amoenum*
- Sematophyllum contiguum*
- Stokesiella praelonga*
- Tayloria calophylla*
- + *Thamnobryum pandum*
- + *Thuidium furfurosum*
- + *Thuidium laeviusculum*

- \* *Thuidium sparsum*
- Tortella knightii*
- \* *Trachyloma diversinerve*
- Trachyloma planifolium*
- Triquetrella papillata*
- \* *Weissia controversa*
- + *Weymouthia cochlearifolia*
- Weymouthia mollis*
- + *Wijkia extenuata*
- \* *Zygodon intermedius*

### **Fungal species list for East Harbour Regional Park**

This list has been taken from a list compiled from various sources by G.S. Ridley in 1997 for the East Harbour Regional Park and published in the Australian Mycological Newsletter, No. 16(4) in 1997. Acronyms used are PDD = Herbarium, Landcare Research, Mount Albert, Auckland; K = Royal Botanic Gardens, Kew; NZFRI(M) = Mycological Herbarium, New Zealand Forest Research Institute, Rotorua.

*Agaricus* sp. (PDD)

*Aemillaria* "mellea" (PDD)

*Armillaria novae-zelandiae* (K, type locality)

*Camarophyllus muritaensis* (= *Hygrophorus muritaensis*, K, type locality)

*Collybia rimutaka* (K)

*Coprinus disseminatus* (PDD)

*Cortinarius* "cinnamomeus" (PDD)

*Cortinarius* "sanguineus" (PDD)

*Cystoderma clastotrichum* (K)

*Entoloma convexum* (K, type locality)

*Hohenbeuhelia podocarpinea* (K, type locality)

*Hydropus ardestiacus* (K, type locality)

*Hygrocybe procera* (= *Hygrophorus procera* & *H. miniceps*, K, type locality of latter)

*Kuebneromyces* sp. (PDD)

*Laccaria* "laccata" (PDD)

*Laccaria lilacina* (K)

*Laccaria* sp. (PDD)

*Lactarius umerensis* (PDD)

*Marasmius atrocastaneus* (K, type locality)

*Marasmius croceus* (K, type locality)

*Marasmius curranii* (K, type locality)

*Marasmius* sp. (PDD)

*Mucilopilus nothofagi* as *Porphyrellus nothofagi* (PDD)

*Mycena flavovirens* (= *Mycena multicolorata*, K, type locality)

*Mycena* sp. (PDD)

*Naematoloma* sp. (PDD)

*Omphalina foetida* (K, type locality)

*Phaeomyccena fusca* (K, type locality)

*Pleurotus australis* (K) as *Pleurotus ostreatus*

*Pleurotus purpureo-olivaceus* (K, type locality)

*Porpoloma amyloideum* (K, type locality)  
*Russula subvinosa* (PDD)  
*Tbaxterogaster porphyreum* (PDD, type locality)  
*Tricholoma testaceum* (K, type locality)  
*Tricholoma viridi-olivaceum* (K, type locality)  
*Tylopilus brunneus* as *Porphyrellus brunneus* (PDD)  
*Xeromphalina leonina* (= *Xeromphalina racemosa* K, type locality)  
*Acanthophysium berggreni* (PDD)  
*Acanthophysium coralloides* (PDD)  
*Aleurodiscus ochraceo-flavus* (PDD, type locality)  
*Aleurodiscus peziculoides* (PDD, type locality)  
*Asterostroma persimile* (PDD)  
*Australoporus tasmanicus* (PDD)  
*Calostoma rodwayi* (PDD)  
*Coltricia dependens* (PDD)  
*Coltricia laeta* (PDD)  
*Coltricia salpincta* (PDD)  
*Cyathus bookeri* (PDD)  
*Cyathus novae-zelandiae* (PDD)  
*Cyclomyces tabacinus* (PDD)  
*Echinochaeta russiceps* (PDD)  
*Favolaschia pezizaeformis* (PDD)  
*Fomitopsis hemiterphra* (PDD)  
*Ganoderma* sp. (PDD) as *Elfvigia australis*  
*Ganoderma* sp. (PDD) as *Elfvigia mastopora*  
*Hericium coralloides* (PDD)  
*Hydnum crocidens* var. *wellingtonii* (PDD, type locality)  
*Hymenochaete tabacina* (PDD)  
*Hymenogaster viscidus* (PDD)  
*Inonotus nothofagi* (PDD, type locality)  
*Lycoperdon compactum* (PDD, type locality)  
*Lycoperdon pyriforme* (PDD)  
*Meruliopsis taxicola* (PDD)  
*Merulius ministus* (PDD, type locality)  
*Octavianina tasmanica* (PDD)  
*Pbellinus gilvus* (PDD)  
*Pbellinus robusta* (PDD)  
*Pbellinus setulosa* (PDD)  
*Piptoporus portentosus*\* (NZFRI(M))  
*Poria alutacea* (PDD)  
*Poria curreyana* (PDD)  
*Poria rata* (PDD)  
*Poria tarda* (PDD)  
*Poria versipora* (PDD)  
*Puccinia euphrasiana* (PDD, type locality)  
*Puccinia heketara* (PDD, type locality)  
*Punctularia strigosozonata* as *Stereum strigosozonata* (PDD)  
*Stereum hirsutum* (PDD)  
*Stereum vellereum* (PDD)  
*Trichaptum rhinocephalum* (PDD)

*Tyromyces chioneus* = *Leptoporus coriolus*? (PDD)  
*Tyromyces guttulatus* (PDD)  
*Tyromyces merulinus* (PDD)  
*Tyromyces mollis* (PDD)  
*Tyromyces oviformis* (PDD)  
*Tyromyces setiger* (PDD)  
*Wrightoporia novae-zelandiae* (PDD, type locality)  
*Bisporella citrina* (PDD)  
*Bisporella discedens* (PDD)  
*Botryosphaeria macrolopha* (PDD, type locality)  
*Helotium citrinum* (PDD)  
*Hypocrea ascoboloides* (PDD)  
*Hypoxyton bovei* (PDD)  
*Hypoxyton diatrypeoides* (PDD)  
*Hypoxyton howeianum* (PDD)  
*Hypoxyton marginatum* (PDD?)  
*Hypoxyton nummularium* (PDD)  
*Hypoxyton subrutiloides* (PDD)  
*Microcera orthospora* (PDD, type locality)  
*Nectria cyathea* (PDD)  
*Nectria macrostoma* (PDD)  
*Nectria vilior* (PDD)  
*Peziza repanda* (PDD)  
*Phomopsis cunninghamii* (PDD, type locality)  
*Physalospora euganea* (PDD?)  
*Plectania rhytidia* (PDD)  
*Rosellinia subiculata* (PDD)  
*Scoleciasis atkinsonii* (PDD, type locality)

# Appendix 2

## WEEDS OF THE EASTBOURNE HILLS

This list does not include all exotic and adventive species that occur in the Eastbourne hills. It focuses on species that are the greatest threat to the structure, function and composition of the indigenous plant communities that occur there. Additional weed records may be sent to the Wellington Regional Council (P.O. Box 11-646) or the Department of Conservation (P.O. Box 5086, Wellington).

LATIN NAME	COMMON NAME	WEED STATUS IN EASTBOURNE	PRIORITY FOR CONTROL AND/OR ERADICATION
<i>Agrostis capillaris</i>	Browntop		
<i>Asparagus scandens</i>	Climbing asparagus	Aggressive invader of forest and shrublands	High
<i>Berberis glaucocarpa</i>	Berberberry		High
<i>Buddleja davidii</i>	Buddleia		Medium
<i>Chrysanthemoides montifera</i>	Boneseed	Invading open areas	High
<i>Cirsium arvense</i>	Californian thistle		Low
<i>Cirsium vulgare</i>	Scotch thistle		Low
<i>Clematis vitalba</i>	Old man's beard		High
<i>Cortaderia jubata</i>	Pampas	Still common on the bush edge.	Medium
<i>Cytisus scoparius</i>	Broom	Not considered a serious threat to native plant and animal communities	Low
<i>Elaeagnus ×reflexa</i>	Elaeagnus	Significant weed in a number of places, especially Muritai Park	High
<i>Erica lusitanica</i>	Spanish heath		Medium
<i>Festuca arundinacea</i>	Tall fescue		Low
<i>Ipomoea indica</i>	Blue morning glory		High
<i>Leycesteria formosa</i>	Himalayan honeysuckle		Low
<i>Meliantbus major</i>	Cape honey flower	Found at the bush edge and in shrublands	Low
<i>Passiflora caerulea</i>	Blue passion flower		High
<i>Passiflora mollissima</i>	Banana passionfruit		High
<i>Pinus sp.</i>	Pine		Medium
<i>Polygala myrtifolia</i>	Sweet pea shrub		High
<i>Rubus fruticosus agg.</i>	Blackberry		Low
<i>Senecio angulatus</i>	German ivy		High
<i>Senecio mikanioides</i>	Cape ivy		Medium
<i>Senecio petastis</i>			Low

LATIN NAME	COMMON NAME	WEED STATUS IN EASTBOURNE	PRIORITY FOR CONTROL AND/OR ERADICATION
<i>Tradescantia fluminensis</i>	Wandering willie	Present in bush edges and gardens and in gulleys in lower part of the forest	High
<i>Ulex europeaus</i>	Gorse	Not considered a serious threat to native plant and animal communities	Low

There are some weed species not currently present in the Eastbourne hills but that could prove destructive should they arrive. A surveillance programme to regularly inspect the Eastbourne hills for these species will be a valuable task. They include species such as smilax (*Asparagus asparagoides*), brush cherry (*Syzygium paniculatum*), and evergreen buckthorn (*Rhamnus alaternus*). For information about other weed species that could pose a threat should they arrive in the Eastbourne Hills see the Department of Conservation factsheets: “*Have you seen these plants in Wellington Conservancy*” and “*Have you seen these aquatic plants in Wellington*” and also information stored on the website of the New Zealand Plant Conservation Network ([www.nzpcn.org.nz](http://www.nzpcn.org.nz)).

# Appendix 3

## PLANT CHECKLISTS FOR AREAS IN THE EASTBOURNE HILLS

The following are plant checklists that have been prepared for areas in the Eastbourne hills. They are divided into three groups: Butterfly Creek; Eastbourne hills (excluding Butterfly Creek); and Lowry Bay. The list includes vascular and non-vascular plant checklists—the latter are denoted with an asterisk. This information has been taken from *Bibliography of plant checklists and vegetation survey data sets for areas in Wellington Conservancy* (Sawyer 2001).

### 1. Butterfly Creek

Anonymous. No date: Locally threatened or rare plant species from Butterfly Creek area (listed on the Wellington Botanical Society card file). Unpublished list.

Brownsey, P. No date: Ferns of Butterfly Creek. Unpublished list held by the Department of Conservation.

Mead, A. 1974: Butterfly Creek. Native Plants in Bush Blocks around Wellington. Unpublished list held by the Department of Conservation.

Ogle, C.C. 1969: Butterfly Creek Track (Eastbourne to Butterfly Creek). Unpublished list held by the Department of Conservation.

\*Polly, B. No date: Mosses of Butterfly Creek. Unpublished list held by the Department of Conservation.

Wellington Botanical Society. 1984: Gollans Valley to Butterfly Creek (from NZMS 260 R27 G.R. 689 865 for circa 0.5 km up each valley). Unpublished list held by the Department of Conservation.

Wellington Botanical Society. 1973: Muritai Park to Butterfly Creek. Unpublished list held by the Department of Conservation.

### 2. Eastbourne hills (excluding Butterfly Creek)

Anonymous. 1994: Gibbs Covenant : Management Statement. (Eastbourne). Unpublished list held by the Department of Conservation.

Clelland, D. 1984: Mount Hawtrey Bush. Unprotected Natural Areas of the Wellington Region: A survey of eleven areas of biological significance. Unpublished report prepared for the Wellington District Offices Dept. Lands & Survey.

Coulter, I.E. 1972: Wainui Ridge to York Bay. Unpublished list held by the Department of Conservation.

Druce, A.P.; Silbery, T. 1993: Species list identified between Eastbourne and Point Howard, including Butterfly Creek and Gollans Valley above their junction. Butterfly Creek: A visitors guide to the forests between Eastbourne and Wainuiomata. Eastbourne Forest Rangers publication.

- Enright, P.; John, O. 1998: Gibbs Covenant (Eastbourne). Unpublished plant checklist held by the Department of Conservation.
- Mead, A. 1974: Eastbourne-Wainuiomata. Native Plants in Bush Blocks around Wellington. Unpublished list held by the Department of Conservation.
- Queen Elizabeth II National Trust. 1994: Gibbs Covenant: Management Statement. (Eastbourne). Unpublished list held by the Department of Conservation.
- \*Ridley, G.S. (compiler). 1997: Fungal species list: East Harbour Regional Park. Unpublished list of fungi compiled from various sources.
- Royal Forest & Bird Protection Society. 1974: Botanical species of part of Muritai Park. Unpublished list held by the Department of Conservation.
- Workers Education Association. 1987: Native vascular species—Days Bay to York Bay via the ridge. Unpublished list held by the Department of Conservation.
- Workers Education Association. 1973: Wainui Ridge to York Bay. Unpublished list held by the Department of Conservation.

### **3. Lowry Bay**

- Kelly, G.C. 1965: The vegetation of Lowry Bay. Unpublished MSc thesis at Victoria University of Wellington.
- Wassilieff, M.C.; Clark, D.J. 1986: Lowry Bay Scenic reserve and adjacent unnamed Reserves. Scenic Reserves of the Lower North Island. Biological Survey of Reserves No. 14. Department of Lands and Survey, Wellington.

# Appendix 4

## KEY CONTACTS

### **Hutt City Council**

P.O. Box 31 912  
Lower Hutt  
Tel: 04 570 6701  
Fax: 04 569 2976

### **Department of Conservation**

#### *Wellington Conservancy*

P.O. Box 5086  
Wellington  
Tel: 04 472 5821  
Fax: 04 499 0077  
[www.doc.govt.nz](http://www.doc.govt.nz)

#### *Poneke Area*

P.O. Box 5086  
Wellington  
Tel: 04 472 5821  
Fax: 04 499 0077  
[www.doc.govt.nz](http://www.doc.govt.nz)

### **Wellington Regional Council**

P.O. Box 11-646  
Wellington  
Tel: 04 384 5708  
Fax: 04 385 6960  
[www.gw.govt.nz](http://www.gw.govt.nz)

### **MIRO**

c/- Gail Abel  
197 Muritai Road  
Eastbourne  
Tel: 04 562 7023

### **East Harbour Environment Association**

c/- Roger Lawrence  
15 Main Drive  
Point Howard

Lower Hutt  
Tel: 04 568 5118

**Eastbourne Forest Rangers**

c/- Ray Smith  
3 Karaka Street  
Eastbourne  
Tel: 04 562 8587

**Wellington Botanical Society**

P.O. Box 10-412  
Wellington  
<http://wellingtonbotsoc.wellington.net.nz/>

**New Zealand Plant Conservation Network**

P.O. Box 16-102  
Wellington  
<http://www.nzpcn.org.nz/>

# Appendix 5

## PHOTOGRAPHS OF SOME NATIVE PLANTS OF THE EASTBOURNE HILLS

Left: *Adelopetalum*  
(*Bulbophyllum*)  
*tuberculatum*.

Photo: Andrew Townsend.

Right: *Botrychium australe*  
(Parsley fern). Photo: John  
Smith-Dodsworth.



Left: *Brachyglottis kirkii*  
(Kirk's tree daisy).

Photo: Andrew Townsend.

Right: *Desmoschoenus*  
*spiralis* (pingao).

Photo: John Sawyer.



Left: *Drymoantbus flavus*.  
Photo: Ian St. George.

Right: *Hypolepis*  
*dicksonioides* (giant  
hypolepis). Photo: John  
Smith-Dodsworth.



Left: *Linguella* (*Pterostylis*)  
*puberula*.  
Photo: Gillian Crowcroft.

Right, above: *Melicytus* aff.  
*obovatus*.  
Photo: Jeremy Rolfe.

Right, below: *Metrosideros*  
*robusta* (northern rata).  
Photo: John Braggins.



Left: *Mida salicifolia*  
(willow leaved maire).

Photo: John  
Smith-Dodsworth.

Right: *Peraxilla tetrapetala*  
(red mistletoe). Photo: John  
Smith-Dodsworth.



Left: *Pimelea* aff. *arenaria*  
(sand daphne).

Photo: Colin Ogle.

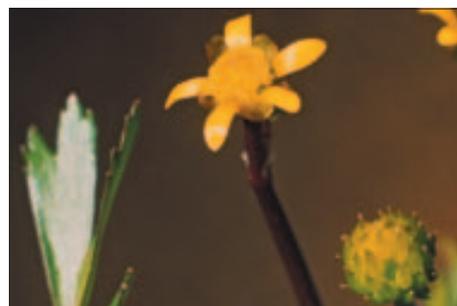
Right: *Plumatocbilus*  
(*Pterostylis*) *tasmanica*.  
Photo: Andrew Townsend.



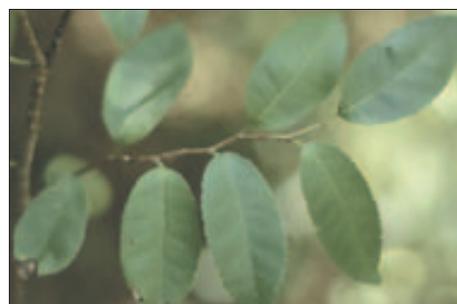
Left: *Pterostylis*  
*cardiostigma*.

Photo: Jeremy Rolfe.

Right, above: *Ranunculus*  
*macropus* (swamp  
buttercup).  
Photo: Colin Ogle.



Right, below: *Streblus*  
*banksii* (large-leaved milk  
tree). Photo: Jeremy Rolfe.



For more information, see [www.nzpcn.org.nz](http://www.nzpcn.org.nz).

# Appendix 6

## PHOTOGRAPHS OF SOME WEEDS OF THE EASTBOURNE HILLS

Left: *Clematis vitalba* (old man's beard). Photo: DOC.



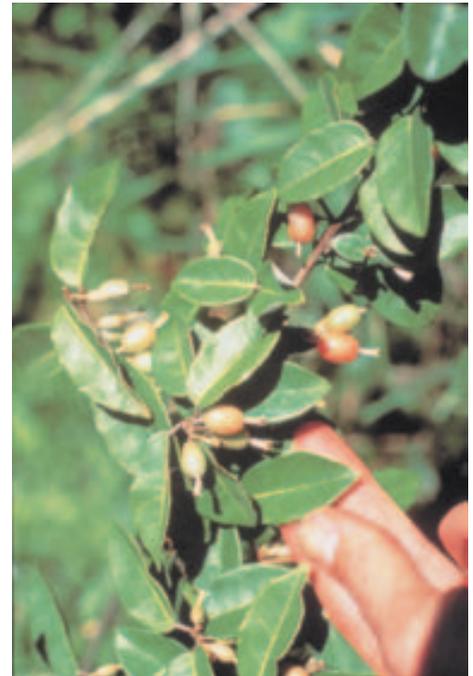
Right: *Asparagus scandens* (climbing asparagus). Photo: DOC.



Left: *Chrysanthemoides monilifera* (boneseed). Photo: Jeremy Rolfe.



Right: *Elaeagnus xreflexa* (Elaeagnus). Photo: DOC.



Left: *Erica lusitanica* (Spanish heath). Photo: Jeremy Rolfe.



Right: *Passiflora mollissima* (Banana passionfruit). Photo: DOC.



Left: *Sellaginella kraussiana* (Selaginella).  
Photo: Jeremy Rolfe.



Right: *Senecio angulatus* (German ivy).  
Photo: Jeremy Rolfe.



Left: *Senecio mikanioides* (Cape ivy). Photo: DOC.



Right: *Tradescantia fluminensis* (wandering willie).  
Photo: Jeremy Rolfe.



For more information, see [www.nzpcn.org.nz](http://www.nzpcn.org.nz).

# Glossary

**Dicotyledon** (-ous adj.) A plant which has two seed leaves (cotyledons) in its seed as a food store to nourish the plant embryo; it has broad net-veined leaves, and flowering parts in multiples of 4 or 5.

**Monocotyledon** (-ous adj.) A plant which has one seed leaf in its seed as a food store to nourish the plant embryo; it has narrow parallel-veined leaves, and flowering parts in multiples of 3.

**Psilopsid** Primitive ancient plant, no true leaves or roots, usually large spore cases (sporangia).

**Grass** A plant with fibrous roots, jointed often hollow stems, long narrow leaves, with ligule (joint) where sheath meets blade.

**Sedge** A plant with flowers clustered under bracts, stems usually solid and triangular, long narrow leaves, in three rows, with long sheaths.

**Rush** A plant with flowers often in branches, clustered under bracts, stems usually solid and triangular, long narrow leaves, sheathing in three rows.

**Liane** A plant that climbs on other plants for support.

**Composite** A daisy; flowers (disc florets) are very small, each surrounded by bracts, and crowded into central part (disc) of the "flower" head, petal-like circle ray of floret surrounds the (true) disc flowers.

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- Parrish, G.R. 1984: Wildlife and Wildlife sites of the Wellington Region. New Zealand Wildlife Service - Fauna Survey Unit Report Number 38. Department of Internal Affairs, Wellington.
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- Wiles, B. 2000: Reassessment of the impact of possums (*Trichosurus vulpecula*) on the vegetation of the Eastbourne Bays Reserves and it was dated. Unpublished report held by MIRO and Hutt City Council.