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USE AND PERCEIVED IMPACT OF RECREATION ON THE PORT HILLS OF CANTERBURY: A CASE STUDY USING KENNEDY'S BUSH SCENIC RESERVE AND AHURIRI SCENIC RESERVE

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USE AND PERCEIVED IMPACT OF RECREATION ON THE PORT HILLS OF CANTERBURY: A CASE STUDY OF KENNEDY'S BUSH SCENIC RESERVE AND AHURIRI SCENIC RESERVE.

By Emily L. Cooke

The Port Hills are a dominant feature of the landscape in Canterbury. They are also the closest hilly landform to Christchurch City and have extensive road and foot access. Thus recreational use can be expected to be high and continue to increase. But what are the consequences of increased use on the Port Hills?

There are 32 reserves on the Port Hills, most of which have been established for nature conservation reasons, but which also cater for many recreational activities. Disappointingly, many of New Zealand's introduced plant and animal pests have been present for many years in the Port Hills and they too jeopardise the ecological quality of the reserves.

Any use of an area produces impact. With increasing use of the area and the range of activities that can be pursued on the Port Hills there is a high chance that increased impacts will result. The first question addressed by this research is the extent too which users perceive use to be impacting adversely on the environment or on their experiences? This study uses Kennedy's Bush Scenic Reserve and Ahuriri Scenic Reserve as reserves to focus on, to see what the users of the areas do there, and whether there is any obvious impact; biophysical and ecological or social.

Research revealed that use is scattered unequally throughout the week and year and that as a result impact, especially social impacts do occur at high peak use times. But it was possible for users to find other reserves where use was still quite low. Management and users do oppose each other on there thoughts on how do reduce impact, with mountain bikers and walkers both requesting single use tracks and management viewing multi-use tracks as a more effective way to reduce impacts.

Impacts from introduced mammal and weed species are at this point in time probably more damaging to the ecological integrity of the reserves than recreational use. Man-made structures are also reported by recreational users as producing negative visual effects.

Keywords: Kennedy's Bush Scenic Reserve, Ahuriri Scenic Reserve, use, impact, perceived impact, Port Hills, Harry Ell.

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I would like to thank Dai Morgan who drove me to most interviews and visits to my study site, rearranging his own thesis commitments to accommodate this.

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Chapter One

Introduction

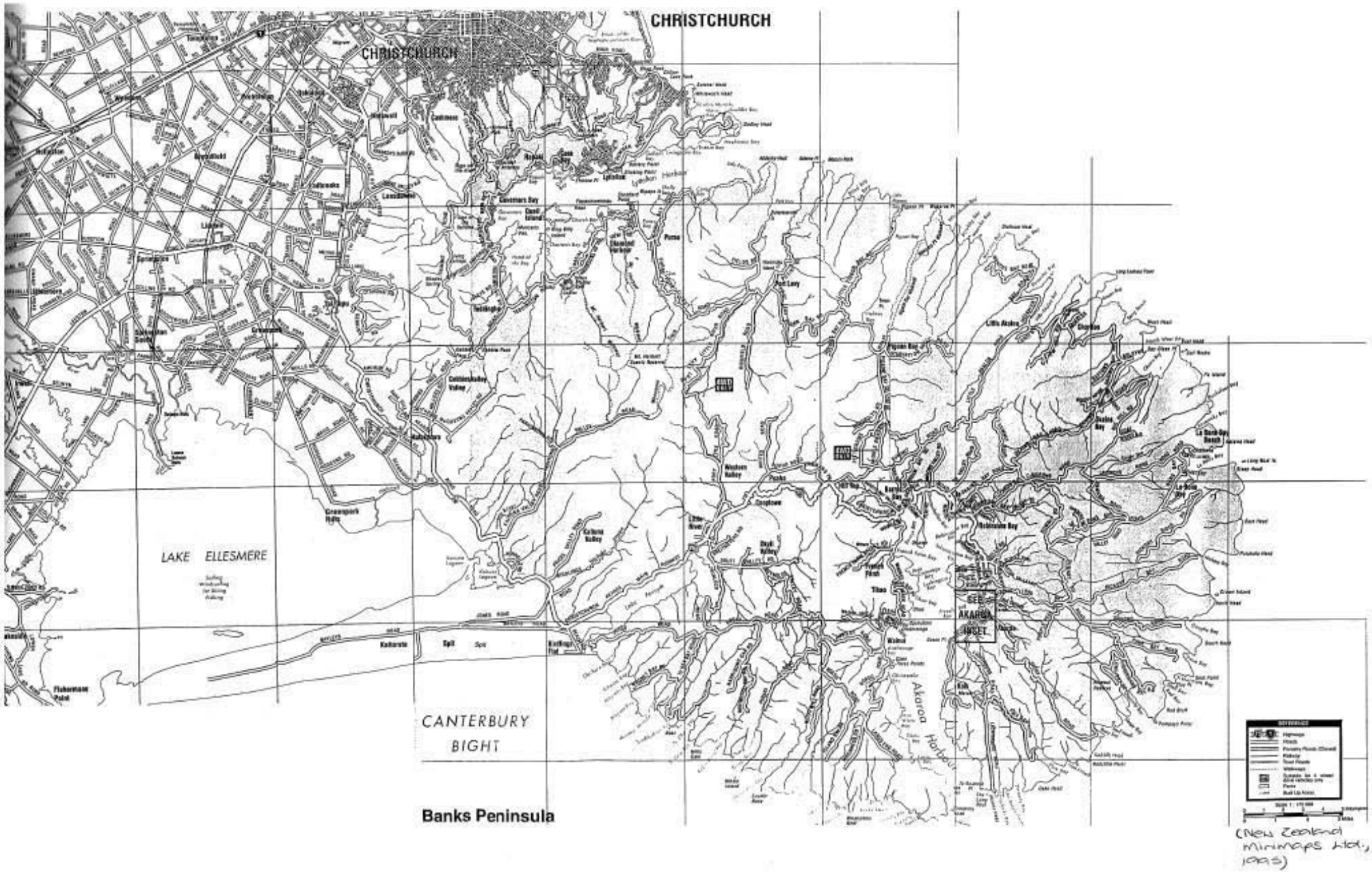
1.1 The Study Area

The Port Hills adjoin the city of Christchurch as a landscape of ridges and valleys with spectacular outcrops of remnant volcanic origin. Maori and European use and settlement, and natural events have altered the Port Hills to produce the place we see today. A predominantly tussock covered area, the Port Hills contain a mixture of remnant native vegetation, pine plantations, urban development, and sheep and beef farming. Recreational and ecological interest and use of the Port Hills and the Summit Road is high as they are one of the closest areas for the residents of Christchurch and Banks Peninsula. The Summit Road and associated reserves, tracks and road reserves provide easy access for these recreationists.

Christchurch is very fortunate with the amount of land available for recreation and open space. Within the urban area 14 percent of land is devoted to recreation and open space, while eight percent of rural land is used for similar purposes (Christchurch City Council, 1999a). Land held for conservation purposes is additional to this and covers 1871ha in over 76 parks (Christchurch City Council, 1999a) to enable passive recreation (ibid.). Passive recreation is those activities that do not involve a strenuous amount of effort, such as reading, picnicking and sightseeing.

Although there are 32 reserves (Devlin, pers. comm.1999) on the Port Hills, two reserves have been chosen for closer investigation. Kennedy's Bush Scenic Reserve was chosen as one because of its long historical association with both Harry Ell, the Summit Road and reserve preservation. It is also the largest reserved forest on the Port Hills, and site of one of Harry Ell's rest houses, the Sign of the Bellbird. Harry Ell was concerned about access to the Port Hills being closed off to the public. He instigated a change in legislation that meant private landowners could not close off access routes without public notification first.

Figure 1. Map of Banks Peninsula



He then decided a road should extend along the Port Hills connecting and legally protecting the few remaining patches of native bush, with resthouses at convenient places along the road. The second study site, Ahuriri Scenic Reserve, is located at the far end of the Summit Road, near Gebbies Pass. In contrast it is a smaller, less well used reserve but has high ecological value. This is supported by the Christchurch City Council (1992) who assigned a 5/5 conservation protection priority score on the reserve, and the forest regeneration potential due to the "degree of local vegetation uniqueness, conditions of vegetation or quantity of regenerating native forest".

1.2 Research Objectives

There are many reports and inventories describing the Port Hills. But most describe only one aspect such as, the vegetation or the bird life. The Canterbury United Council has done an in-depth study of the recreational activities that occur on the Port Hills, but these data are now 13 years old. Management of the Port Hills has changed since then and use has increased. It is of interest to me to find out about use of the Port Hills and the way that recreationists perceive the area.

- Hence the first objective was to review the literature associated with use of the Port Hills and the specific reserves.

- The second objective was to investigate the activities that occur in Kennedy's Bush Scenic Reserve and Ahuriri Scenic Reserve.

- The third objective was to visit the Port Hills and observe users to see what activities are occurring.

- The forth objective was to study perceived impact from three different perspectives; present users, users with a long historical association with the hills and from a management perspective. This objective required a literature review on recreational impacts; social, biophysical and ecological and a discussion of perceived impact. Perceived impact is a subjective concept and information found relating to use and impact on the Port Hills is site specific and may have limited application to other areas. Talking with recreational users will provide their perceptions on impact.

- The fifth objective included finding out if it was perceived that non-recreational land uses impacted the natural environment as well, and whether these impacts affected people's recreational experiences.

1.3 Methodology

Six interviews, two personal communications and one email conversation were held with selected people who have had a long association with the Port Hills. The views from these people do not necessarily represent the organisation they belong to. These interviews were carried out at times that were mutually convenient to both parties, between the 27 August and 18 October 1999. Five of the interviews were held in the interviewee's home and the other one at a café. All interviews were taped and later transcribed by myself. Notes were taken from personal communications with people.

I have visited the Port Hills, over several months from April to October, with visits more frequent in the past five to six months. Most visits were made on Sunday afternoon. Initially this was because past literature suggested this was when most use occurred, and it became quickly apparent during some week day visits that there was no one around to observe. I observed people at Ahuriri Scenic Reserve, Gibraltar Rock, Kennedy's Bush Scenic Reserve Bush, 'Sign of the Kiwi' and Victoria Park and the roads associated with these areas.

Non-randomly selected recreationists, who passed me when I was out observing people, were asked questions about why they were there, what activities they were doing and whether they had noticed any changes. The 22 conversations were kept casual and the amount and depth of information provided varied between respondents. A brief description, to maintain anonymity, of these people is provided in the reference section.

1.4 Structure of Dissertation

This dissertation is divided into four sections. In the first section I will describe the area, its geological origins, past and present human colonisation, the flora and fauna and the soils and physical conditions of the reserves. It is important to present this background information as a framework for considering use and impacts. The geological, natural and historic values of the area provide an environmental context in which recreational use, and consequently, impact, occur.

There is a range of reserve classifications on the Port Hills. These include historic, recreational and scenic reserves. Section two looks at what reserves are found on the Port Hills and how their reservation came about. The two reserves I have chosen to take a closer look at, Kennedy's Bush Scenic Reserve and Ahuriri Scenic Reserve are described in detail according to their history, natural qualities and what they provide in terms of opportunities for recreational activities. The differences and similarities of the two reserves are outlined as well, in terms of their recreational suitability.

The third section discusses past and present uses and users of the Port Hills. It includes a review of past literature on this topic, and is illustrated with the writer's observations during fieldwork on the Port Hills. Recorded comments from recreational explain why they choose the Port Hills to carry out their activities.

The final section relates to impacts. Although positive impacts do accrue from recreation, the literature and people's perceptions normally focus on the negative changes that occur because of recreational activity. In the time span of this research it was impossible to see if any actual physical or biological impacts occurred. Therefore impacts have been assessed by interviewing selected people to build up a profile of their perceptions of changes over recent decades and the factors which have contributed to these changes. Recreationists that use the Port Hills now, and in particular Kennedy's Bush Scenic Reserve Bush and Ahuriri Scenic Reserve, as a place to carry out their activities, have also been interviewed on their perceptions of impacts.

Chapter Two

The Port Hills

2.1 Introduction

The Port Hills are a dominant feature in Canterbury. They are located on the East Coast of the South Island in New Zealand. They are the closest hilly landform to the nearby city of Christchurch, which is situated on the flat wide plains below. The Port Hills are described as an "outstanding natural feature and landscape of national importance" (Christchurch City Council, 1999b p.2/29) due to the rock outcrops, open tussock grassland and other native flora and fauna. What is also significant is the 'openness' of the Port Hills as a landscape. The Christchurch City Plan (Christchurch City Council, 1999b p.2/29 & 2/32) alerts readers to the significance of this aspect and the importance of "the preservation and protection of the skyline of the Port Hills, and the maintenance of unobstructed views from the higher ridgelines".

The Summit Road (Canterbury) Protection Act 1963 controls the structures, forestry and subdivisions on the upper slopes. The Summit Road Society is a voluntary organisation formed in 1948, which among other things organises work parties to maintain the upkeep of certain areas.

> *I suppose it would be 15-20 years ago when regular volunteer groups started. Before that, the Society would hold special days, about one or two special days a year for planting (Gordon Kirk, President Summit Road Society, pers. comm., 1999).*

The Society has the ability to purchase additional areas of land and is in close consultation with the Christchurch City Council. It is through this act that the dual purpose of this society, conservation and recreation is recognised and this is exemplified in the following objectives.

The objectives of the Society are to "enhance the natural beauty of the Summit Roads, to promote and encourage a sense of civic pride in the Summit Roads and reserves, to plant and care for trees, plants and shrubs within reserves and areas adjacent to the Summit Roads, to construct and maintain fences, paths, seats and shelters, and to preserve the

open space character of the Summit Roads and their environs, and oppose development that could detract from that character" (Loughton, 1997 p.6).

2.2 Geological History

The Canterbury region is known for its flat terrain, its gentle rolling hills and plains that stretch for miles with the Southern Alps as a back drop. However, on the East Coast, Banks Peninsula protrudes out into the Pacific Ocean providing a contrast to the flat terrain. The northern and western sides of this dramatic landform are known as the Port Hills. The Port Hills are the outer walls of the now extinct Lyttelton volcano (Canterbury United Council, 1986c).

Ten to fifteen million years ago a series of volcanic eruptions began in the waters off the East Coast of Canterbury. Governors Bay, Lyttelton, Mount Herbert and Akaroa volcanoes erupted basaltic, andesitic and/or rhyolitic lava which flowed to form an island with several craters (Wilson, 1992) (Figure 2). Basalt and trachyte rocks predominate in the Port Hills region (ibid.). Volcanic activity stopped about six million years ago (Porteous, 1987). Between each volcanic eruption erosion quickly took over and lowered the island each time. A postglacial rise in sea level helped to erode the steep volcanic landscape and flood the valleys to form the harbours and bays we see today (Sewell, Weaver and Reay, 1993).

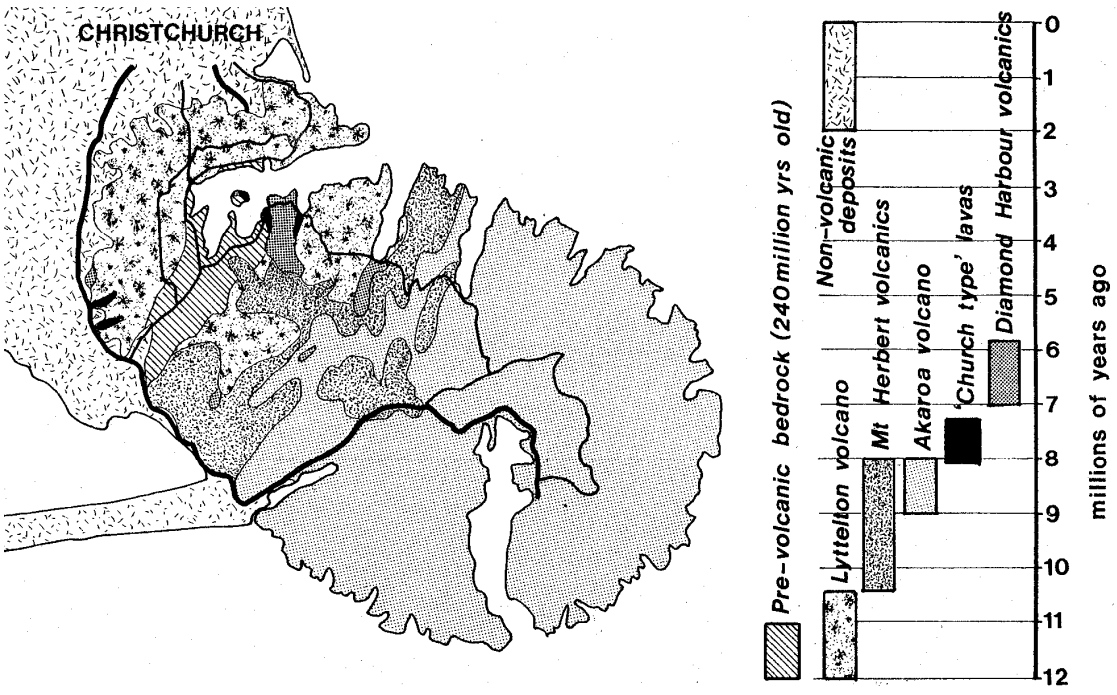


Figure 2. Geological history of Banks Peninsula (Cox, 1994).

Loess is silt-sized material, which is carried from dry riverbeds or outwash plains and is deposited as a blanket on another landscape (Lynn and Crippen, 1991). During the later part of the recent ice age (about 10,000 years ago) winds from the river fans of the Southern Alps brought huge amounts of loess that built out the Plains. The encroaching sediments eventually joined the former island to the mainland, creating a Peninsula (Summit Road Society, 1991) (Sewell, Weaver and Reay, 1993). On north facing slopes (Sewell, Weaver and Reay, 1993) the loess is still up to 20m thick (Cox, 1994). Most, though, has been washed down into the valleys below (Brown and Weeber, 1992).

Today the sea, wind and rain continue the gradual process of erosion on the Port Hills. Trachyte dykes now prominent, stand out along the Port Hills where surrounding softer material has eroded away, leaving the harder volcanic rock behind (Brown and Weeber, 1992). Today dykes, such as the one at Castle Rock attract interest and make for a geologically unique landscape. Walks to these dikes are the focus of tracks mentioned in Weaver, Sewell and Dorsey's book (1985). The two Summit Roads follow the remaining part of the crater rims from the Akaroa and Lyttelton craters (Cox, 1994).

2.3 Soils

The depths of soil formations vary on the Port Hills with stability and fertility reflecting this. On the upper slopes a thin layer of loess on bedrock is present. At lower altitudes the loess cover is deeper, allowing for greater soil development and subsequently vegetation differences (Porteous, 1991). Where soil development is shallow (Canterbury Regional Council, 1997) and/or yellow-grey or yellow brown soils (Christchurch City Council, 1999a) are present, slip and tunnel-gully erosion is common after prolonged wet weather and this limits potential land use. This occurs at a significant rate and the need to control this erosion with appropriate land uses is necessary (Christchurch City Council, 1999a). The high susceptibility of loess and loess-derived soils to slope failure was highlighted during the 1970s when subdivision on the lower parts of the Port Hills was increased (Brown and Weeber, 1992). Slope failure also occurs naturally though, and is not solely a response to human interference (ibid.).

Christchurch City Council (1998, p.86) states that soil on the Port Hills has the "lowest land use capabilities". This weakness was realised years ago, and can be supported by the comment "the land was too poor and broken to be sold at that time (1907-8) for farming purposes" (Oakley, 1960 p.30) and so the preservation of reserves seemed justifiable.

Rapaki soils, dominant at Kennedy's Bush Scenic Reserve, but often form complexes with Summit soils. They are formed of basaltic tuff, ash and/or scoriaceous basalt and loess. Ahuriri Scenic Reserve is situated on a tongue of Summit Soil, but like the soils at Kennedy's Bush Scenic Reserve bush they form complexes with Rapaki soils. Summit soils are soils derived from loess parent material overlying basalt (Christchurch City Council, 1992). But these soils are often shallow and the loess layer often none-existent on the steep slopes, but because they are formed on basaltic tuff or scoriaceous basalt, they hold some moisture (Christchurch City Council, 1992). This is helpful to the success of plantings.

Port Hills loess however, is a low quality soil when combined with climatic extremes and an exposed location high plant mortality occurs. Additional pest damage decreases the chance of plant survival (Webster, 1998)

2.4 Climate

Due to the exposed position of the Port Hills, wind and rain levels are greater than those in Christchurch (Canterbury United Council, 1986c). Microclimates also exist within the Port Hills (Christchurch City Council, 1999a), which influence the soil formation, flora and fauna and recreation activities that occur at different sites. Sunshine also differs between ridge top and valleys, where shading effects set in early, especially in winter (Canterbury United Council, 1986d). More rain falls on the south-western end of the Port Hills than the eastern end and more falls at higher altitudes, which is also reflected in the type of vegetation. Snow is not uncommon in winter on the tops.

Ahuriri Scenic Reserve receives the highest rainfall of the Port Hills Reserves at 1200^{+} mm per annum and Kennedy's Bush Scenic Reserve receives 1000^{+} mm per annum (Christchurch City Council, 1992). Reserves with north-facing slopes are extremely susceptible to the warm Norwest winds that occur in Canterbury and accelerate drought

conditions in the vegetation (Wilson, 1992). Long dry summers can result in increased populations of rats and mustelids (Webster, 1998). Mustelids are known Tuberculosis (Tb) vectors, which then becomes a threat to stock.

The climate, parent material and stage of soil development determine the dominant vegetation of a site. For instance at Kennedy's Bush Scenic Reserve a mix of mahoe-five finger-lemonwood and broadleaf grow on damp slopes, while on dry slopes a secondary kanuka association is dominant (Wassilief and Timmins, 1984).

2.5 Flora

Prior to human settlement of Canterbury, Banks Peninsula and the Port Hills was covered in Podocarp/hardwood forest (Christchurch City Council, 1992). Around 56, 000 hectares of forest used to cloak Banks Peninsula, where now, a sparse 61h remains (Cox, 1994). During the Polynesian period (up to 1840) 30 percent of the forest was removed, and during European settlement the forests were milled for timber, and fires (accidentally or deliberately lit), were a common occurrence. The vegetation was then dominated by tussock and introduced pasture grasses to provide for sheep and cattle grazing, which is still predominant today. Today about one percent of the original forest cover remains (Cowan, 1923) between silver (*Poa caespitosa*) and fescue tussock (*Festuca novaezelandiae*), introduced pasture grasses, weed invaders; gorse (*Ulex europaeus*), broom (*Cytisus scoparius*), bracken fern (*Pteridium aquilinum*), shelter belts and pine plantations (Canterbury United Council, 1986c).

Today the dominant types of vegetation that occur on the Port Hills are tussockland, open shrubland, fernland, sedgeland, rushland, and pockets of bush mostly confined to valleys, where they missed fire or clearance (Wilson, 1992). Typical forest remnants on the Port Hills consist of second growth hardwood forest of mostly kanuka canopy (*Kunzea ericoides*) with fuchsia (*Fuchsia excortocata*), mahoe (*Melicytis ramiflorus*), five finger (*Pseudowintera arboreus* and *P. colensoi*), kowhai (*Spohora microphylla*) and kaikomako (*Pennantia corymbosa*) (ibid.). The once abundant short tussock is being overtaken by 'improved' ryegrass (*Lolium perene L.*) clover swards (*Trifolium* sp.) (ibid.).

The current vascular flora totals about 334 species" (Wilson, 1992 p.66) of which there are six regionally endemic taxa. Regeneration of Podocarp species is slow to non-existent, which is not a very positive outlook for the long-term potential of the vegetation. The tussock as noted by Boffa Miskell Partners Ltd. (landscape consultants) (1985 p.14) is

> *One of the most remarkable aspects of the land cover in the study areas is the existence of tussock grassland. The persistence of the tussock is dependent on soil pH, fertility and stocking rates. Any increase in the factors, particularly stocking rates could see the loss of the tussock as a feature of the Port Hills.*

Of the unique endemic species that exist on the Port Hills, *Senecio sciadophilus* (Shade Groundsel) is possibly at risk (Given, 1981), with a few plants at Ahuriri Scenic Reserve (Wall, 1953). *Senecio saxifragoidea* (Fine Rock Groundsel) on the other hand, which also grows only on the Port Hills is quite abundant on all rock faces facing south and west (Wall, 1953) (Cockayne, 1927). Another, the rare and endangered species *Cotula nana* (Button Daisy) is found on open and rocky habitats of the Port Hills (Given, 1981), along with *Pleurosorus rutifolius* (Fern) in dry rocky crevices (ibid.). These species could become increasingly rarer if activities like rock climbing occur in the same vicinity.

One hundred and sixty seven species make up the fern flora of New Zealand. Almost one third of this flora (50 species) was found on the Port Hills in 1979 by Thompson (1979). Of these an endemic, *Eriopus brownii* is found on the Port Hills (Visch, 1979).

Most writers note a lack of understorey vegetation in Port Hills forest remnants. This is due to the effect of introduced mammals and the fragmentation of the reserves. Some species are common in a few of the reserves, but not others. Non-Port Hills native species were planted in some reserves to accelerate regeneration, such as North Island provenance of *Olearia paniculata* (Wilson, 1992), but now only species and stock sourced from the area are used (Brumley, 1980)(Plate 1). This type of thing has been mentioned by Jameson (pers. comm., 1999) and O'Connor (pers. comm., 1999).

> *Kennedy's Bush Scenic Reserve Bush was planted with natives, or supplementary planting once it was fenced in against stock. But we did make the mistake of planting some species that were not grown in Canterbury. It has been a long time before that mistake has been partly rectified by the natural regeneration of the species. You can look down on Kennedy's Bush Scenic Reserve Bush and see a whole sward of a particular green, which was plantings of non-native variety. There was a time when the director of parks and reserves was not as puritan as the other ones and subsequent directors have been very very good in maintaining the integrity of the reserves (Jameson, Summit Road Society member, 1999).*

Plate 1. Kennedy's Bush showing supplementary planting of *Olearia paniculata*

This sort of thing also occurred at Jollies Bush, where

> *Some beech trees [were] planted in there and the bulk of the vegetation is rangiora, which is introduced from the North Island into here. It's not native native (O'Connor, past lecturer in nature conservation, 1999).*

O'Connor (pers. comm., 1999) says this occurred through the 1930s and 40s , when " the planting which was done in various places was not with this strict ideology of planting progenies specific to an area and so on, as is the case today". However he goes on to say "Jollies Bush is a lovely little experience, you can have a walk through the forest and its quite attractive" (O'Connor, pers. comm., 1999). Just because a reserve is not strictly ecologically correct, for many people it will still provide a picturesque environment for a short, pleasant bush walk.

2.6 Fauna

Mass extinction of invertebrates and vertebrates, including the moa, adzebill, giant eagle, giant rail, and goshawk occurred from loss of habitat and hunting during Maori

occupation of Canterbury (Christchurch City Council, 1992). Those forest birds that had survived Polynesian times then "succumbed to the colossal destruction of habitat, the introduction of predators such as rats (*Rattus* sp.), cats (*Felis catus*), stoats (*Mustela erminea*) and ferrets (*Mustela putorius*), and probably also to competition for surviving food sources from introduced birds and mammals, brought by European colonisation" (Wilson, 1998 p.114). A change of vegetation to the predominantly tussock grasslands favoured the presence of introduced bird species.

Thirty-one native bird species were identified in 1850s on the Port Hills (Christchurch City Council, 1998), but today only 13 native and 18 introduced bird species exist (Crossland, 1996)(Appendix 1). Introduced species utilise all habitats, whereas native species are more selective in their choice, and this has resulted in the decline in abundance of certain species. The success of native species is determined by there ability to utilise a variety of habitats and that are capable of crossing open country between pockets of bush, which is so typical of the Port Hills landscape (Freeman, 1999). For example, the New Zealand Pipit is common, but keeps to the "less modified tussock grassland and rocky areas on ridges or summits above 800m" (ibid., p.11). This poses a danger though as native avifanua populations are small, and vulnerable to localised extinction's (Wilson, 1992). Canterbury United Council (1986a, p.36) also notes that "it is only in the larger areas of native forest that there is any variety of bird species".

There is some hope though. *Anoposobius neozelanicus,* a small centipede found only in three places in New Zealand, is found on the Port Hills "at the edge of forest or scrub areas only" (Harrison, 1969 p.371). Wilson (1992 p.34) suggests that Banks Peninsula holds a "large, diverse invertebrate fauna of considerable scientific interest". Banks Peninsula has a very high level of endemism within its invertebrate species, with expansion from Lyttelton, recreational activities and holiday homes listed as threats to these endemic species (Johns, 1980 cited in Wells, Pyle and Collins, 1983, p.582). Therefore a likely assumption could be made that the Port Hills, so close and geologically similar would hold similar invertebrate species. However, Kelly (1972) in his study of scenic reserves although in-depth, makes no mention of the invertebrate fauna.

Introduced wild mammals, such as goats (*Capra hircus*), hares (*Lepus europaeus*), rabbits (*Oryctolagus cuniculus*), hedgehogs (*Erinaceus europaeus*), ferrets *(Mustela furo)*, stoats, *(Mustela erminea),* weasels (*Mustela nivalis*), possums (*Trichosurus vulpecula*), rats,

(rattus ssp.), mice (*Mus musculus*) and cats *(Felis catus)* can all be found on the Port Hills (Wilson, 1992). "In nearly all instances the reserves have been used as winter runs for the local farmer's stock" (Oakley, 1960 p.30). This is reflected today in the destruction of understorey vegetation which Crossland (1996 p.13) describes as "skeleton forests". Also "despite an apparently goat proof fence …these wily animals were using the fence corner braces to walk onto the top wire and leap down into the bush, a process which could not easily be reversed" (Loughton, 1998 p.88).

A lack of fences in the past meant native forest remnants were easy targets for domesticated goats, sheep and cattle and their feral counterparts. Today fire and grazing pose the greatest threats to fauna and flora of the Port Hills (Summit Road Society, 1991).

2.7 Recreation Possibilities

Recreational use has a chapter of its own, chapter four, and the impacts of recreation are discussed in chapter five. However it is necessary at this point to highlight that recreation is a major use of the Port Hills. The "Summit Road reserves are used for a diverse range of passive and active recreational" activities (Hayes, 1985 p.45). Brumley (1980) found that most people regarded recreation as the main purpose of the Port Hills.

Most of the Port Hills Reserves are administered for both recreation and conservation purposes (Christchurch City Council, 1999b). So it could be said that the protection and conservation of the reserve's flora and fauna is necessary to enable visitors to experience another type of landscape in which to recreate. But if the reserves were not there and the maintenance of them was halted, I think that recreational use of the area would decrease as the two are linked. The reserves protect various ecosystems and therefore enhance the natural characteristics of the area and provide for outdoor recreation in a variety of situations (Christchurch City Council, 1999a).

The Port Hills add to the mixture of alpine, beach, estuarine and rural environments in which Christchurch people can recreate. About half the recreational users that I talked to said they did not need the Port Hills environment to carry out their recreational activity, because there where others places they could go to. This attitude may differ depending on the recreational activity being pursued. For example, one person who used the Port Hills

for several activities said the environment that the Port Hills provided was good for shooting and rock climbing, but that tramping and abseiling were not terribly site-specific, and that they could go other places for these activities to achieve the same experience.

A mountain biker suggested that the specific environmental make up of the Port Hills was important for her recreation.

> *I believe we need a specific environment for mountain biking so there is no conflicts with other track users, [and] this has been adequately provided for.*

Some walkers commented that walking could be done anywhere, but others can be represented by this comment made by a male who used the Port Hills for walking,

> *We just like the views and the seasonal changes and the enjoyment it gives our visitors because it is not on he mainstream tourist routes.*

2.8 Summary

This chapter has highlighted the major natural resources located on the Port Hills. Prior to colonisation and settlement of Canterbury the native flora and fauna were abundant and the area housed many endemic species. I have mentioned a few of the endemic species still remaining, but sadly most are now assigned the term threatened or endangered. Where vegetation remains, it is isolated from other remnants, has been supplementary by planting with non-Canterbury natives and has been invaded by exotics. All this affects the type, abundance and diversity of native fauna and invertebrates found within the reserves. But the area is still unique, in that it does still contain some remnants.

The landform makes for an interesting landscape and a place drastically different from the rest of the area. The rock formations are found no where else in Canterbury and are a reminder of the area's volcanic past. As a consequent of the topography, the climate is very different to the plains.

This chapter has described the natural features of the Port Hills, and it is these that directly benefit from the legal protection of natural areas. The use of protected natural areas must be in accordance with the overall purpose of the reserve, which, in turn, should acknowledge the presence of any significant landforms or unique flora and fauna.

Chapter Three
Protected Natural Areas

3.1 Introduction

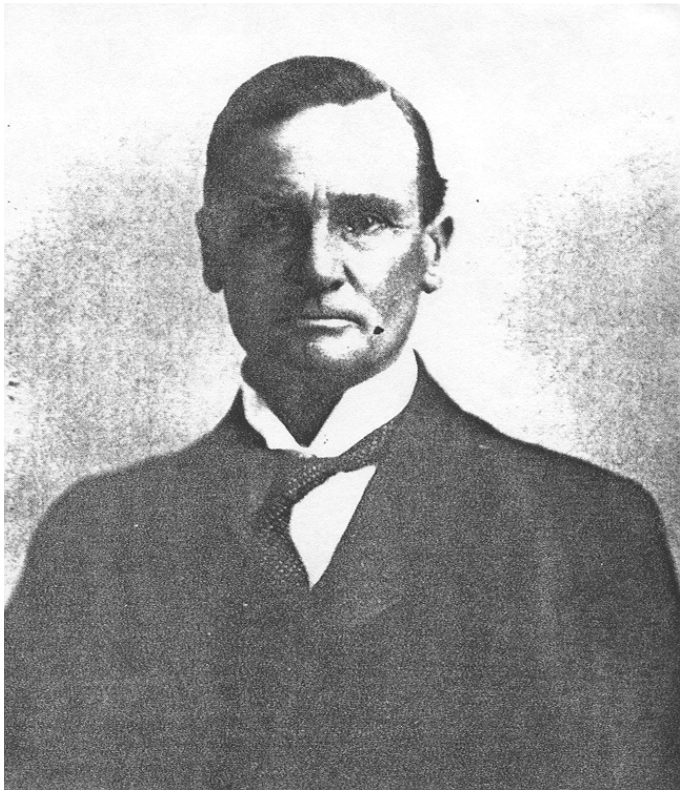
The protected natural areas on the Port Hills lend themselves to recreation, yet public access at one stage was threatened. This chapter provides a history on how protection of natural areas for public access and enjoyment occurred. A discussion on the types of reserves in general, leads the reader into a more in-depth investigation of two reserves, Kennedy's Bush Scenic Reserve and Ahuriri Scenic Reserve, which I have chosen as a case study for this dissertation.

3.2 The Beginnings of Protection

According to Paul Devlin, head ranger on the Port Hills, 88 percent of the land [on the Port Hills] is still in private ownership, "but increasingly land is being acquired one way or another as public reserves" (Wilson, 1992 p.68). The acquisition of land is critical to protect the natural flora and fauna of the area, especially since endemism is so high. Field (1980 cited in Wells, Pyle and Collins, 1983, p.583) suggests that the endemic invertebrates are confined to such small localities that even small reserves would be sufficient to protect them. Where protected areas have been established and grazing and browsing have been eliminated or reduced, the regeneration of browse-vulnerable species, such as mahoe, five-finger, seven-finger, tree ferns and broadleaf does occur (Wilson, 1998).

Mr Harry G. Ell (1863-1934) was concerned that access to the Port Hills and other open spaces in New Zealand; would be locked up in private property, denying the public access. In 1899 an unformed road now known as Kennedy's Bush Road, was about to be closed by the Selwyn Roads Board (Loughton, 1998). As a man of vision and drive Harry Ell fought this closure and he "obtained an amendment to the Public Works Act

1900, making it impossible for any local authority to close a road without order of Council" (McCaskill, 1978). Although the Port Hills had several tracks across them Ell decided that a legal formed road should extend along the hills with reserves and rest houses at various spots along the way (Summit Road Society, 1991). Some of the reserves were donated by private landowners and others bought (Loughton, 1998) for the purpose of "the preservation of the animal and bird life of this country".



The realisation of the road and reserves came about when the first sod on the Summit Road was turned on November 28th 1908, and Kennedy's Bush Scenic Reserve Bush was purchased for £954 in 1906. A government subsidy of £2 for every £1 raised by the people of Canterbury helped the cause (Canterbury United Council, 1986a). It was 30 years before the section of road from Evans Pass to Dyers Pass was officially opened (Loughton, 1998).

Plate 2. Harry Ell (The Christchurch Press in Oakley, 1960)

Harry Ell was also passionate about the need for scenery preservation and eventually the Scenery Preservation Bill was passed in 1903 (Oakley, 1960), largely a result of his efforts. It became the Scenery Preservation Act 1908 where "the Government had the power to vest the control of any reserve in any local authority or in any special board constituted by it for that purpose" (Oakley, 1960, p.46). A commission was set up to establish a legal framework for the 'acquisition, reservation, fencing and preservation' (Loughton, 1998, p.7) of land, "whether Crown, private, or Native lands, [which] in their opinion should be preserved as scenic, thermal of historic reserve" (Scenery Preservation Act, Appendix 2). This directly benefited the protection of Ell's reserves on the Port Hills.

By 1915 Harry Ell had secured 23 reserves distributed over 3000 acres of the Port Hills. In 1915, Cockayne gave a rather positive account of the reserves mentioning that the only

patch of blackberry in Ahuriri Scenic Reserve had been removed, the bird life was plentiful, noxious weeds were being kept well in hand and that the accommodation, at the Sign of the Bellbird, in Kennedy's Bush Scenic Reserve Bush should be enlarged.

The Summit Road Scenic Reserve Board came into existence in 1909 (Baughan, Cockayne and Speight, 1914), and in 1911 was amalgamated with the Kennedy's Bush Board. The amalgamated board controlled the reserves and properties secured by Harry Ell (Oakley, 1960). As a result of constant money shortages, boards folded and were re-established quite often. Later on, the Society helped to secure a milestone; the Summit Road (Canterbury) Protection Act on the 22 October 1963. The Act has been amended several times since 1963. It provides "protection for the areas from the ridgeline to the Summit Road and for one hundred vertical feet below the road" (Loughton, 1998 p.28). The purpose of this act is to

> *Provide for the preservation and protection of the scenic amenities associated with the Summit Road and other roads in the Port Hills in Canterbury, and to provide for the improvement of facilities for the public enjoyment of those amenities* (Terpstra, 1981).

There is of course the desire by some developers to build beyond this limit. A bargaining process can then be entered into. This is sometimes allowed with disadvantage and advantages falling to both parties. A respondent describes an example of a hypothetical situation below,

> *For instance, if you allow me to develop from above the normal contour level, which you have established for development, I will give you so much land up the top [for reserve purposes]. Which isn't altogether a very plausible thing to do because it immediately increases the upward trend of houses. So there is a need for balance in this bargaining process.* (Jameson, pers. comm., 1999*)*

Although this Act was passed many years after Harry Ell's death in 1934, today it is the "objective of the Summit Road Society to further the vision of Harry Ell, by fostering use of the Port Hills, by protecting and enhancing the natural amenities, and by preserving the open spaces and wilderness areas" (Summit Road Society, 1991), which can be more easily done if an Act is in place. Although his vision had included building 15 resthouses, they have never eventuated. The acquisition and preservation of land for public enjoyment is still pursued.

3.3 Present Administration

Although there is comparatively little public land on the Port Hills (12 percent), access to and use of it is ensured in many ways. Land tenure and control of reserves on the Port Hills is administered by several different parties. For example the Department of Conservation controls Buckley's Bay Scenic Reserve, and the Christchurch City Council administers areas like Coopers Knob. Mount Vernon is controlled by the Port Hills Park Trust Board, and Prendergast's Bush is looked after by the private landowner and Queen Elizabeth II National Trust, through a covenant.

Another stakeholder involved in the Port Hills is Turning Point 2000. Turning Point 2000 was established by the Christchurch City Council to identify, co-ordinate and develop significant events and long lasting projects to celebrate the new millennium, the 150th anniversary of European settlement in Canterbury and the 160th anniversary of the signing of the Treaty of Waitangi by Ngai Tahu (Port Hills 2000) (Appendix 3). Fourteen projects have been established by Turning Point 2000, one of which is called Port Hills 2000, with the aim to "preserve, enhance and increase the native forest, both for recreation and nature preservation" (ibid.).

> *Turning Point 2000 is actually involved in buying bits of land, all the way along the Port Hills, but especially from Sugar Loaf towards the South we're looking for bits of land that come up for sale and trying to make deals with the landowner* (Colin Burrows, member of Port Hills 2000).

According to Burrows where land is not for sale Port Hills 2000 encourages covenants for nature preservation, although as yet they have not done much of it. Port Hills 2000 is also active in planting thousands of natives within the Crater Rim area.

The Port Hills lie on the boundary of three councils; the Christchurch City Council, the Selwyn District Council and the Banks Peninsula Council. One implication of this is that each Council has its own agenda, and although the landscape is one, it is viewed in different ways. The Society is

> *A whole lot more independent than a lot of the Councils are, because we cover the whole of the Port Hills. We look at the Port Hills like that, an ecological district, and that's what we're interested in that one day the whole area will be identified as a regional park, and then people [will] get a sense of pride in the thing as a whole, rather than just individual sites* (Kirk, pers. comm., 1999).

3.4 Reserves

These protected natural areas are scattered throughout the Port Hills and vary greatly in size from Jollies Bush at 1.1ha to 223ha of Mount Vernon Park. A map of the reserves is in the back pocket. All reserves and roads on the Port Hills that are referred to can be found on this map. The scattered arrangement of the reserves has implications for the long-term survival of the flora and fauna, and the bio-diversity of the area. For instance the size of the reserve and type of flora found there determines the type, diversity, and number of bird species present. Species are often confined to one bush remnant, because there is no connecting vegetation between the reserves. Diamond (1975 cited in Brumley, 1980) "emphasises the need to retain corridors between the scattered reserves to enable species to utilise more than one component area". In Crossland (1996 p.11) this is reiterated again "the area of bush remnants is a major determinant of species richness. The larger the remnant, the wider the range of both native and introduced birds present and the higher the chance of rarer species being present (O'Donnell and Moore cited in Crossland, 1996).

3.5 Kennedy's Bush Scenic Reserve

For the purposes of this dissertation Kennedy's Bush Scenic Reserve was chosen as a case study. It was chosen because of its long historical association with the Summit Road and the joint ecological and historical importance of the reserve. The establishment of the reserve was hailed as an object lesson to the rest of the Dominion, and an example of what can be achieved (Journal of Lands and Survey, cited in Canterbury United Council, 1986b).

Kennedy's Bush Scenic Reserve was gazetted in 1906 and at 87ha, it is the largest of the forested reserves on the Port Hills (Plate 3). It is administered by the Christchurch City Council in collaboration with the Summit Road Society. Being a scenic reserve it is protected by the Reserves Act 1977.

It was named after Thomas Kennedy who lived in the bush in a mud and slab hut for a while (Pickering, 1994). Prior to 1906 though the bush had been subjected to much

damage for utilitarian purposes. During the1850s and 60s the best trees were logged, and much of the remaining timber was felled for fence posts or firewood and sledges, hauled by bullocks, were used to bring the timber out (Rooney, 1990a). Bullocks were also used to bring rock out, for Mr Kennedy and people previous to him who quarried the basaltic rock in the area. The rock (Port Hills basalt) was used in the Plinth of the Christchurch Cathedral and the original Christchurch Railway Station and other buildings around Christchurch (ibid.). 'Port Hills tuff' was also a favoured building stone in early times and was extracted from Redcliffs and Sumner, where large quarries were located (Brown and Weeber, 1992).

Plate 3. Kennedy's Bush Scenic Reserve.

Plate 4. Sign of the Bellbird.

The reserve takes up nearly all of one valley with the Summit Road cutting through the top end of the reserve. Close to the road is the site of the 'Sign of the Bellbird', one of four 'resthouses' that Harry Ell built along the road for people to stop off at during their journey (Plate 4). It was also called 'Orongomai' by Harry Ell, which meant "The Place Where Voices are Heard" or "Place of Sounding-hitherward", after the Ngai Tahu name of Cass Peak which overlooks the reserve and building (Cowan, 1939). The original Bellbird, built as a caretaker's cottage in 1913 was extended into tearooms in 1915 (Pickering, 1994) (Appendix 4, 5 and 6). Until 1922 it was a telephone bureau and between 1918 and 1921 it was also a post office (Rooney, 1990a). The shelter present today was made from the original stones of the teahouse, which had fallen into disrepair during World War II (Pickering, 1994) (Appendix 7 and 8).

Surrounding the shelter a 'parkland area' exists which Kelly (1972) describes as "receiving a fair amount of use...as the average city visitor wants a fair measure of pasture around his trees". Whether this is still the reason today, the parkland setting caters well for picnickers with the stone building providing a dry place to sit, eat, or for children to play. However, the area is quite small and the land sloping, so this would limit the activities that could be done here.

Kennedy's Bush Scenic Reserve was reported in (Boffa Miskell Partners Ltd, 1985 p.16) to be one of the six "most visually important areas of bush in the study area". The bush itself states the Christchurch City Council (1992) is of considerable scenic value with natural regeneration occurring beneath the canopy. It is described as the most beautiful; of the Port Hills scenic reserves (Jameson, 1988). Over 150 species of indigenous plants now grow in this reserve (McCaskill, 1974). The Christchurch City Council (1992), McCaskill (1974), and Summit Road Scenic Society (1972) all comment on how fencing of this reserve is essential for maintaining and restoring the vegetation to the way it must have been once.

The forest is dominated by second-growth hardwood forest, including mahoe-dominant bush, kanuka-dominant bush, fuchsia/pepperwood bush, and ribbonwood-kowhai bush. Amongst this are the few old totara (*Podocarpus totara*) and matai (*Podocarpus spicatus*), with bracken, gorse and rough pasture encompassing the bush (Wilson, 1992 p.80). Old *podocarps*, make it unique, and second-growth hardwood forest indicates regeneration is occurring (ibid.). Plantings have helped to accelerate this process, but

some are not of Banks Peninsula origin (ibid.) (e.g.*Olearia paniculata*). Cockayne in 1915 (p.10) reported 119 vascular species in this reserve and went as far to say that "examples of probably all the flowering-plants and most of the ferns, which formed the primitive forest" could be found at Kennedy's Bush Scenic Reserve Bush. Appendix 9 contains a comprehensive list of the plants found in this reserve by Kelly in 1972.

In a study by Freeman (1999) between March 1992 and February 1993, 222 five-minute stationary bird counts were conducted at 12 sites in this reserve. Native birds; Bellbirds, Silvereyes, Fantails, Grey Warblers, New Zealand Pigeons, and introduced birds; Blackbirds and Dunnocks were found to be resident in the reserve year round, with Kennedy's Bush Scenic Reserve providing an important habitat for the native species still present on the Port Hills (Freeman, 1999).

The track system in Kennedy's Bush Scenic Reserve has been re-developed in the last few years, and four well-defined tracks lead the way through the reserve (Appendix 10). They are all circular tracks of different lengths. An information board at the beginning of the tracks describes the walks, times and distances, with signs in the reserve indicating the various turn-off points (Plate 5). There is a rubbish bin and a composting toilet is now

Plate 5. Signs at Kennedy's Bush Scenic Reserve

being built. A carpark is located across the road. A path connects with Kennedy's Bush Scenic Reserve Bush road reserve, where mountain biking as well as walking occurs. In the future it is hoped that interpretation panels will be erected to describe the flora and the history of the Sign of the Bellbird (Devlin, pers. comm., 1999). This range of facilities is

more than what most of the reserves on the Port Hills provide. For example only Victoria Park, Kennedy's Bush Scenic Reserve, Castle Rock and Sign of the Kiwi have toilets.

3.6 Ahuriri Scenic Reserve

In the Ahuriri Scenic Reserve area three protected natural areas are located, but only one; Ahuriri Scenic Reserve is available all the time for the public to access. The other two; Ahuriri Tussock and Ahuriri Bush, are part of private land protected by Queen Elizabeth the Second National Trust covenants in 1983, and public access is limited. Ahuriri Scenic Reserve Tussock covers 23ha and is the best remnant of tussock on the Port Hills, made up of silver (*Poa caespitosa*) and hard tussock (Wassilief and Timmins, 1984). Ahuriri Scenic Reserve Bush is large and protects several locally and nationally rare species, such as the native climbing groundsel; *Brachyglottis sciadophila* (Wilson, 1992), and endemic plants which reach their southern limit here, for example akeake (*Dodonaea viscosa*), titoki (*Alectryon excelsus*) and kawakawa (*Macropiper excelsum*) (Wassilief and Timmins, 1984). Wilson (1992 p.83) states that there is a great diversity of plants, which probably accounts for the prolific bird life noted by Wassilief and Timmins (1984 p.359) and Cockayne (1915 p.9). In 1953 Wall believed Ahuriri Scenic Reserve Bush to contain the best examples of White Clematis (*Clematis indivisa*) and tree fern (*Hemitelia smithii*). Whether this is still the case today is not documented.

Ahuriri Scenic Reserve was reserved in 1914 and covers 10.9ha (Plates 6 and 7). It is noted by Kelly (1972 p.287), Canterbury United Council (1986d p.27) and Wilson (1992 p.82) to be the only significant remnant of Podocarp/hardwood forest on the Port Hills which is also of climatical and geographical interest.

> *…and yet the more you look at it and examine it the more it has quite a potential of as much significance or greater than Riccarton Bush and a memorial of the kinds of vegetation we have (O'Connor, 1999).*

The bush consists of a podocarp/mixed hardwood forest with adult and juvenile matai (*Prumnopitys taxifolia*), adult kahikitea (*Dacrycarpus dacryiodes*), a diverse array of mahoe, fuchsia, five finger, pepperwood and lots of *Coprosma rotundifolia,* and some mapou (*Myrsine australis*) (Wilson,1992) (Plates 8 and 9). A full list of the species found in this reserve was recorded by Kelly (1972) (Appendix 11).The "variety and richness of

mosses, liverworts and lichens that covered the bark and branches of nearly every tree, shrub and liana", impressed Visch (1979) when he carried out an inventory of vegetation in the reserve (Appendix 12).

Plate 6. Ahuriri Scenic Reserve

Plate 7. Gorse surrounding Ahuriri Scenic Reserve

Ahuriri Scenic Reserve used to have a track that went through it, but about two years ago the style was removed and the track closed off (Devlin, pers. comm., 1999). This is one way of increasing protection for the flora and fauna in the reserve, and minimising non-human impacts. It is possible to climb over the fence and enter the reserve. There is an small informal car parking area close to the reserve, where people presumably used to park when they walked in the bush, but now it is used as a lookout, where a panoramic view of Lyttelton and Diamond harbour can be observed.

Kelly (1972 p.287) mentioned that in the past “many people visit the area, and go “a little way” producing “local human trampling” amongst the bush.

Plate 8. Regeneration in Ahuriri Scenic Reserve (photo by Rueben McPeak).

Plate 9. *Fuchsia excorticata* (photo by Rueben McPeak)

3.7 Contrasting the Two Reserves

The two reserves differ in that the understorey of Ahuriri Scenic Reserve is fern cover while Kennedy’s Bush Scenic Reserve is young *Coprosma* (Canterbury United Council, 1986d), probably reflecting the longer grazing past of Kennedy’s Bush Scenic Reserve, and the wetter nature of Ahuriri Scenic Reserve. Kennedy’s Bush Scenic Reserve is large

and of less scientific value but also provides an important historical dimension as well. Small areas of bracken in Ahuriri Scenic Reserve are quickly regenerating to second-growth forest (Wilson, 1992, while regeneration in other forests is much slower. Juvenile forms of podocarps are also present in Ahuriri Scenic Reserve, but rarely occur in other reserves. This is a problem if you are trying to regenerate the forests to how they may once have been.

The Christchurch City Council (1992) classified reserves on the Port Hills into categories, of forest regeneration potential and conservation protection priority. Ahuriri Scenic Reserve scored five out of five for both forest regeneration potential and conservation protection priority, due to the "high degree of local vegetation uniqueness, condition of vegetation or quantity of regenerating native bush" (ibid., p.16). Kennedy's Bush Scenic Reserve scored only four out of five for conservation protection priority. But this reserve was noted as important for the "extensive forest vista and historical qualities" (ibid.)

Earlier the Canterbury United Council (1986c and 1986d) also classified the reserves for the recreational experience they provided. Ahuriri Scenic Reserve is the only reserve on the Port Hills that scored five out of five, due to the 'wilderness feel' and undeveloped nature of the reserve. Both these ratings reflect the high natural values of Ahuriri Scenic Reserve.

3.8 Summary

This chapter highlighted the similarities and differences between Kennedy's Bush Scenic Reserve and Ahuriri Scenic Reserve. Kennedy's Bush Scenic Reserve Bush was the first natural area on the Port Hills to be legally protected and holds significant historical value because of this. The 'Sign of the Bellbird', one of Ell's four resthouses is situated here and portrays an equally interesting past. I believe the public would appreciate and benefit greatly from the interpretation of this building. Surrounding the bush section of this reserve rank grass and bracken is abundant. However, the combination of a pleasant park, a picnic-type area and a scenic reserve is uncommon together on hills. Protected natural areas commonly incorporate only one of these factors.

Ahuriri Scenic Reserve has been closed off to the public for 2 years now. It is a small reserve compared with Kennedy's Bush Scenic Reserve Bush and is regarded as having the highest ecological and scientific importance out of all the reserves on the Port Hills. It was felt that the 'remote' scientifically fascinating qualities that Ahuriri Scenic Reserve provides, could be found in other reserves. But as this is the only reserve on the Port Hills that scored a five out of five for its forest regeneration potential and conservation protection priority how can there be other reserves that offer the same experience to a user? However, it is possible to climb over the fence, and enter the reserve if one so desires.

Chapter Four
Recreational Use

4.1 Introduction

This chapter can be divided into four sections. This chapter first provides information on what recreational use is and reviews past quantitative studies that investigated recreational use on the Port Hills.

The second section in this chapter incorporates my observations of what people are doing on the Port Hills and comments from recreationists as to why they choose the Port Hills and what they like or dislike about the area. A discussion of the facilities and opportunities that the Port Hills provide for recreation is outlined. No attempt is made to list all the recreational activities people can do. What is outlined here are the activities that the recreationists mentioned during the research phase.

The third section discusses recreational activities taking place in Kennedy's Bush Scenic Reserve and Ahuriri Scenic Reserves. The final section takes into account other land uses, such as farming, housing, exotic forestry and the educational role that the Port Hills provide. Recreational use sometimes occurs in conjunction with these other uses, for instance walkways often cross farm land to allow for public access to a recreation site.

4.2 Use

Use of an area is determined commonly by quantitative surveys. Surveys of recreational use of areas in and around Christchurch for instance have been carried out to inform managers of recreation areas of the extent of recreational activity occurring within their park. Socio-economic and demographic characteristics of visitors are often collected in an attempt to predict use and users (Booth and Peebles, 1995). Finding out the "cultural and education background, financial resources, social expectations, community values and social status, population structure and gender" (Christchurch City Council, 1999 p.3/44) of users can assist managers to tailor the parks more to suit users, needs better.

Use studies can inform managers of the levels of use, who the users are, what activities they do, what they like, and want, and when and where greatest use occurs in their park. For example Booth and Peebles (1995) and Davidson (1972) report that use is concentrated around road end sites, in peri-urban and in rural areas. Urban parks are becoming increasingly important as the population in cities increases and people can not access distant national parks for various reasons, such as cost or time constraints (Devlin and Corbett, 1995). Elson (1979) noted that the provision of urban fringe leisure sites performs a "interceptor function, relieving pressure on national parks and other parts of the 'deeper' countryside more sensitive to high levels of visitor use". This suggests that high levels of visitor use need to be accepted as part of urban fringe sites, such as the Port Hills, and are incompatible with sensitive areas. If sensitive areas exist where lots of people go, they will not remain so for long.

Use can be divided into passive and active, appreciative and consumptive categories. Due to the nature of the Port Hills, appreciative, passive recreational activities are the norm. Neighbour in 1973 (p.62) did a survey of outdoor recreation patterns of Christchurch residents and found that passive recreational experiences accounted for most of the recreational activities people undertook with, "pleasure driving the second most popular recreational pastime after picnics with 88 percent [of respondents] having been for a pleasure drive in the last year" [1972]. Consumptive recreation in New Zealand is limited to areas where preservation is not the primary aim of the area. Consumptive activities are things like hunting and fishing, where something is removed from the environment. Viewing scenery, tramping and photography are examples of appreciative activities.

Sample surveys of recreation activity should be repeated at regular intervals to detect a change in use patterns (Canterbury United Council, 1986a). This has not occurred within the Port Hills area, and while details are somewhat dated, trends can be ascertained through observation.

With increasing use, conflict can arise. Cars, bikes, buses and walkers presently use the Summit Road. Considering that the road is narrow and is also windy with many blind corners, there is potential danger.

4.3 Recreational Use of the Port Hills

Christchurch has 666 parks and reserves (Christchurch City Council, 1998), and since the Port Hills are such a dominant land area in Christchurch it contributes to the 'garden city image' with which Christchurch has been linked. The Port Hills are the closest area of hilly open space to Christchurch (Terpstra, 1981), which makes them a major attraction for residents and tourists alike. Two comments from mountain bikers illustrate this

> *The Port Hills provide a different type of ride compared with Bottle Lake. Being a lot steeper there are better down hill rides and traversing single tracks.*
>
> *They are the only hills in Christchurch, and therefore are the only 'mountains' to mountain bike on.*

Back in 1908 many believed that the "Port Hills reserves were too remote from Christchurch to be of any value" (Ogilvie, 1978 p.213). The formation of 'touring clubs' occurred as many people were able to buy cars and 'going for a drive' became an organised activity with other car owners. For instance such clubs existed in Christchurch, with the touring party pictured below from 1912 looking down on Redcliffs from the Summit Road (Johnson, 1992, p.92). But even since the 'car boom' use has not been high.

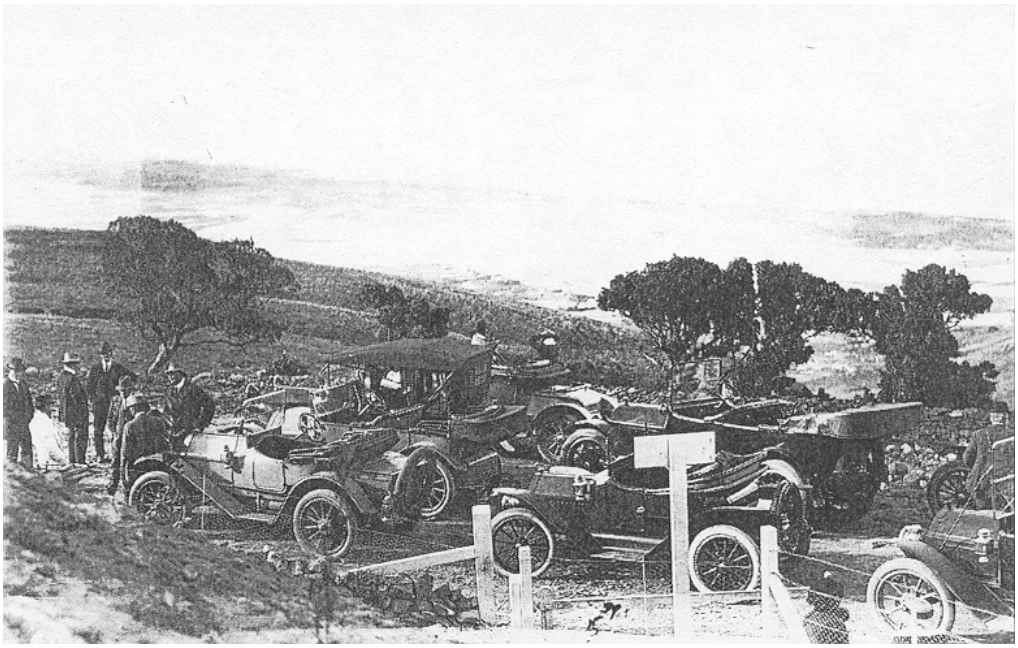


Plate 10. A touring party, 1912 (Johnson, 1992)

Up until the present we haven't seen enough of it [recreational use], but now we're getting it, and on Sunday its quite popular. For example the piece of land I had coming up from Governors Bay into the bottom of Ohinetahi Bush I would see possibly two or three people on it per year, and now you easily get hundreds (Kirk, pers. comm., 1999).

One user, when asked why they chose the Port Hills to carry out their recreational activity, answered because it is "Very close to home. I do not have to use my car to get there. It is convenient". The mass use of the motor vehicle has probably led to the change, and the Port Hills are now considered to be quite close. The other alternatives for recreation; at the coast, Banks Peninsula and the Southern Alps (Brumley, 1980), are further away and consume more time, money and effort to visit. A trip to the Port Hills can be an 'on the day decision' (Canterbury United Council, 1986a p.11) with 71 percent of respondents reporting this as their main motivation to visit (Canterbury United Council, 1986b p.24).

Neighbour (1973), in a study of the outdoor recreational activities of respondents in Christchurch, found that most people did not travel further than 45 minutes to get to their recreation site. The Port Hills would be within that distance for most Christchurch citizens and therefore use can be expected to be quite high (ibid.). If the location of your recreation activity is closer to home then you can spend less time getting there and more time enjoying the activity. This is mentioned by a rock climber who chooses the Port Hills rather than other sites to carry out their recreational activity,

> *Because it is so close to town, so I have more time climbing instead of travelling half the day just for a couple of hours of climbing*

and a walker,

> *The Port Hills are close to home, so there is no time wasted in excessive travel, and I can use public transport if necessary.*

Both these answers suggest that time is scarce and that effective use of time is necessary even when participating in enjoyable recreational activities.

Neighbour (1973) noted that some people will always return to the same location, whereas other will seek out new places. "Some people place a premium on familiarity and always return to the same location to which they become very attached, others are on the move to see new places" (Neighbour, 1973 p.37). For instance some people will always choose the Port Hills over other recreation sites, and others will return always to the same reserves within the Hills, while others will vary their site choices. However, site choice could be constrained by other factors. Even though a person may want to go to other places, proximity to home, cost and transport could constrain the decision.

Recreational use of an area is directly related to access. If access is not unconditional, there will be a reduction in the amount of use an area receives. Five roads join the Summit Road and provide access to the reserves along it and the historical sites, such as the Sign of the Takahe. Several tracks also link the city side of the Port Hills to the Summit Road, for example the road reserve at the end of Kennedy's Bush Scenic Reserve Bush Road.

The presence and availability of parking areas also determines the use of a site. There are 12 purpose-built parking areas (Plate 11) along the Summit Road and several 'pull-over places' (Plate 12) which increases the use of the surrounding area. People "stop at convenient places" (Canterbury United Council, 1986a p.12).

Plate 11. Car park at Kennedy's Bush Scenic Reserve

Plate 12. Informal car park at Ahuriri Scenic Reserve

The Canterbury United Council (1986d p.123) found that use was related to seasonal weather and special events, and that on Sunday afternoons there was also a concentration of traffic on the Summit Road. Neighbour in 1973 (p.67) found that "Sunday is far the most popular day for a pleasure drive with 66 percent of the sample preferring this day as compared with 16 percent on Saturday. This still occurs today, 26 years on. Christchurch City Council (1998) also reported that the weather influences people's recreational behaviour, but it also affects recreation resources and amenity values. So it can be assumed that use of the Port Hills, over a week or a year fluctuates. Likewise, recreational use within an area can fluctuate. Long one way tracks appear to have less use than shorter circular tracks (Corbett, 1985).

Most of the use of the Port Hills occurs on the weekend and is quite spread out during the week. During one observation period on a mild sunny weekday in the afternoon of August (Friday 20th 1999) on a drive between Gebbies Pass and Sign of the Kiwi, I noted ten other cars and one motorbike on the road, no cars were parked at any of the stopping sites other than a half-full car park at the Sign of the Kiwi. This supports findings that use of the road and therefore the reserves fluctuates, not so much due to the weather, but maybe more to which day it is; weekday versus weekend or holiday.

Brumley (1980 p.65) also identified that some sites; Kennedy's Bush Scenic Reserve, Sign of the Kiwi, walking tracks to Victoria Park, Crater Rim Walkway and the Pioneer Woman's Memorial and Historic Reserve attracted more recreational use than others along the road. From my observations between Gebbies Pass and the Sign of the Kiwi, cars were clustered at Kennedy's Bush Scenic Reserve, Kennedy's Bush Scenic Reserve Bush Road Reserve entrance off the Summit Road, and at the Sign of the Kiwi during weekends.

"Victoria Park is certainly the dominant one [for high levels of use], and the Sign of the Bellbird, Bridle Path-Castle Rock area, Godley head and Mount Vernon-Rapaki areas" get a lot of use as well (Devlin, pers. comm., 1999). Victoria Park is the site of the park headquarters and the visitor's centre that has maps brochures, information displays and a video; produced by the Summit Road Society, playing. There are several large car parks and well-defined tracks, which leave from Victoria Park, including some suitable for wheelchairs. A flat grassy area ideal for picnics and family games, a child's playground

and toilet are close to the visitor's centre. Plantings around this area are obviously landscaped, and more in the style of a botanical garden.

All the factors combined; close to the city, hilly open space, little cost and effort involved and a variety of recreational sites make the Port Hills a very desirable place to visit. There is provision for several types of activities and tracks cater for all types of people; children, adults and the disabled.

So who are the users? Canterbury United Council (1986a p. 11) found that 800,000 visits are made to the Port Hills each year with the majority of people surveyed "make at least five visits per year on average", usually at the weekend. People who use the walkways predominately do this with their families and friends (Corbett, 1985). "The majority of users (74 percent) of the Port Hills users indicated that they spent up to three hours there and twenty five percent spent more than three hours (Canterbury United Council, 1986 p.17). Naturally some tracks are better used than others are, such as the Harry Ell walkway which had 12, 000 people on it one month last summer (1999) (Devlin, pers. comm., 1999).

Of the passive activities that attract people to the Port Hills, appreciation of the natural landscape and aesthetic qualities of the Hills themselves are a main attraction (Canterbury United Council, 1986a). "The mere presence of it [native bush] enhances the scene and makes it more interesting (Boffa Miskell Partners Ltd., 1985p.16). The quest for peace and solitude are rated high amongst users (Canterbury United Council, 1986a).

Two articles, one a history of the Summit Road Society and the other a study of recreation on the Port Hills, suggest that "there had been a marked increase in the general use of the Summit Road and its tracks" (Loughton, 1998 p.43). The Canterbury United Council (1986a p.2) attempts to give some reasons as to why use may increase; "the use of the Port Hills for recreation, is likely to increase [because of] increasing leisure time, increased mobility, better health and greater life expectancy, improved disposable income, changing social attitudes [and the use of] modern technology" (Christchurch City Council, 1999 p.3/44). The promotion and advocacy of a healthier lifestyle could encourage more people to seek the outdoors. The Port Hills are literally at the 'back door' for some people. For example, people who live in the suburbs of West Morland and Cashmere the Port Hills are a short walk away.

Naturally some sections of the Port Hills attract more use. Certainly the eastern part gets more use than the southern part, but that is changing. Devlin (pers. comm., 1999) said that track counters and road counters indicate that there is increasing use of the southern part of the Port Hills.

In the future active recreation such as mountain biking will increase (Brumley, 1980) as the Port Hills is the only "hilly type environment" close to Christchurch to ride in and the decreasing price of mountain bikes is making such an activity more accessible to more people. A male rock climber said that "proximity of the hills" was an important factor when he had to choose a place to go rock climbing. Brumley also mentioned that use would increase due to the 'hilly factor'. As two mountain bikers point out "being a lot steeper there are better down hill rides" and "mountain biking or walking on the flat isn't much of a challenge". The Port Hills are the only place in Christchurch where this type of landscape exists and therefore demand can be expected to be high.

Christchurch City Council (1999b p.2/31) mentioned that there "has been an increase in such activities as mountain biking and paragliding", an example of the fact that activities which involve an interaction with the natural environment are increasing (Christchurch City Council, 1999a). Even running in a natural environment was mentioned as important, by one runner whom I talked to,

> *I need to run in a clean-air environment, and off-road for keeping running 'fresh', not running on old boring sealed roads.*

4.4 Provision for Recreational Activities

As mentioned, there is provision for many activities on the Port Hills. There are special areas for single use activities, such as the dog exercise area situated between Victoria and Elizabeth Parks. One time I saw a group of people who were walking their dog on Prendergasts Track. The sign at the beginning of the track read:- 'No dogs, firearms, bicycles or fires permitted'. So the Port Hills provide areas where dogs are allowed, in the hope that they will not be taken to other 'non-dog' areas. However this does not always appear to happen in practice.

4.4.1 Orienteering and rock climbing

There are permanent orienteering tracks in Victoria Park. There are also 1000 routes (Devlin, pers. comm., 1999) on rocky crags for rock climbers. As mentioned by Grew (1983, p.8) “many of these outlying crags are being systematically developed, as new routes often require ‘cleaning” (Plate 13). The impacts of this are noted in section 5.2.

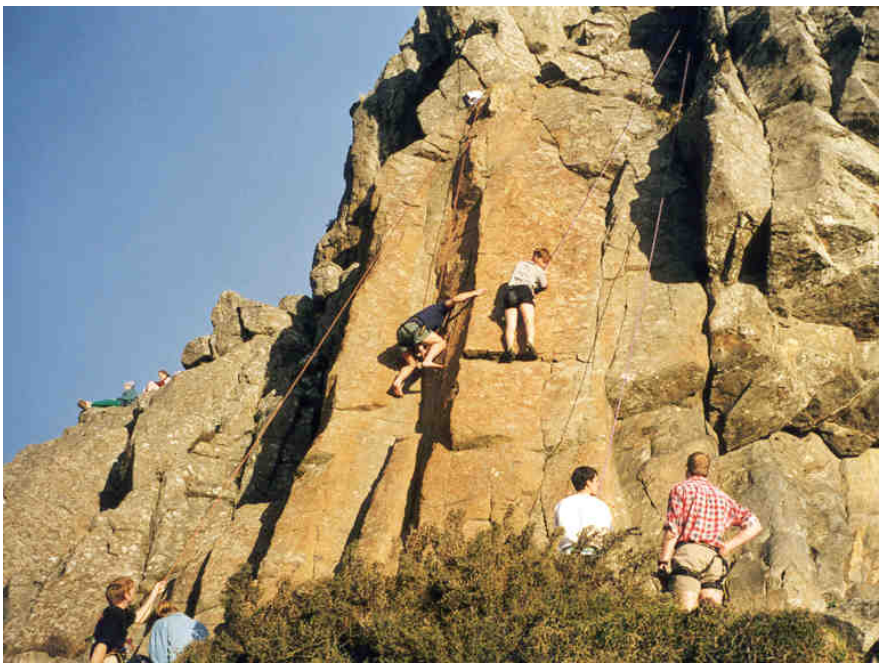


Plate 13. Rock climbing at Castle rock (photo by Kim Bestic)

4.4.2 Parapenting and hang-gliding

There are parapenting and hang-gliding take off sites for these activities on the Port Hills, but the take-off point depends on which way the wind is blowing e.g. Castle Rock. For example “if the wind is blowing in the wrong direction they’ll go to another site and use that” (Devlin, pers. comm., 1999).

4.4.3 Walking tracks

There are many kilometres of track within and surrounding the reserves, and along the Summit Road for people to walk and run. A revised edition of the book, ‘The Port Hills- a guide to the walking tracks on the Port Hills’, specifically describes all walking tracks in this area and how to get to them (Pickering, 1999).

4.4.4 Mountain biking

The Port Hills offer a variety of different mountain bike experiences such as, unformed legal roads, four-wheel drive tracks, walking tracks and general public open space (Gerald, 1992).There are tracks for the sole purpose of mountain biking and multi-use tracks such as Kennedy's Bush Scenic Reserve Bush Road Reserve track. Recreation for example is not the only use for this track, and during the lambing season from August to September, the track is closed to the public. A guide put out by 'Ground Effect', a Christchurch based company that designs and produces cycle clothing, describes eight of the most popular mountain bike tracks in Christchurch. Seven of these are on the Port Hills (Ground Effect, 1997) (Appendix 13). The Port Hills ranger service also puts out leaflets of the mountain bike tracks of the Cashmere Spur reserves (Appendix 14). This identifies single purposes mountain bike tracks and multi-purpose tracks, where mountain bikes are allowed as well as other users, such as on the Bowenvale walkway. Port Hills ranger, Paul Devlin describes these tracks,

> *There are three multi-use trails. They are wider than normal…we design them so people have a good line of sight, so that people can't go too fast, [and] so that people can step off the track if they need to let them go past*

4.4.5 Sightseeing

Appreciation of the landscape is an important recreational activity on the Port Hills. People can often be seen just sitting in their cars, or standing beside them just looking out at the view. I observed people doing just this at the car park at Ahuriri Scenic Reserve, and the Sign of the Kiwi car park, which provides an excellent opportunity to view the city. On Sunday afternoon on the 19th September I sat and observed motorists for one and half-hours. During this period of time nearly every third car stopped on the corner of the Summit Road near Gibraltar Rock, and people got out and looked at the view. It was a warm sunny day with a slight warm breeze. Lake Ellesmere was very visible and a clear view could be obtained to the South, with the Southern Alps capped with snow.

4.5 Recreation Use of Ahuriri Scenic Reserve and Kennedy's Bush Scenic Reserve

Kennedy's Bush Scenic Reserve was identified by Brumley (1980) to be one of the five most popular sites on the Port Hills, and was mainly used for sightseeing. This is probably

because it offers various elements essential to sightseeing. There are look out points to Christchurch and Lyttelton, a car park, the historic Sign of the Bellbird, and a picnic area. There is also a network of tracks including short tracks, and a circular one-hour return track (Pickering, 1994).

Kennedy's Bush Scenic Reserve caters for walkers, runners, photographers, picnickers and botanists. It would be very easy for mountain bikes to cycle around the parkland area. Although not intended, it would also be possible; once you got over the style to bike some of the tracks in the reserve, although there are many steps. Even though there is a fence at the entrance of Ahuriri Scenic Reserve, if you jump over the fence it caters for walkers, botanists and photographers and people interested more in the finer details of ecology and regeneration of plants. One user of the Port Hills said she had been to Ahuriri Scenic Reserve once on a Canterbury University ecology trip and O'Connor (pers. comm., 1999) also mentioned that, "generally I would take my classes to the southern end. The reason for that was because of Ahuriri Scenic Reserve Bush".

Use of these reserves in the past though was not high. O'Connor (pers. comm., 1999) remembers that use was very low at Ahuriri Scenic Reserve, as the reserve was hardly known about, and even Kennedy's Bush Scenic Reserve was not used much.

> *It was used on occasions, like I can recall CORSO sponsoring a Kennedy's Bush Scenic Reserve Bush walk, a walk for water. But even major events like that were pretty rare. Kennedy's Bush Scenic Reserve Bush used to be a very exhausting place to walk, because it was hot and dry. So it wasn't a very pleasurable experience. I wouldn't have walked Kennedy's Bush Scenic Reserve Bush track or Spur for pleasure, heck no!*

Studies by the Canterbury United Council (1986a and c) divided the Port Hills using the Recreation Opportunity Planning Spectrum (Figure 3). The Recreational Opportunity Spectrum is a continuum which divides up the land; regardless of tenure, into opportunities for outdoor recreation experiences to occur in accordance with the various setting, activity and experiences available to the recreationists (Taylor, 1993). Reserves were classified into five categories; urban extensively modified (RO1), modified (RO2), developed natural (roaded) (RO3), developed natural (nonroaded) (RO4) and natural (non-roaded) (RO5). Some sites therefore are more suitable for 'sociable/intensive' activities, whereas others provide a more remote tranquil experience (Canterbury United Council, 1986d p.21). The intention is that the visitor will be able to choose the setting that will best fulfil their specific needs.

The Canterbury United Council (1986c) identified Kennedy's Bush Scenic Reserve Bush as RO4/developed natural (unroaded) and Ahuriri Scenic Reserve as the only reserve cited as RO5/natural (unroaded). RO4 and RO5 "are more appropriate as remote experience areas" (Canterbury United Council, 1986a p.9), "although they are scarce they are the most susceptible to change" (Canterbury United Council, 1986b p.69). The Christchurch City Council (1999b) assigned the term 'a remote experience' to the majority of the Port Hills.

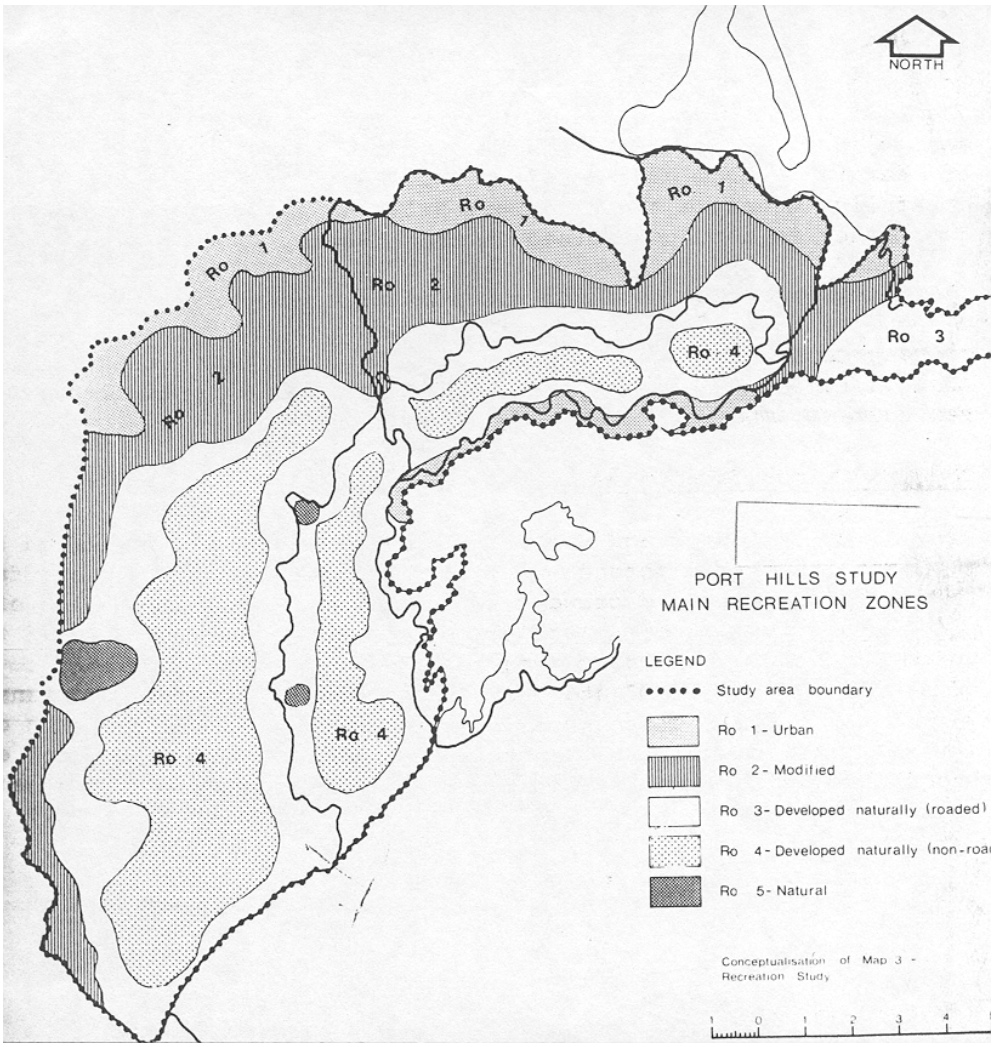


Figure 3. The Port hills divided into the main recreation zones using the Recreation Opportunity Spectrum (Canterbury United Council, 1986c).

The idea of remote experience seems to me to contradict the fact that the Port Hills are so close to a major city. Even when one is in the reserves, cars travelling on the road above can be heard. However, a female recreational user of the Port Hills was "still able to find solitude even though it was close to a large populated city". The informal untracked nature of some areas does lend itself to a more wilderness experience where fallen and

drooping branches from trees are not cut out of the way, as is done in other reserves to facilitate easy walking access.

"Wilderness visits are primarily motivated by the desire to escape from the artificiality of civilised surroundings where the necessity for primitive means of existence results in various emotional beliefs to the participant" (Neighbour, 1973 pp.74). Ahuriri Scenic Reserve can promote these feelings as this reserve has very high botanical status. The Christchurch City Council (1993a) suggested that to protect the forest ecosystem [of Ahuriri Scenic Reserve] public access should not be encouraged and the trails should be kept as they are, lightly defined. Today, as mentioned previously, the entrance to the reserve is closed and the track is overgrown in places.

The wilderness aspect is further mentioned in Brumley (1980 p.92) where the

> *"Main walking tracks from Kennedy's Bush Scenic Reserve to Scott Reserve, and most of the eastern section of the Summit Road receive high levels of use, while the western section past Kennedy's Bush Scenic Reserve Bush receives little use. This leaves the undeveloped bush reserves at the western end to serve a semi-wilderness area for that section of the population primarily interested in the natural environment"*

On the other hand at Kennedy's Bush Scenic Reserve several tracks provide access to most of the reserve and the Summit Road Society encourages use by developing and maintaining present walking opportunities (Christchurch City Council, 1993b). At present a brochure of the location of the walks at Kennedy's Bush Scenic Reserve can be found at the Christchurch City Council, Victoria Park Information Centre and an information board is located at the reserve.

Improved facilities such as a toilet and extended car park for easier bus turning areas are proposed (Singleton pers. comm., 1999) which is likely to attract more use. As use levels grow the potential for increased social and biological impact will increase. By indirectly attracting attention to this reserve, increased use is removed from such reserves as Ahuriri Scenic Reserve where increased use is not encouraged. On the other hand, by increasing use to Kennedy's Bush Scenic Reserve, users who do not want a populated site to carry out their recreation could shift to less used reserves, and reserves presently less well known such as Ahuriri Scenic Reserve could attract more use. This is the idea of displacement. One recreational user that I talked to said that,

> *When I am not doing activities which do not require a specific location, that is anything except rock climbing, if I find lots of people I go somewhere else to avoid*

them, as I go there to escape from the crowds of people, but I know I shouldn't expect it to be free of people..

Displacement is where some 'sensitive users' alter their recreation patterns to avoid crowding, and ultimately move on to less densely related areas (Manning, 1986). Theoretically, displacement will continue until there is no more 'wilderness' left (Booth and Cullen, 1995), and ultimately a loss in the diversity of recreation opportunities will occur (Manning, 1986). This is because "degradation in one area causes visitors to seek more pristine surroundings and move further into wild areas, effectively widening the impact zone" (Sage, 1995). People may turn their attention to smaller, less advertised reserves like Ahuriri Scenic Reserve to experience a reserve of greater scientific quality and this increased use would increase impact and at first this would be quite noticeable on the reserve.

The existence of tracks through Ahuriri Scenic Reserve is not well advertised in the hope that use is minimised (Singleton, pers. comm., 1999). The track has been closed for over two years now, with the style having been taken away. The undeveloped nature of the reserve is in keeping with the wishes of the Christchurch City Council and the fact that it is the only RO5 status reserve that is found on the Port Hills. The following two comments show how this closure is viewed in a positive light.

There's real value in Ahuriri Scenic Reserve in terms of monitoring and to see what is happening, and what isn't happening, and how do we impact on it…there is a lot of value in not having the distraction of tracks in an area..

… Ahuriri Scenic Reserve has a tremendous future. I think that is very important. You see at the present time you do not need it for the public, rehabilitate the thing and then engage the public in the restoration process. That's where the educational and recreational value is. But get it right in the first place, and not cater too much for the public

4.6 Other uses of the Port Hills

The Port Hills are subject to a variety of different land uses, and are not solely reserved for recreational use. Other land uses do occur. Some times conflict occurs between different users of the land. Farming, forestry, and housing are some of the other land uses that occur on the Port Hills. Christchurch City Council (1999b), describes pastoral farming as having limited viability on the Port Hills. Forestry, recreation and conservation

on the other hand are mentioned as alternative land uses to effectively control erosion, in-particular tunnel gully erosion; on the Port Hills (Christchurch City Council, 1999a).

4.6.1 Farming

Sheep and cattle farming occur in the areas of mixed tussock and introduced grassland surrounding the reserves (Brumley, 1980). Some farmland provides access to reserves for walkers. Although the harsh climatic conditions are not optimal for farming, farming was considered to be the "most suitable form of land use" (Brumley, 1980 p.96) (Plate 14).

4.6.2 Housing

The Port Hills have a few farmhouses scattered throughout the hills, but increasingly subdivision is creeping up the valleys and ridges from the city. The potential for development is great as the area offers high aesthetic and scenic views and a semi-rural lifestyle. This is obviously desirable to Christchurch residents looking at the number of partially built and proposed subdivisions occurring on the Port Hills at the moment. The pressure to allow development is certainly there with Kennedy's Bush Scenic Reserve Bush Road end being pushed as a potential urban area for expansion as opposed to other sites on the Port Hills (Canterbury United Council, 1986c). Brumley (1980) found that most "people felt that the open nature of the area was its greatest attraction and any threat to this atmosphere would spoil the major source of satisfaction".

4.6.3 Exotic forestry

There has also been an increase in exotic forestry planting, both as blocks and shelterbelts, which had significant effects on the landscape (Porteous, 1987). For instance on Banks Peninsula 1700 hectares of forestry plantation existed before and Wilson (1998, p.116) estimates that about 2000 hectares have been planted since this date.

The Summit Road (Canterbury) Protection Act 1963 protects the land 100 feet below the Summit Road and therefore excludes the growing of exotic forestry for production purposes (Hayes, 1985). But this does not stop landowners below this level planting exotic trees, which would break the view of Canterbury presently achievable from the Summit Road. Most of the forestry blocks are small and fragmented areas of *Pinus radiata,* planted for timber production, erosion control and gorse control (Canterbury United Council, 1986d) (Plate 14). Boffa Miskell Partners Ltd. (1985 p.16) suggest that shelter-belts and isolated wood lots that ignore landform patterns are one of the major elements, which detract from the visual quality of the natural landscape. Fragmented areas of forestry may have a greater adverse affect on the visual appearance of the Port Hills, than if forestry was contained in a continuous planting.

Plate 14. Agroforestry on the Port Hills.

4.6.4 Education

Another important use of the area is that of its educational role. Each year for example Lincoln University takes its ecology students on field trips to the Port Hills to discuss the history, flora and fauna and alternative uses of the Port Hills. A past student of the University of Canterbury, said she had been taken there as well for an ecology trip. The Port Hills are close and incorporate both the past and the present, remnant bush and present farming and forestry blocks.

Comments from teachers explain how appropriate the Port Hills were for teaching.

> *I found it a good medium when I was teaching park planning and recreation planning to use the Port Hills because it was a handy environment that was of interest to the students* (O'Connor, pers. comm., 1999).

Burrows (pers. comm., 1999) also says he took students up there to look at bits of botany and the Botanical Society had trips up there. He mentioned a workshop on lichens for example up there. This semester even, (July to October 1999) Sowman (pers. comm., 1999) took a landscape architecture class up onto the Port Hills to look particularly at the regeneration potential of Ahuriri Scenic Reserve and Predergasts Bush.

So the role that the Port Hills has in education is very strong and important. It is important because it is only through education and advocacy that attitudes change and the long-term protection of this environment is assured.

4.7 Summary

Farming is the major land use on the Port Hills, although farmers are diversifying into forestry as well. Both can affect recreational use, with lambing season closing public access to some tracks, and forestry, being seen as an inappropriate land use by some recreationists. Encroaching subdivisions reduce the areas of possible recreational access and public recreational land, and again are seen as an inappropriate land use.

Recreational use of the Port Hills and the individual reserves is high and possibly increasing, but it is irregular through time. If use is high, then this could warrant the building of a new track, or the spending of more money on a particular area. But if use is high only on weekends and public holidays is there any point investing money into an area that really doesn't get that much use overall? This can be a difficult decision for management to make. Again if use is high and people's experiences become less enjoyable then displacement could occur.

High levels of use at Kennedy's Bush Scenic Reserve has resulted in the installation of a composting toilet, and the proposal for a larger car park to accommodate buses turning. Obviously there is a need for these facilities, but the addition of these facilities will attract a greater level of use to this area. The provision of facilities may alter the experience some recreationists were after, but will provide an enhanced experience for some others.

Dividing the Port Hills according to Recreational Opportunity Planning Spectrum seems to me to bit a bit pointless. The Recreational Opportunity Planning Spectrum is a macro-planning tool. The Port Hills are a large landform, but compared with a national park they are quite small. The Recreational Opportunity Planning Spectrum also assumes there are a variety of settings within an environment, but this is not the case on the Port Hills. For example most of the reserves are connected to the Summit Road or another road, therefore being quite close to civilisation, non-natural noises and often a lot of other users. The idea that something can be classified as remote in this setting to me seems inappropriate.

Chapter 5
Impact

5.1 Introduction

Previous chapters have discussed the natural qualities of the environment, both of the Port Hills in general and of the specific reserves, Kennedy's Bush Scenic Reserve and Ahuriri Scenic Reserve. The types of recreational activities and other land uses that occur on the Port Hills and in the reserves were then discussed. This section looks at the impacts that recreation and non-recreational uses cause on the unique environment of the Hills. The two reserves provide a focus for comments made about impact on the Port Hills.

First an introduction into recreational impacts looks at the research that has been done in New Zealand on this topic, and the frameworks that have been developed to identify, monitor and manage impacts. The issue of perceived impacts is discussed.

Data from interviews with recreational users are analysed in this section. Recreationists and managers discuss their perceptions of the effects of recreational activities on the social and biophysical environments. As the effects of other land use activities also occur on the Port Hills, these activities are also discussed in this chapter, as their impacts are felt on the reserves. Some ways to manage and mitigate impacts is addressed at the end of the chapter.

5.2 Recreational Impact

When people use the outdoors for recreation they induce changes in the natural, social and economic environment. Such changes are described in the literature as recreational impacts. This study does not address the economic impacts of recreation on the Port Hills, but will focus on the ecological, biophysical and social impacts of recreation, with examples and comments from recreational users and interested community groups in relation to recreational and non-recreational impacts.

Recreational impacts are the result of use and while an area is subject to some level of use, impacts will occur (Boffa Miskell Partners, 1988). The greatest rate and degree of change to occur will result from low initial use levels (Cessford and Dingwall, 1997b). Impact is usually limited to focal points, such as road ends and entry and exit points to tracks, and picnic sites.

The degree of impact is very dependent on the amount of use, location of use, timing of use, types of use and visitor behaviour (Cessford and Dingwall, 1997a). People are sensitive to impacts at different levels, and some people perceive an impact, which may not be noticeable to someone else.

In New Zealand "very little research has been conducted into the biophysical or ecological impacts of recreation, despite the breadth of studies overseas" (Booth and Cullen, 1995, p.107). Ward and Beanhead (1996) add that most research that has been done has focussed on the terrestrial impacts, with very little having been undertaken with respect to impacts on natural features, wildlife or environmental qualities. In New Zealand impacts on the physical environment by recreationists, such as impacts on vegetation and soils have been investigated. Studies have also been done on the effects of off-road vehicles, trail bikes, mountain bikes, rock climbers, walkers and campers (Booth and Cullen, 1995).

Research into measuring impacts would help to predict future changes in the natural environment. This would allow managers to control these changes and thus undesirable effects and enhance beneficial ones (Cessford, 1997). But even monitoring has its problems, "we have really focused on localised, visible things [recreational impacts] to the detriment of some broader landscape issues that are much more subtle, but probably more important in terms of maintaining the intrinsic values" (Cessford and Dingwall, 1997a p.60).

5.2.1 Theoretical Frameworks

Despite the problems associated with determining where change occurs, managers and planners have tried to develop conceptual frameworks to identify, monitor, measure and manage impacts. In New Zealand the Department of Conservation has adopted one framework, the Recreational Opportunity Spectrum, but this has not been fully embraced.

A carrying capacity framework was adopted from the biological sciences and applied to recreation in the early 1960s. 'The number of animals that can be maintained in a given habitat' was redefined as "the maximum number of people who could use an area without destroying its essential qualities" (Glasson, Godfrey and Goodey, 1995, p.44).Carrying capacity was therefore defined as "the level of use beyond which impacts exceed acceptable levels specified by evaluative standards" (Shelby and Heberlein, 1981, p.30). Fundamental to this was the notion that at some point a limit of users in an area would be reached (Booth and Cullen, 1995). Identifying the number of users and then limiting use was seen as the solution to managing impacts.

The impacts of recreation on the biophysical and ecological, and the social environments were central to working out whether carrying capacity had been reached. Biophysical carrying capacity is the ability of an area to cope with a certain number of recreationists. Social carrying capacity is where increasing use was thought to diminish the quality of a recreational experience. These were integrated to help obtain the carrying capacity of an area. However, it was found that the number of people could not be directly linked to a level of impact. No use number, such as 100 people per day per park, could be predicted.

The determination of carrying capacity requires two separate elements. One involves a description of the relationships between specific conditions of use and the impacts associated with these conditions (Kuss, Graefe and Vaske, 1990). The other "refers to an evaluative dimension which incorporates value judgements about the acceptability of various impacts" (ibid., p.2). "The idea of an optimal rather than a maximum number introduces the notions of quality and values" (Shelby and Heberlein, 1986 p9). Values differ between individuals, and everybody has a different tolerance level and expectation. A problem though was how to identify what level of change could occur, and was acceptable. Differing perceptions of what is considered an impact poses a problem for managers, when they have to decide to whom is the level of impact acceptable?

Since the 1970s planning techniques have built on this carrying capacity concept in an attempt to manage visitor impacts. The Recreational Opportunity Spectrum, Limits of Acceptable Change, Visitor Impact Management and Visitor Experience and Resource Protection, are some of the frameworks that have expanded from the original carrying

capacity theme. They have been developed in an attempt to establish 'how much recreational use is too much' in a specific environment.

5.2.1.1 Recreational Opportunity Spectrum

It had been recognised that there was a need to provide a diverse range of recreation opportunities to match the diversity of peoples tastes for recreation. The Recreational Opportunity Spectrum aims to categorise areas according to the potential recreational experiences they provide and consider appropriate use levels for the areas and experiences identified (Sutton, 1992). An area may provide a range of recreational opportunities within a diversity of settings, which range from urban, modified, settings to wilderness, pristine settings. The concept can be defined as "the availability of a real choice for a user to participate in a preferred activity within a preferred setting in order to achieve a satisfying experience' (Taylor, 1993, p.2).

The Department of Conservation uses this spectrum to describe, manage and maintain a range of recreation opportunities in order to achieve satisfying recreation experiences (Taylor, 1993). The purpose of this planning spectrum is to provide a logical and consistent framework for recreation decision-making. "Through overlaying the identified recreation opportunities over the natural characteristics, assessment of recreation patterns and changes that might be required to manage the impacts can be made" (Taylor, 1993, p.5). By dividing the landscape into six land classes (known as opportunity classes) to aid the understanding of biological, social and managerial relationships, management can set parameters and guidelines depending on the experiences gained within that particular setting to help identify when an impact is unsuitable.

The Port Hills were divided up using this spectrum in 1986. For example Ahuriri Scenic Reserve was the only reserve identified on the Port Hills as being able to cater for a 'wilderness type' experience. The reserve was reported to cater for experiences of solitude within a highly natural landscape where management presence was limited. At Kennedy's Bush Scenic Reserve a natural, yet developed experience was identified. This is because although the reserve is large with an abundance of native plants and animals, the track system and car park are well developed.

5.2.1.2 Limits of Acceptable Change

The Limits of Acceptable Change concept represents a reformulated view of the original carrying capacity model where the aim is to identify desired conditions and manage use levels and/or other management parameters so that impacts do not exceed these conditions (Shelby and Heberlein, 1986). It also incorporates the 'opportunity class structure', which is the basis of the Recreational Opportunity Spectrum.

The Limits of Acceptable Change process "identifies appropriate and acceptable resource and social conditions and the actions needed to protect or achieve those conditions" (Nilsen and Tayler, 1997, p.51). Quantifiable indicators are used to monitor changes in the ecological and social environments, which were previously identified as areas of concern. Standards of each indicator are used as the 'basis for judging whether a condition is acceptable of not" (ibid.). Management actions are then developed to counter undesirable changes (Booth and Cullen, 1995). Examples of indicators used to measure change at Kennedy's Bush Scenic Reserve could be the spread of noxious flowering currant. At Ahuriri Scenic Reserve, the number of juvenile podocarp species, would give an idea regeneration was occurring.

The focus in 1985 became not how much use should be allowed, as had been the basis of the Recreational Opportunity Spectrum, but how much change should be allowed. This model places importance on the effects of recreational use in an area, rather than the numbers of users in an area. The Limits of Acceptable Change, like all frameworks, is a process dependent on value judgements, but such a process can help to identify and then monitor natural, physical and social environments in a quantifiable manner so that management can base some objectives for their park on a 'satisfactory level of quality' (Manning, 1986, p.44).

5.2.1.3 Visitor Impact Management

Visitor Impact Management was developed by the National Parks and Conservation Association in America (Cessford, 1997a). It builds on the Limits of Acceptable Change concept, again focussing on the effects of recreational use, but "places more emphasis in the determination of potential causal factors affecting the occurrence and severity of unacceptable impacts" (Booth and Cullen, 1995, p.103). It is seen as a process which

managers can use to scientifically evaluate impacts and consequently manage visitors (Kuss, Graefe and Vaske, 1990).

Like the Limits of Acceptable Change process standards are established which specify the limits or appropriate levels of impact which can occur (Nilsen and Tayler, 1997). Nilsen and Tayler (1997) identified possible examples of impact to include indicators like, the area of bare ground, the diversity and composition of plant species, and visitor perceptions of crowding and impact on the environment.

5.2.1.4 Visitor Experience and Resource Protection System

Visitor Experience and Resource Protection System was designed by the National Parks service in America in 1993. It is based on the same elements of Limits of Acceptable Change and Visitor Impact Management methodologies. A reformulated view of carrying capacity, this framework investigates the quality of the resources and the quality of the visitor experience rather than the maximum number of users who can fit into a natural area. Therefore, this planning framework looks at carrying capacity in terms of the experience desired and the resource protection wanted for an area.

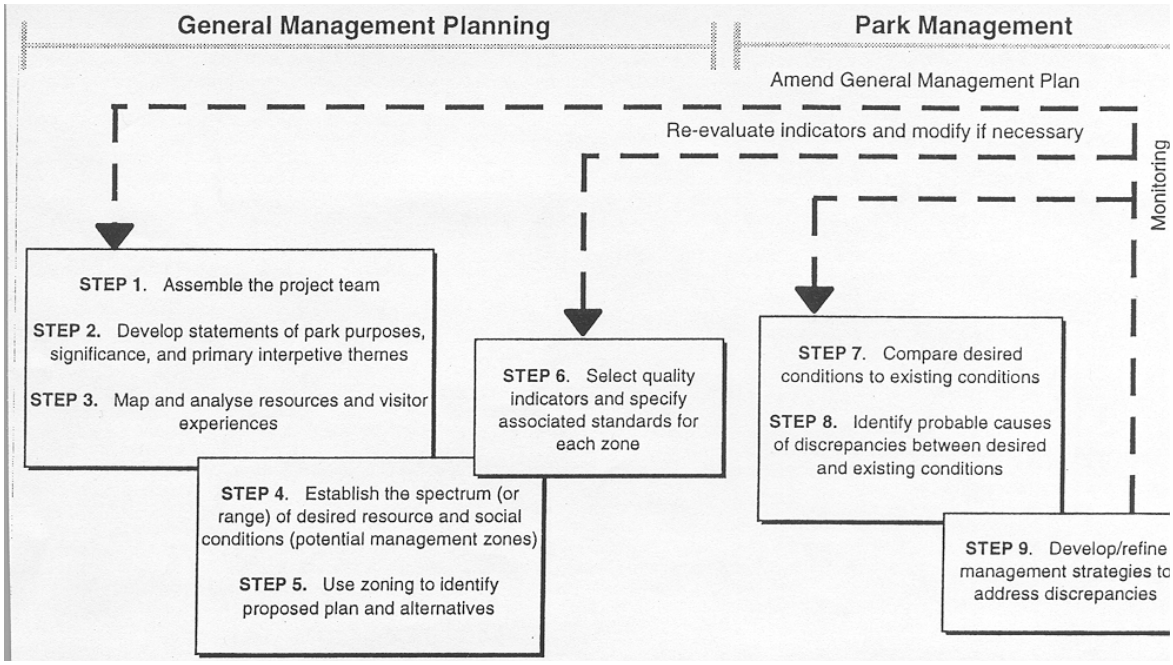


Figure 4. Process for addressing the visitor experience and resource protection system (Cessford and Dingwall, 1997).

"The product is a series of prescriptive management zones defining desired future conditions with indicators and standards" (Nilsen and Tayler, 1997, p.51).

A long term monitoring programme is an essential element of all these planning programmes mentioned and is intended to give park managers the information and rationale processes needed to make sound decisions about visitor use in order to gain public and agency support to implement those decisions (Cessford and Dingwall, 1997a). Data collection and monitoring is a constant, time consuming, and expensive process which often limits the application of these processes in reality.

5.3 Perceptions of Impact

This section provides some background about the perceptions of impact. It is useful to know this ,information on the perceptions of impact as the following sections provide examples of perceptions of impact on the Port Hills. This research uncovers some of the perceptions of impacts, felt by recreationists, landowners, managers and community groups who use the Port Hills.

> *Outdoor recreation is primarily a psychological experience, the quality of which depends on personal expectations, belief systems and prior experiences as much as it does on the physical condition of the area visited* (Booth, 1988).

Over time, each recreationist will build up a collection of perceptions for particular settings. Perceptions of today's experience may be based on previous trips, so that a person can perceive a place as crowded, based on the fact other users were not here on the first few trips (Druce, 1995). Crowding is a perceptual concept and this can reduce your individual satisfaction level and could cause displacement (Manning, 1986). Impact, whether it is perceived or actual impairs the quality of experience of a user.

In New Zealand research into individual's perceptions of the natural environment has concentrated on the perceptions of crowding and conflict (Booth and Cullen, 1995). Correlation's between visitor numbers and the resulting visitor experience suggest that the perception of crowding effects a recreationists experience. Likewise the conflict between different activities can be perceived to impact on a recreationists experience. (ibid.).

Research also indicates that manager's perceptions of visitors to outdoor recreation areas often differs from reality (Manning, 1986). People's perceptions may also be poor indicators of resource conditions (Sutton, 1992), as people have different expectations and outcomes of a recreational area, and tolerate impact to differing levels. What you perceive as impact depends on your level of tolerance, and your expectation of what you want to

get out of the activity (Manning, 1986). If the desire for solitude is strong, then you are likely to be more sensitive to crowding and how other people are interacting with you (Druce, 1995).

The behaviour of others is intertwined with your own personal definitions of what is appropriate behaviour (Druce, 1995). The perception of impact may be dependent on a person's perception of similarity with other users (Manning, 1986). It may not be the numbers of people that affect the quality of a recreational experience, but the differing norms and social values that other users may have. Some people indicated that they were aware of certain impacts, but indicated that they were not bothered by them, whereas the impacts could have ruined someone else's experience (Cessford, 1997).

O'Connor (pers. comm., 1999) believes that one of the stumbling blocks that have resulted in conflicts has been the landowner's views of recreation and impact, which differs sometimes from that of a recreational user or a manager. He believes

> *Their views have not been understood by those who are doing the recreational planning or the reserve planning.*

Recreationists may perceive something, like forestry, which does not directly affect their ability to carry out their recreational activity to hinder the experience they are achieving . For example people perceive that some land uses are more appropriate than others. Forestry was noted by a landowner on the Port Hills, as one of the best land uses to mitigate erosion and yet

> *It's difficult when you have some people who think you should be able to plant on your land what you want and where you like, and other people who think there should be no trees.*

Research into the perceptions of impacts is rarely investigated, although the perceptions of crowding and conflict have been studied by Cessford on many of the 'Great Walks' in New Zealand. Crowding and conflict can result in displacement. As use increases the kind of experience some users were after will disappear, and "they may leave the area in search of lower-density experiences more desirable to them" (Shelby and Heberlein, 1986 p.57). As physical and social impacts occur it seems also inevitable that dissatisfied users will be replaced by others (Kearsley, 1997).

5.4 Types of Impact Resulting from Recreational Use

There are different types of impact. Impacts that occur in an area may be a result of both recreational and non-recreational use, and so both of these types of uses will be discussed. Social and biological and ecological impacts are discussed first.

5.4.1 Social Impacts

Research on social impacts has been focused on crowding and conflict, both, which are perceptual concepts. Social impacts, for example can be seeing too many people, perceived over-development of an area seeing too many big groups, seeing litter or hearing noise (Cessford, 1998).
For those recreationists who perceive crowding and conflict to interfere with their recreational experience two forms of coping behaviour, displacement and rationalisation can operate. On the Port Hills recreationists mentioned that crowding and conflict were occurring, and that displacement did occur. Displacement is where tolerant users take the place of less tolerant users who move onto areas which are, for example, less crowded, more pristine, or have less litter. Rationalisation is where people focus on the positive aspects of their experience and try to forget or minimise the aspects that would otherwise cause them conflict (Booth and Cullen, 1995).

Crowding is a value judgement signifying that there are too many people, which can interfere with a persons goal achievement and enjoyment of the activity (Kuss, Graefe and Vaske, 1990). Conflict is where the behaviour of other users adversely interferes with your goals. “The extent of conflict varies according to the importance of the goal being obstructed and many other factors”, such as the number of other users and the extent to which groups perceive themselves as dissimilar to each other (ibid., p.192).

Conflict is often asymmetrical, between different activity groups. For example, research in New Zealand has concluded this as well. Cessford (1998) noted that encountering motorboats on the Whanganui River was a very prominent negative social impact from users of non-mechanised watercraft. Likewise recreationists on the Port Hills mentioned this dislike for noisy cars when they were out walking or biking. The reason for this impact and conflict between users is explained well by the following quote,

> *"The interests of those who seek solitude and those who wish to enjoy the wild attributes of more or less primeval environments may clash with the interests of persons whose pleasures depend on extensive artificial facilities, use of motorised equipment etc."* (Caton, 1979).

The perceived quality of the recreational experience is being undermined. There is a relatively long history associated with the effects of increasing use levels producing lowered satisfaction and quality in recreational experiences (Manning, 1986). The concern over this was what brought about the need for a carrying capacity or limit to be placed on areas where the quality of recreation was perceived to be threatened.

Noise was reported by Kearsley (1997, p.160) as a predominant irritant by users. Likewise there appeared little tolerance from visitors to seeing litter (Cessford, 1998). Recreationists may also annoy nearby residents, through trespassing on private land and the invasion of privacy. Cessford (1995) also found that walkers perceived mountain bikers to cause too much environmental impact, to present a safety hazard to others and to be in inappropriate in settings where walking occurs. These perceived impacts are mentioned in connection with the Port Hills in sections 5.5.2 and 5.5.6.

5.4.2 Biophysical and Ecological Impacts

Impacts of recreation on the natural environment is the result of inter-related and interdependent environmental components (Booth, 1988). The soil, vegetation, climate and fauna make up an environment of inter-related ecosystems, where impacts to one aspect can create a succession of impacts. For example the clearance of vegetation from a campsite disturbs and compacts the soil, opens up the vegetation and can change a shady area to a high light intensity area, removing the previous environment once suitable for shade tolerant species. As a result birds that are dependent on these trees may fly elsewhere, reducing species diversity.

Biophysical and ecological impacts can be direct, people cutting trees or branches for firewood, or indirect, the impact of engine exhaust noise from off-road vehicles, which disturbs wildlife (Blumhardt, 1979). Effects can appear quickly, or can be long term, such as the decreased productivity of breeding in wildlife. Long term effects are harder to monitor as the effect is not immediately obvious and numbers could appear to be the same, yet the proportion of young could be decreasing. For example in a reserve on the

Port Hills, the number of birds present could remain the same, but the proportion of native and introduced species could alter.

Recreational impacts on soil can result in soil compaction, erosion, disturbance, and nutrient enrichment or pollution, and the consequential effect is dependent on the soil type, slope, aspect, climate, drainage and the type of vegetation present (Appendix 15) (Plate 15). Walking can disturb flora and cause soil erosion if tracks that walkers use are poorly formed (Canterbury United Council, 1986c). Soil compaction, can result in reduced soil porosity, and greater run-off (Cessford and Dingwall, 1997b). Erosion and disturbance can weaken the soil structure and cause water channelling, which reduces the amount of water available to plants. Nutrient enrichment and pollution can disrupt soil biological processes and/or allow for invasion of new species due to the altered soil type (Cessford and Dingwall, 1997a).

Plate 15. Soil compaction at car park, Summit Road.

Cessford (1995, p.7) described how mountain bikes can alter the soil by enhancing water flow and disturbing the soil to increase erosion. After rain, the use of tracks by mountain bikes caused the development of lateral spread, as bikers avoided muddy stretches of water which have ponded due to soil compaction (Cessford, 1995). The impact of recreation on geological features can result from graffiti on a rock or a network of pitons across a rock face (Booth, 1988).

The effect of recreational use on vegetation can also be quite harmful due to trampling, vegetation removal/destruction, pests and wild animals, fire, loss of percentage cover, loss of species diversity and habitat alteration. Trampling can make the soil inhospitable to plants and can harm tree bases and roots reducing growth (Booth, l988). Tree cutting and the collection of wood for fires and poles and the collection of plant species for gardens directly affects vegetation composition, especially if the 'souveniring' is of a rare plant.

People also bring in seeds on their shoes. The presence of people can alter the percentage cover as vegetation is removed to make way for tracks, campsites and huts, and species diversity as less recreation-tolerant species are succeeded by those which are (Booth, 1988). Track cutting also creates habitats for new plants opening up an area (ibid.), but exotic species are quick to colonise these new high light intensity areas.

In New Zealand recreationists are attracted to areas where wildlife occurs. Often people adversely affect what they have come to see. People affect the behaviour of wildlife, the feeding behaviour and the breeding success, and can alter the habitat, by introducing pests which then compete with natives. People may also trample and/or destroy wildlife habitat (Ward and Beanhand, 1996). People can displace wildlife from their preferred habitat, forcing them into less optimal habitats (Kuss, Graefe and Vaske, 1990). Noise from vehicles and dogs associated with visitors can also impact on fauna.

"Perceptions of ecological disturbance can also influence the quality of a visitor's experience in much the same way as conflicts arising from other user groups" (Kuss, Graefe and Vaske, 1990 p.3). For example, if a person feels they scared away the birds by walking through the reserve, or helped to expand the track, and damage trackside vegetation by avoiding puddles, then their recreational experience could be diminished. Likewise recreationists could feel that adjoining land uses impact on their experience. For example a visitor could be worried about the cattle in the next door paddock and the gorse over the fence invading the native vegetation. Perceptions such as these were reported by recreationists who use the Port Hills.

5.5 Recreational Impacts on the Port Hills

The previous section discussed social, and ecological impacts in general. This section discusses people's perceptions of recreational impact on the Port Hills and on the specific reserves, Kennedy's Bush Scenic Reserve and Ahuriri Scenic Reserve, using data to illustrate the points made.

Biophysical and ecological, and social impacts occur on individual reserves on the Port Hills. Recreationists, landowners, managers and members from community groups mentioned that walkers, mountain bikers, rock climbers, 'hoon' car drivers, four-wheel drive users and people who trespass produce these. Therefore this section is divided into a discussion of each of these activities in turn. It is acknowledged that others recreational users do impact on the Port Hills as well, but they were not mentioned by the people who I interviewed, and so are not discussed here.

It is acknowledged that recreational activities do produce impacts on the Port Hills. However, policies are set up to try and minimise impacts on the Port Hills. For instance, policy 2.7 of the City Plan (Christchurch City Council, 1993b p.2/29) states that no recreational activity should "adversely impact upon the landscape characteristics". The City Plan (Christchurch City Council, 1993a p.3/46) notes that although the use of open space produces positive impacts, such as environmental awareness and education, increased fitness, a number of negative impacts can also occur. Eight negative impacts were mentioned. These included potential conflict between users, car park facilities resulting and increased traffic movement and the use of environmentally sensitive areas.

The Canterbury Regional Council (1997) noted that the main human activities that impact on land stability are earthworks, vegetation clearance, and introduction of domestic grazing and levels of pest control. It is interesting to note that the impacts from recreational use are not mentioned at all as a primary human-related impact. Loughton (1998 p.13) stated that Kennedy's Bush Scenic Reserve Bush parking area had an "unstable, unsightly appearance". Earthworks, such as the car parks and associated fences at Kennedy's Bush Scenic Reserve and Kennedy's Bush Road (Summit Road end), also attracts more use, which in turn increases impact to these areas.

Plate 16. Tree damage at Kennedy's Bush Scenic Reserve

Vandalism and rubbish are problems associated with public use of public areas. Loughton (1998) mentions that vandalism and the dumping of rubbish occurs along the Summit Road (Plate 16 and 17). Vandalism still occurs at the Sign of the Bellbird (Jameson, pers. comm., 1999). Areas such as Kennedy's Bush Scenic Reserve lend themselves to picnicking and therefore the likelihood of rubbish is greater. Ahuriri Scenic Reserve would have less of a concern with litter as use is lower and there are no 'resting-places' set aside. A female recreational user suggested that rubbish "might be more of a problem in places like the playground at Victoria Park where more people go".

Plate 17. Rubbish pile at Kennedy's Bush Scenic Reserve.

5.5.1 The Impacts of Walking

Walking and botanising contribute to the ecological impacts on the Port Hills and have the potential to cause damage as natural environments, which are particularly sensitive to

change. Tracks in Ahuriri Scenic Reserve Bush are based on a mixed colluvium regolith and "have shown slight compaction of the upper layers and some soil disturbance on the areas of steeper ground" and "tracks through loessial soils in Kennedy's Bush Scenic Reserve Bush have shown damage from compaction and puddling of the topsoil" (Brumley, 1980 p.128).

Impact is usually attributed to entry and exit points of reserves and tracks. Where there is no obvious track, each individual will make their own and this can result in impact becoming more obvious and widespread. Therefore users could perceive a high impact although overall, the affected track may only cover a small percentage of the reserve. After wet weather, if walkers keep to a track, this greatly reduces impact elsewhere, but can cause the track to become 'boggy' and people can expand the track sideways as they avoid the 'boggy area'. A walker agrees with this, saying,

> *Soil compaction and possibly erosion is effected by the use of these facilities when the ground is going to be susceptible, after heavy rain, or foliage has been removed.*

Another recreationist who uses the Port Hills for walking and mountain biking said "mountain biking causes some soil damage", but did not perceive walking to produce the equivalent effects.

5.5.2 The Impacts of Mountain Biking

Comments about mountain biking and mountain bikers relate to the perceived ecological, and social impacts that occur as a result of the recreational activity. Jameson, a member of the Summit Road Society, gave the impression that mountain biking was not a suitable activity on the Port Hills:

> *Mountain bikers are fairly largely confined to these road reserves, which we can not prevent them from riding on.*

Biophysical impacts occur as a result of mountain biking. For instance two mountain bikers, a male and a female acknowledged that biophysical impacts do occur,

> *Rutting can be a hazard from mountain bikes but generally that is caused by heaps of rainfall.*

> *Some of the bike tracks rip up the ground.*

Jameson (pers. comm., 1999) perceives that in certain areas mountain biking (and other activities additional to walking) is an inappropriate activity because of the biophysical impacts it causes. Note how the original impact is thought to lead on to other impacts.

> *I would say in certain areas walking tracks are getting overused, and if it's confined to the walking tracks we're not doing too badly. But once you spill over, or once you put mountain bikes or horses on walking tracks you get a lot of damage done, to not just the walking tracks but the enjoyable areas of native bush, because of the run-off and the flooding and that kind of thing, like erosion*

Another mountain biker, a female, provided a reason as to why she perceived biophysical impacts from mountain bikes to occur,

> *Tracks that are not well maintained do have effects, such as track widening.*

However, a male mountain biker felt that biophysical and ecological impacts would be minimal because,

> *Most of the mountain bike tracks are purpose-built, so there is little problem with environmental impact. Also mountain bikers stick to the track (usually) and so do not tend to damage the plants and stuff close to the side of the track.*

Social impacts were also reported by users, with conflict being perceived as a common occurrence. Jameson, a member of the Summit Road Society, mentioned an example where he perceived social impact to be occurring. He was disturbed with the following report where he heard of

> *Mountain bikes coming and they [the people] hadn't heard, [bikers] coming around the bend in the track and suddenly they were upon them. So there's that element of danger, lack of control, because the ranger staff can't be everywhere and you get people who co-operate and then those who do not.*

Both single use tracks and multi-use tracks exist on the Port Hills. All the mountain bikers I spoke with commented on the benefits of single-use tracks, because they reduced the possibility of conflict between different users occurring. This is illustrated by the four comments by different mountain bikers:

> *Having separate walking and mountain biking tracks is a good idea.*

> *I believe we need a specific environment for mountain biking so there are no conflicts with other track users*

> *The Port Hills have tracks that activities like mountain biking are not allowed and this is good for preserving some areas and designating them for walkers only.*

> *I think it is better to have designated tracks for walking, biking, four-wheel driving or motorbiking. The old days of free-for-all on the same tracks aren't safe with the greater number of people, or particularly environmentally friendly.*

Although mountain bikers preferred purpose-built mountain bike tracks, they realised the need to accept there were going to be other users on multi-purpose tracks and that social impacts, especially conflict, should be minimised between users. A female mountain biker suggested that,

> *As long as we follow simple common sense such as slowing down and not using excessive speed close to walkers it is fine.*

and visa-versa,

> *Good to have separate tracks for mountain bikes, but I have walked these as well, and then I give way*. (a female mountain biker)

Mountain biking and walking can be in conflict, unless you have lots of vision (O'Connor, pers. comm., 1999). Conflict occurs because users with different goals and aims must get along in the same environment. For example, two male mountain bikers were adamant that conflict was an issue where different activity users occurred in the same areas on the Port Hills, and this did bother them.

> *Runners and walkers need to stay off mountain bike tracks or they risk causing serious accidents. Generally speaking mountain bikers stay off the pedestrian tracks, so they need to respect our rights too.*

> *Mountain bikers go rather fast and sometimes this can be a bit scary for a walker who isn't expecting it. Although I have found that there are some walkers who will make a deliberate effort to stand in front of a speeding mountain bike*.

5.5.3 The Impacts of Rock Climbing

Rock climbing is another recreational activity that can be undertaken on the Port Hills, although it is not pursued in either Kennedy's Bush Scenic Reserve or Ahuriri scenic Reserve. The proportion of comments relating to the social impacts of rock climbing versus the biophysical and ecological impacts of rock climbing suggests that the latter is of greater concern at present for people who use and manage the Port Hills for rock climbing.

One comment was made relating to social impacts, suggesting that crowding occurs only during weekends. However, it was also perceived by two recreationists that "at the current level its [impacts are] not too drastic", "although sometimes [there are] too many rock climbers on weekends".

The following comments all refer to the biophysical and ecological impacts that rock climbing produces. Devlin (pers. comm., 1999) reported that they:

> *We're noticing some detrimental effects from people lashing their way through the bush to get to the bluff and then cleaning the route out, which means cleaning out all the rare ferns and things like that so they can get a route through there and then drill holes in the rock to bolt it. Which sort of adds a visual problem, as well as the impact of removing the vegetation.*

One interesting comment from a female rock climber is that she acknowledged,

> *Chalk marks on the rocks, [and]wearing of the rock does not look natural.*

As noted in section 2.5, some endemic rare species grow only on the rocks of the Port Hills. Kirk (pers. comm., 1999), too was upset to notice that at Mount Pleasant rock climbers have made a bit of a mess, which is a concern as there are some special plants there.

However one rock climber perceived things differently,

> *Impact is only slight. Climbers are always careful of vegetation and [it] is noiseless. I think the detrimental effects from climbing are very very minimal.*

Kirk (pers. comm., 1999) also realises that most rock climbers are sensible, and one recreationist goes as far to say that most users are environmentally conscious.
The difference in perceptions between users and managers is highlighted in this section. Rock climbers noticed that vegetation could get damaged during rock climbing, but did not feel this was a huge issue. Whereas managers and people whom I interviewed who came from an ecological background, not only felt rock climbing produced detrimental effects on vegetation, but perceived it as being detrimental to the ecological integrity of the Port Hills.

5.5.4 The Impacts of Cars

Pleasure driving is a major activity along the Summit Road. It was perceived that social impacts occur as a result of this activity. All impacts are related to noisy vehicles. Noise had negatively effected the recreational experience of two males, I interviewed. They commented:

> *The worst thing is inconsiderate and noisy drivers.(walker)*

> *Noise from motorbikes sucks.(pleasure driver)*

O'Connor (pers. comm., 1999) identified however that some cars are causing negative social impacts, due to the type of activity in which they participate.

> *Recreational use of the motor vehicle is something that needs to be counted. The Port Hills is a place for slow driving. There can be too much exhilaration gained from 'gunning it'. It's quite serious, unless you provide hoon opportunities [elsewhere] they will continue to use the Port Hills. In my view it seldom gets patrolled by traffic officers.*

People not driving noisy cars perceive themselves to be affected, because they often go to the Port Hills to escape from the noises of the city, whereas the noise produced from 'hoon' cars enhances the experience for the drivers.

Impacts can be perceived as being produced from certain users, when in fact those users may not be at fault. For example, a male walker perceived specific users as producing negative impacts:

> *Inconsiderate mountain bikers and motorcyclists are probably the worst offenders but young people having parties etc. on areas, usually near Victoria Park up to the Sign of the Kiwi, leave rubbish and are prone to damaging the plants etc. or marking/damaging signs.*

5.5.5 The Impacts of Four-wheel Drive Vehicles

Social and biophysical and ecological impacts result from the use of four-wheel drive vehicles. One landowner mentioned the social impacts of four-wheel drive vehicles, which trespass on to private land to carry out their activities, and the impacts associated with trespass such as fire, public safety, and stock loss as a result of leaving gates open.

> *We have four-wheel drivers who use the gullies as a place to test their driving skills. Because they do not know where the paper road is they think that any farm track near the road is a paper road as well, or because you can drive onto it from the paper road, without closing a gate off the paper road, they think that it is public land too. In the height of the drought, not last summer, but the summer before, it was in February, I woke up one Sunday morning and looked out to find 80 four-wheel drives going up the hills, and by the time I got on my bike and found them they were parked in my paddock having lunch. Anything would have set fire to the whole hill.*

Conflict can also occur between users participating in the same activity. A female four-wheel drive user commented about biophysical impacts of four-wheel drives, especially when they are used inappropriately. This is also a concern of hers because other people's use of the area impacts on her experiences. She said that

> *Some of the four-wheel drive tracks, for example Worsley Spur, are completely ruined by motorbike tracks dug very deeply, and ignorant losers who go up when the ground is very wet and muddy.*

A walker also mentioned Worsley Spur in the similar manner, but note how he perceives mountain bikers, not motorbike riders to be to blame.

> *The mountain bikers have absolutely devastated Worsley Spur, turning a lovely track of a few years ago into a bomb site which is very dangerous so that I would never take visitors up there now.*

Both the four-wheel driver and the walker used to use the same area and both comment on how the area has been ruined. However, each is quite definite about who caused this impact. Regardless of who caused the damage, these users now perceive one activity to be to blame, and as a result this has affected their experience and enjoyment of the area. Both users have been displaced from this site, and will seek out less used areas.

5.5.6 The Impacts of Trespass

Trespassing is a problem with people using the hills for recreation. One landowner identified differing perceptions of the land as to be the cause of the trespass problem:

> *First of all because it's a hill and not flat. Even though its part of the irony, a lot of New Zealanders, particularly city New Zealanders, want to treat it as they would a national park, because they think of hills as government owned, either in national parks or crown leases. So we have a great number of people who think they have a right to be there, as of right, on this hill. They wouldn't consider stepping over a fence on a piece of flat land, but they have no hesitation about doing it on the hills.*

Kirk, (pers. comm., 1999) also accepts that trespass is a problem, suggesting people will trespass to get a short cut and that is a problem for everybody else, and if they do not trespass then they'll go somewhere else, and take a back route through some farmer's property, and that's a problem.

Jameson (pers. comm., 1999) can see why farmers may not allow recreationists across their land, "I can appreciate and understand his [sic] feelings for it, maybe someone has taken a dog on his property, and ruffled up the sheep, or he feels it's an invasion of property". Jameson mentioned how one landowner views recreational use as an improper activity for his land:

> *As being his land, I brought this land with my own money, and I'm running sheep on it and cattle and I like it because its my property and I do not intend to have all Tom, Dick and Harry wandering across my land.*

Jameson believes that these worries can be minimised if a public walkway system is put across private land, because the landowner can then control traffic with the benefit of a formed track, which will hopefully restrict people to that track.

Differing perceptions of how freely people should be able to obtain access to other people's land produces conflict. The impression given by the Summit Road Society is that people should have the right to walk across private land. The landowners perceive this freedom of access differently. The perception provided by the landowner, that if this was flat land people would not view it as their right to use it.

5.6 Perceived Impact on the Port Hills as a Result of Other Uses

Impacts that occur on the Port Hills are not solely a result of recreation. People also perceive that some non-recreational uses impair their experience whilst they are on the Port Hills. Non-recreational uses mentioned were: weeds, natural events, stock, wild mammalian pests, forestry and built structures. In the previous section it was recreationists who had a lot to say about the impacts they perceived other recreationists to produce. In this section, the people with a strong ecological background are quick to point out the devastating impacts of pests and natural events. A lot of time is spent by managers controlling weed and animal pests. Recreational users of the area, may have noticed these impacts, but did not seem as bothered by them.

5.6.1 Weeds

In 1993, the Christchurch City Council (1993b) reported "extensive infestations of gorse and some broom over parts of the lower road reserve" at Kennedy's Bush Scenic Reserve. A weed is classified as something that would change the character of an area (Burrows, pers. comm., 1999), and in this case it could alter the visual landscape (Plate 18).

The adverse ecological impact of gorse (*Ulex europaeus*) needs to be balanced with its usefulness as a nursery plant for natives. Gorse is not perceived to be a problem weed by managers on the Port Hills, although it is there in large quantities. However, as a landowner on the Port Hills points out

> *Most of the gorse given our current climate could be left till the cows come home and you're not going to get anything but gorse and unfortunately a lot of gorse is just being left there as huge seed packs. If you're on some of the valleys on the other side of the hill, that sort of thing, some of the easterly facing ones which tend to stay a lot wetter, some of the south faces, they'll regenerate if there's a decent seed source nearby. But for most of it, it won't, not on the dry areas, and it does create a big fire risk.*

Kirk (pers. comm., 1999) also believes gorse is not a problem, and what is there is sprayed by the rangers, along with broom (Devlin, pers. comm.,1999). Broom (*Cytisus scoparius*) is not a concern in Whakaraupo. For example the whole reserve is nearly covered in broom, but "there is about three organisms [biological control agents] chewing away at it and there is debris everywhere" (Burrows, pers. comm., 1999).

Plate 18. The visual impact of gorse and broom surrounding Predergasts Bush (photo by Rueben McPeak)

Devlin and Burrows identified the weeds that they consider to be a major problem, nassella tussock and woody weeds. Nassella tussock (*Stipa trichotoma*) is a class A, targeted, noxious weed and is a problem in the dry eastern reserves, because it can limit stock movements. "*You can't move stock if the nassella tussock is too bad because it gets into the stock and then as you move the stock from block to block you spread the problem*" (Devlin, 1999). Each nassella tussock can produce up to 120,000 seeds per year with seeds being viable in the soil for up to 20-25 years. The most seriously infested areas

in Canterbury are the Hurunui District, Banks Peninsula and the Rakaia River catchment, where step, sunny slopes, dry spurs and knobs, tussock grasslands and stony riverbeds are preferred (Sheldon, Rossiter, McCaw and Glennie, 1991). All these qualities except the last one, can be found on the Port Hills, which explains why each year a control programme involving grubbing the weed out by hand occurs. This year (1999) 11,000 plants were removed (Devlin, pers. comm., 1999).

In the area from Sugar Loaf to Kennedy's Bush Scenic Reserve, Burrows, member of Port Hills 2000 believes woody week species are

> *Getting away in leaps and bounds. Red currant, boneseed, elderberry, hawthorn, boxthorn are all berry fruits and so they are transported round by birds and they can travel in one shot for hundreds of metres.*

Therefore, the effects of a single plant can be felt for quite a distance. To remove these plants, hand removal is again the best method. As Burrows (pers. comm., 1999) says "spraying extensively with herbicide is not a good idea, because you hit things that you do not want to, things that are desirable". Also, with people using the areas of weed infestation, the extensive use of herbicides could be perceived as harmful to them. However the visual presence of weeds could adversely impact on the experience of a person who has gone to the Port Hills to experience the panoramic views.

So although weeds are very abundant on the Port Hills, and are perceived as a huge problem to managers, it is interesting to note that no recreational users mentioned that weeds adversely impacted on their recreational experience.

5.6.2 Natural Events

Natural disaster events occur periodically greatly affecting localised areas of reserve. This in turn can have an impact on the experience that a recreational user might seek. Several natural events have occurred in Kennedy's Bush Scenic Reserve. In 1930 an extensive fire caused damage to Kennedy's Bush Scenic Reserve Bush (McCaskill, 1978). Heavy rain in 1977 resulted in a slip destroying some of the reserve and perimeter fencing in Kennedy's Bush Scenic Reserve (Loughton, 1998). Again this year (1999) a natural event has took its toll on the bush. A slip wiped out a large portion of Orongomai trail and surrounding bush (Singleton pers. comm. 1999). As the Port Hills ranger says,

> *It is quite sad because what little ecosystem we have here [is] quite small, precious and fragile, and to have three hectares of it disappear, large trees and a lot of habitat, is not good.*

So here the natural event has adversely affected the ecological nature of the reserve, and it has impacts on recreational use of the reserve. A large portion of this track is now closed. Recreational users who used this track, because it offered steep downhill and uphill gradients, a long walk, and a track with fewer people on, have now been displaced. This natural event has adversely effected on the ecological integrity more than any impact from recreation.

The Christchurch City Council (1993b) also reported that

> *Following a disastrous snow storm of Friday 27 August 1992, considerable damage and destruction occurred to the bush and a significant percentage [of the] vegetation was either badly damaged or in some cases destroyed altogether.*

The snow did a lot of damage, for example in Ahuriri Scenic Reserve it "smashed down the tops of totara, which had been standing there for a number of years" (Burrows, pers. comm., 1999). The flow on effects on this were equally as devastating, as the snow which had piled up against the fence made an easy 'bridge' for goats to walk into the reserve.

Also due to the proximity of the hills to urban housing, fire in an important factor which must be reduced if possible before it spreads down into housing areas. So grazing of some land is an important management option for reducing the threat of fire. In addition, grazing has the benefit of enhancing regeneration through the removal of highly competitive, tall exotic grasses (Wilson, 1998). Grazing with sheep can maintain the native tussock grasslands, but cannot reduce the growth of woody weed species (ibid.).

Burrows, a member of the Port Hills 2000 committee, recalls a fire that happened at Scott Reserve, an area where members of Port Hills 2000 were supplementary planting natives amongst the naturally regenerating natives. "I do not know how it began, after we planted last year, and it came right up over the top and burnt every plant" (Burrows, pers. comm., 1999). Fire so easily produces a devastating impact on an area, but it does have one positive benefit,

> *This year we went back. The one advantage was that it burnt all the grass and made it much easier to plant again, the soil was bare and fairly easy to dig. These European grasses are so vigorous, they suppress anything else, because grass is such a strong competitor for water.(Burrows, pers. comm, 1999)*

5.6.3 Stock

Stock problems on the Summit Road and in the reserves were frequent events before each was fenced off. As far back as 1915 Cockayne reported (1915) that due to cattle, ferns were not numerous in the reserve. Coopers Knob Reserve, the reserve next to Ahuriri Scenic Reserve, is regenerating from bracken to forest and until it was fenced, cattle from the adjoining Living Springs farm would come through into the reserve. "It was a terrible set back to have these cattle in there, munching away" (Burrows, pers. comm,. 1999). Another cattle stop has been installed and the reserve is now partly fenced, tactics that will hopefully reduce the impacts from stock. But as Webster (1998) mentions, due to the lack of fencing, sheep are practically free to move between the farmed areas and the reserves in the Coopers Knob area.

Plate 19. Stock and predator fencing around Ahuriri Scenic Reserve.

The impacts of grazing and trampling of stock have resulted in "the destruction and further suppression of regenerative growth" and a lack of middle story growth (Brumley, 1980 p.129). Grazing, fire and erosion are invariably linked, as Devlin from the Port Hills ranger service mentions.

If we over-graze we are going to open up the ground cover and erosion will set in. If we under-graze we will have to much rank growth and silver tussock and inter-tussock weeds will set in and if we have fire its going to take out much more land than if it was grazed.

In 1992 the Christchurch City Council stated that accelerated soil erosion on the Port Hills continues with overgrazing and housing subdivisions. Due to the susceptibility of erosion of the soils on the Port Hills, Policy 2.7.6 of the City Plan (Christchurch City Council 1999b p.2/31) states that activities need to be viewed in terms of their potential to increase erosion and cause an unsightly effect.

5.6.4 Wild Mammalian Pests

There are many introduced pests present on the Port Hills. Possums, rabbits, goats, deer and pigs cause various impacts. The impacts of these pests are perceived differently by different people. Pests eat and/or trample the vegetation, reducing native regeneration and spread introduced pest weeds. A lack of vegetation diversity reduces the abundance and diversity of habitat for native birds. This is turn could impact on a recreationists experience of a trip to a reserve, if they were interested in bird watching. The additional influence of pests adds considerable pressure on the already vulnerable ecosystems.

5.6.4.1 Possums

Possums (*Trichosurus vulpecula*) are present in Kennedy's Bush Scenic Reserve and other reserves and cause "significant damage by chewing the tops off native vegetation" (Christchurch City Council, 1993b). Webster (1998) believes possums are not only present, but out of control in Kennedy's Bush Scenic Reserve Bush. The effect of possums and rabbits is not significant at Ahuriri Scenic Reserve, although the threat is always there (Christchurch City Council, 1993a). However, 15 years ago O'Connor (pers. comm., 1999) noticed a lot of possum damage. Pest control is only a recent occurrence (Devlin, pers. comm., 1999).

Plate 20. Bait station at Ahuriri Scenic Reserve (photo by Rueben McPeak).

At present (August 1999) bait stations filled with sodium monofluoroacetate (1080) at Ahuriri Scenic Reserve, and Talon can be found at Kennedy's Bush Scenic Reserve Bush, to combat the impact of possumsPlate 20). Although 1080 is water soluble the risk of secondary poisoning does occur, and bird species such as tomtits, robins, rifleman and moreporks do die from inducing the pellets even though dyeing the baits green does make them less attractive to birds (Eason, Wickstrom and Spurr,1998). 1080 still could adversely impact the very things the reserves try and protect.

Talon is a second-generation anticoagulant with the active ingredient of Brodifacoum (Canterbury Regional Council, 1993). It is used for the control of rats and possums, but dogs, cattle and native non-target species have died from ingesting it. However this is minimised with the use of bait stations (Haycock and Eason, 1997).

Such methods are used as "the risks of 1080 are acceptable in relation to the benefits of use" (Fraser, Spurr and Eason, 1995) that is reduced possum numbers, and therefore improved vegetation. Despite the deaths to individual birds, populations will remain stable and therefore the use of such poisons is warranted (Haycock and Eason, 1997). The disadvantage of talon is that possums can ingest sub-lethal doses over along period of time and if enough accumulates they will die of internal bleeding. If not, they become bait shy and very sick.

The problem with possum control is due to the differing perceptions held by stakeholders. Devlin (pers. comm., 1999) views possums as a problem, and mentions how others do not.

> *Everyone's doing it for different reasons, and the local properties over the fence line do not particularly care about the possums unless there's a Tb problem. In some areas there is and in some areas there isn't, so he's not going to spend lots of money unless he's told there's a Tb problem.*

5.6.4.2 Rabbits

Rabbits (*Oryctolagus cuniculus*) can be found all over the Port Hills, but are more of a problem in the eastern part, especially around the Gondola and Castle Rock reserves. The calicivirus (RCD) has decreased rabbit numbers, but the incorrect strain was released and in the wrong season, therefore reducing the effectiveness of the disease (Webster, 1998).

Rabbits are a major cause of soil disturbance and erosion of pastureland (McGuigan, pers. comm.,1999). As Burrows (pers. comm., 1999) points out

> *One of the objectives of Turning Point 2000/Port Hills 2000 is to plant up extensive areas in a reserve above Lyttelton, Whakaraupo and also in Castle rock reserve. Were talking about ten thousand plants in each, and to plant those plants I felt it was simply a waste of money and time unless you've done something about the pest control.*

So pest control is vital for the survival of existing and new plantings. If the environment became overrun with pests and the vegetation degraded, this would impact on how the public perceived and correspondingly treated the area.

5.6.4.3 Goats

Goats (*Capra hircus*) have been identified as the single most important threat to the Port Hills Reserves, second only to the damage of fire (Burrows, 1997). Goats are present in and around Kennedy's Bush Scenic Reserve and large numbers of straying goats are regularly shot in the Reserve (Loughton, 1998). The vegetation in Kennedy's Bush Scenic Reserve provides good cover and feed for goats (Webster, 1998). It is thought that at Kennedy's Bush Scenic Reserve, Coopers Knob and Sugar Loaf reserves, goats continually migrate there from surrounding areas (Webster, 1998), meaning impacts will always occur and continual control will always be necessary.

The problem is some farmers do not perceive goats to be a problem while others do. Goats keep the gorse down for farmers, but also eat the native vegetation in reserve land.

The Port Hills rangers view goats as a problem now, and concentrate on controlling them in their areas, but as Devlin (pers. comm.,1999) points out "most of the pests do not recognise fence lines and boundaries". However, years ago this was not the case. One of the rangers used to go and shot goats every now and then and that used to be pest control, and that was all that was ever done. They were virtually farmed because only the odd one was only taken out every now and then, and so the ones with good heads were left to get bigger" (ibid.).

Another perspective on goats was brought to my attention by a recreational hunter, when asked why they choose the Port Hills as a recreation site, he replied there are, "lots of nasty goats to shoot". So the presence of goats on the Port Hills adds to the recreational experience of some users, while having adverse impact on the experience of others, whose interest is in the vegetation.

5.6.4.4 Deer and Pigs

Deer (*Cervus* sp.) and pigs (*Sus scrofa*), like goats have escaped from domestic stock. A few years ago a landowner in the "Otahuna Valley decided he was going to start a safari, and in the end when he sold the place, the deer and pigs were just let go (Burrows, pers. comm.,1999). So there are now wild red and fallow deer, pigs and goats running rampant on the Hills. For instance an increase in pig 'rooting signs' have been noted in the bottom end of Kennedy's Bush Scenic Reserve (Webster, 1998). Pigs are detrimental in several ways. They dig up vegetation, disturb the soil, invertebrates and birds, and pose a safety issue between hunters and other people using the reserves at night. These pests therefore cause social and ecological impacts in the area.

No recreationists mentioned that introduced pests adversely effected on their visits to the Port Hills. The impacts of these mammalian pests, like weed pests, were perceived to be extremely detrimental to the ecological qualities of the reserves, by managers and community group leaders. These people have had a long association with the Port Hills and the reserves, which might suggest why they perceive these impacts to be so great, as the impacts from pests may not be obvious to short time visitors. Because pests have been around on the Hills for a long period of time, recreationists on the other hand, may just accept the impacts produced from them as the 'norm'.

5.6.5 Forestry

Policy 2.7.4 of the City Plan (Christchurch City Council, 1999b p.2/31) lists eight potential adverse effects that can result if forestry occurs on the Port Hills. Forestry is perceived by landowners to be one of the best ways to prevent soil erosion. However, commercial forestry "particularly on the upper slopes of the Port Hills and those areas east of Dyers Pass Road" (ibid.) is excluded from this area to avoid any adverse impacts and adverse flow-on effects as a result of forestry. As the following quotes suggest it is the visual and social impacts of the trees that people perceive to be unsuitable, rather than the ecological and biophysical impact. Note also in this section, how recreationists perceive forestry to adversely impact their experience.

The perception of pine forests from users is not clear-cut though:

> *There are some[forests] that come up pretty close to the Summit Road and I think in the future where they're logged it would be a very good thing if there was a limitation on that to prevent it being quite to the top, but on the other hand, the one valley that goes up to Dyers Pass looks very attractive with pines. However if there was an initiative by some farmers to more of that it's certainly going to alter the landscape pretty tremendously, so I think it's all the more reason for the city and anyone else to try and acquire as much of this [land] as possible* (Burrows, pers. comm., 1999).

Like Burrows, a female recreational user of the Port Hills also had an ambivalent attitude towards forestry.

> *I prefer trees to buildings, but prefer native bush to* Pinus radiata*. Still the landowner needs to make a sustainable living and grazing sheep and cattle are no longer profitable activities.*

O'Connor (pers. comm., 1999), portrays another dimension.

> *Forests are of significance to kids. Our kids used to get a tremendous kick out of the forest plantations in Victoria Park and so on. We as professionals tend to pay attention to the native forests, but we do not pay attention to the child mind, being in a forest with big trees even though they are all* Pinus radiata*. The significance of pine forest for recreation use has not even been thought of, but bear in mind its limited use because of fire risk.*

So although pine forests are perceived as having negative visual impacts on the landscape, and this has been acknowledged in the City Plan, they can offer a different type of recreational experience and provide an alternative income for landowners. A landowner on the Port Hills believes that there needs to be,

> *Some definite acceptance that the forest owner or forest developer must protect the landscape values on the skyline and so forth, and must be responsible for any erosion that goes with it. So long as you plan on taking out the trees in an environmentally sensitive way there is not problem with using trees, which is exactly how it should be, and that you do not plant over major or significant landscape features.*

5.6.6 Built Structures

Built structures also influence the setting and visual appearance of the Port Hills and can impact on the environment and recreational enjoyment. Although users of the Port Hills and reserves have not commented on the impacts produced by natural events, weeds or mammalian pests in the previous section, in this section a sense of concern is evident that built structures on the Port Hills are inappropriate.

One female recreationist perceived that

> *Potentially huge damaging effects will occur if further development for housing is allowed.*

Although some structures provide enjoyment for some people, they do hinder the pleasure achieved by others. For example the Christchurch Gondola, as mentioned by one user of the Port Hills, "has a bad looking landscape effect especially for Lyttelton residents looking up at the building", but for people using the Gondola it may enhance their enjoyment of the view, whilst doing a unique activity.

The impact to the visual landscape can then alter the way some users perceive the Port Hills (Canterbury United Council, 1986b). Structures are visible a long distance due to the open nature of the Port Hills, and it has been noted previously (section 2.1) that the skyline is an important facet of the Port Hills (Plate 21). One recreationist gave the following opinion that

> *Not being allowed to have things built on the skyline is good. Subdivision encroaching on the flanks of the Hills is a shame.*

Plate 21. Built structures on Sugar Loaf

Policy 2.7.1 of the City Plan (Christchurch City Council, 1999b p.2/29) accepts the fact that certain structures can detract from the visual appearance of the environment and recommends that the "height and bulk of building should be such that no adverse visual impact is created on significant natural feature" of the Port Hills. For instance the Christchurch City Council is getting the owners of the geodesic dome at Cass Peak to repaint it next year (2000) so that it is less visually obvious and blends in more to the surrounding environment (Devlin, pers. comm., 1999). Likewise the Port Hills Landcare Group has the same views,

> *Basically we believe that the upper land should be left undeveloped and that development should be lower down, down on the valley floors and valley walls, so the ridge and significant landscapes and the upper area is not going to be filled in with buildings. If you are going to build in that area, its not absolute that you can't build, but it has to be done in such a way that structures should not go above the skyline, the amenity planting does not break the skyline and that sort of thing* (McGuigan, pers. comm. 1999).

Six of the recreationists I talked with commented on how they perceived housing and built structures on the Port Hills. For instance a new housing development at the base of Kennedy's Bush Scenic Reserve was perceived as negatively affecting a users experience, "housing development is bad due to the loss of aesthetic appeal". Other comments reflect the same negative feelings:

> *I do not like the encroachment of housing creeping higher and higher up the hills. Christchurch is unique in not having built over the Hills. We should keep it that way. (a female user)*

and the

> *Council purchasing land in the Heathcote area is a good way to go to prevent further subdivision of the Hills like what is going on in the Kennedy's Bush Scenic Reserve area.*

These comments give the impression that recreationists perceive housing development and built structures to adversely impact the visual appearance of the Hills. These comments are strongly in favour of there being no buildings built on the Port Hills. Managers are more tolerant of buildings as long as they are done in such a manner that does not adversely affect the visual setting of the area.

5.7 Managing and Mitigating Impacts

The literature on impacts discusses methods to monitor, measure and prevent impact. The frameworks mentioned previously; Limits of Acceptable Change, Visitor Impact Management and the Visitor Experience and Resource Protection system, can be utilised by managers and planners to monitor, measure and prevent impacts. Indicators and standards can inform managers when the level of impact has reached an unacceptable limit. Management can then activate an approach to reduce this impact from occurring further.

There are many different techniques to prevent impact, and suitability will vary site by site. Examples of techniques to minimise impact can be found on the Port Hills. Managers can build tracks so that impacts will be minimised (Plate 23). On the Port Hills, for example, multi-use trails are wider than normal and they are designed so that people have a good line of sight, and a fair bit of enforcement work is done "to slow people down, to tell the walkers not to push people off, and tell the bikers not to brake too hard". "We also spread some shingle on the road so that bikes can't go fast" (Devlin, pers. comm., 1999). Management uses these methods to try and avoid conflict between users, and to try to reduce the visual and environmental impacts.

Methods to control use or channel use are mentioned by several authors. Simple interpretation of the area's environmental values will encourage careful use of the area (Boffa Miskell Partners, 1988). Managers can artificially increase the resistance of a resource by hardening or shielding it from impact (Department of Conservation, 1994). Steps and board walks concentrate impact and it is easy for management to see impacts. Likewise well-constructed tracks provide little opportunity or encouragement for walkers to 'step off' the track. Although initially construction may damage the surrounding environment, well-constructed tracks will also protect the environment (Simmons, 1980). Tracks need to be clearly defined with side drainage 'gullies' if they are going to experience increasing levels of use (Brumley, 1980). Terpstra (1981) points out how the cutting of tracks is not recommended even though it lessens the chance of lateral spread, it increases the chance of erosion.

Careful planning, design and management can reduce negative impacts (Boffa Miskell Partners, 1988), but constant monitoring and research is needed. Simmons (1980) suggests that research needs to be directed at improving the understanding of use, as use is directly related to impacts. An understanding of the natural environment is also crucial, as the resulting impacts are directly related to this. Managers need to understand how ecosystems work in order to minimise impacts to them in an appropriate fashion.

Terpstra (1981) identified three methods of studying the impact of outdoor recreation: after-the-fact analysis, monitoring over time and simulation experiments. The first, after-the-fact analysis has the problem of measuring the actual level of recreational use. This is because changes have occurred in the past, but the researcher is trying to analyse the situation in the present. Monitoring over time is probably the best method in an ideal

world, but because it is a long-term project it is costly and time consuming. Where past data are not available, research-by-management is highly effective and informative. Research and management occur simultaneously and when research unveils something, management can be adapted. Simulation experiments can not accurately simulate the real situation, with the foot type and degree of pressure being individual to each walker.

One method of monitoring an environmental situation over time is photographic monitoring. Photography produces high precision evidence, which decreases the possibility for subjectivity, and it is a good method to show the changes in physical conditions of the resources which can be later used to back up management policies and actions (Elson, c.1998). Van Horn and Van Horn (1996) add that it is an effective method for evaluating aesthetic condition and ecological trends. No photographic monitoring has been used on the Port Hills to monitor change. However this process is being investigated (Devlin, pers. comm., 1999).

One method to manage visitor impacts is to segregate different types of visitors (Department of Conservation, 1994). Sutton (1992) mentions that where single use tracks exist there is a need to decide how much development is appropriate, then in order to mitigate impacts managers could add another track, provide more interpretation, and promote the use of small side tracks. However, on the Port Hills, Devlin (pers. comm., 1999) believes “there is a point in the not-too-distant future where there will be a saturation of tracks, we can’t say use is too much, lets build another track”. To combat this, multiple use tracks are being promoted and tracks that are getting less use can be advertised and promoted more.

Signs can have the benefit of informing visitors about appropriate uses (Department of Conservation, 1994).Although management can build tracks, car parks, signs and fences to direct recreational use these features attract more use and therefore more impact. For example, “signs are expensive” says Mr Johnson, (a member of the Summit Road Society) “and experience has shown that they invariably attract the attention of vandals” (Rooney, 1990b). At Kennedy’s Bush Scenic Reserve the information sign is located away from the road in the actual ‘bush’ section of the reserves, to minimise this problem. However one of the recreationists commented that management needs to provide “more amenities such as toilets at some areas”. A female recreationist commented how pleased she was to see amenities being installed on the Port Hills,

I am glad they have a toilet now, because once a friend peed on a totara and I thought that was rude.

On the Port Hills the tracks and reserves were designed for foot traffic only and fences have been erected in most places to hinder the use of these areas by other forms of transport, such as mountain bikes and trail bikes. The concern was their "physical danger to walkers and the damage to track surfaces" (Loughton, 1998 p.43). However if users of bikes choose to ignore fences and signs, their impact on the reserves and other recreationists could be severe.

The Port Hills have large areas of erosion prone loess soils, which means greater care and expense in respect of track maintenance and construction is needed (Gerald, 1992). The Department of Conservation (1994) suggests that allowing mountain biking only in the dry season would limit or avoid the chance of soil erosion occurring. Likewise tracks across pastoral land are often closed during lambing season, for example, Kennedy's Bush Track/Road Reserve.

Areas of important conservation value, are numerous on the Port Hills and require protection from overuse. Management can discourage or prohibit use by not advertising the reserve and not providing a car park, or by closing off the entrance, like at Ahuriri Scenic Reserve.

Many of the tracks on the Port Hills are formed on grass (Plate 22). It is suggested that the grass should be mowed (Brumley, 1980), as the mowing or clearing of grass through grassland and bracken helps to identify the track, lessening the impact elsewhere (Terpstra, 1981). Simmons (1980, p.157) noted that trampers were consistently observed to follow evidence of previous walkers, even on the open riverbeds, or tussock flats. It is in the interests of walkers not to ruin the environment or the experience the next time they visit will not be as satisfying (Boffa Miskell Partners, 1988).

Hendee, Stankey and Lucas (1990) provides some strategies and techniques for mitigating problems. Where track erosion is a problem, improving the location, by building water bars will help, and where multiple trails occur relocation of the trail is suggested. One extreme method of reducing impact is to not allow use. For example Devlin (pers. comm., 1999) said one way to stop the bolting of new routes was to ban it, and this is what happened. Or as a landowner suggested to stop trespass,

The council can sell the right of the paper roads to the landowners, and close them off, or fence them with assistance, some sort of joint agreement with the landowners, signpost them and make proper access to designate the public places.

The impacts of introduced fauna can be greatly reduced with the building of fences. Although some of the reserves are fenced, many are not or are poorly fenced. A lot of new fencing can be seen at reserves such as Ahuriri Scenic Reserve and its neighbour Omahu. The control of some pests, such as possums are not stopped by fences, and intensive poison control is necessary to lessen the impacts of these species. Eradication will never be possible, so a long term plan to control these species is necessary.

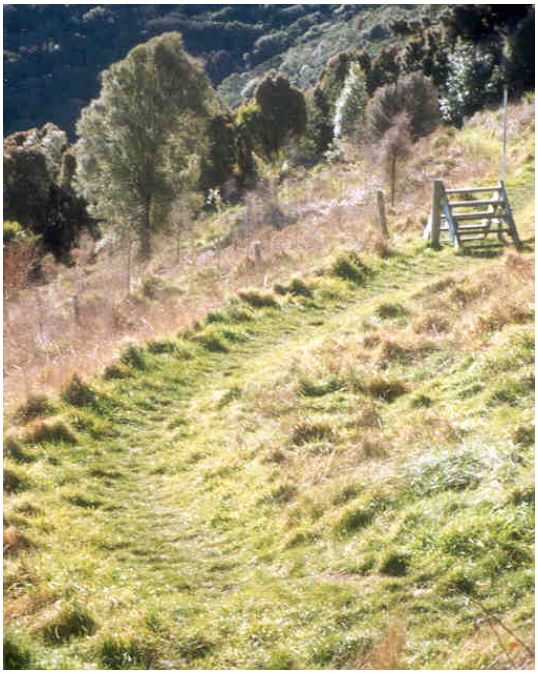


Plate 22. A narrow grass path in Kennedy's Bush Scenic Reserve

Place 23. Gravel path in Kennedy's Bush Scenic Reserve

5.8 Summary

This chapter has highlighted what recreationists, managers, landowners and members of community groups perceive to adversely impact on recreational experiences on the Port Hills. Because some of these people have known the Port Hills and reserves for several decades, they have been able to see the slow incremental changes that have happened over time. In contrast, those recreationists who have only been using the Port Hills for a short while did not notice this change, however all of them could also identify recreational impacts that have occurred during short periods of time.

Sometimes users acknowledge that their recreational pursuit produces impacts. Other times they are quite definite that impact is minimal, or that it is produced by another group. For example, Burrows (pers. comm., 1999) believed that the impacts from natural disasters and animal and weed pests are manifold. In comparison he did not

> *Notice recreationists having adverse impact. I have to say that. I think the main way to prevent that sort of thing, is in the first place to have very good tracks, well defined tracks, and also very good signage.*

Regardless of whether impacts are perceived or real, recreational experiences are impaired. Management can reduce some impact through various means, although sometimes these practices impact on the environment or a person as well. For instance boardwalks remove vegetation, and the application of poison to kill pests has side effects of non-target kill and potential danger to people and their pets.

An area can be subjected to human, natural and pest impacts. Which one contributes more is unknown and site specific. Impacts happen and management planning frameworks can be used to identify what the resources of the area are and when impacts to these resources is occurring at an unacceptable level. Management can then implement tactics to deal with the impacts. Impacts, especially crowding and conflict, are perceived notions, so where managers draw the line between acceptable changes and unacceptable changes is a value judgement. This decision can be assisted with the use of recreational planning frameworks.

Chapter 6
Conclusion

6.1 The Study

In this dissertation I have examined the perceptions of impact that occur on the Port Hills of Christchurch, with specific reference to two reserves, Kennedy's Bush Scenic Reserve and Ahuriri Scenic Reserve. A qualitative research approach allowed me to investigate what people perceived the impacts to be and what or who they perceived to be the cause of these. Although time consuming, talking with people proved to be an excellent means of gathering information. Therefore this dissertation focuses on the impacts that are recognised by the interviewees, and does not attempt to uncover all impacts, which occur on the Port Hills.

The natural environment of the Port Hills is unique. Although only 61 hectares or one percent of the original vegetation remains, 334 plant species have been identified in these remnants. Of these, six taxa are regionally endemic. It is also known that many of the invertebrates found on the Port Hills are endemic. Sadly the native birds have been greatly reduced in abundance and type. The destruction of the forests and resulting habitat fragmentation, the introduction of pests and introduced birds has led to their demise. Because so little of the native ecosystem is left, it is vitally important to protect and preserve as much as possible for future generations of New Zealanders, especially since endemism is so high on the Port Hills, and on Banks Peninsula. Protected natural areas are the best way to ensure this occurs.

Five objectives guided my study. First, a review of the literature associated with use on the Port Hills and the specific reserves was conducted. Recreational use of the Port Hills is likely to be quite high considering they border a large city. My survey of the literature suggested that convenience was the reason people choose areas for recreation. Recreation resources in urban periphery are defined by simple location, rather than by visitor preference for some intrinsic quality (Kearsley, 1981). A large proportion of users commented on how it was quick to walk or drive to the Port Hills. However, since the Port Hills offer a variety of recreational opportunities, people are ale to seek out an

environment, which suited their purpose. For example, mountain bikers commented on how special tracks were provided for them, and they liked this. Specifically designed facilities like this will result in more mountain bikers using the Port Hills.

Recreational use of the Port Hills is skewed across the week and the year. Previous research suggested that most use occurred on Sundays, especially in the afternoon, and was greater during summer. I found that all of my recreationists visited the Port Hills at the weekend. My own observations led me to believe that during the week use of the Port Hills was light. Although use can be high at certain times, it was perceived that the Port Hills were not being used by Christchurch residents to their full potential.

Second, I investigated the activities that occur in the reserves. Ahuriri Scenic Reserve is presently closed off to the public, but access, although difficult, because of a perimeter fence, is possible. A lightly defined walking track goes through the centre of the reserve. Apart from passive activities like walking, botanising, bird watching and listening, Ahuriri Scenic Reserve does not provide a wide range of recreational opportunities. Only a few of the recreationists I talked with had visited Ahuriri, and many did not even know of its existence. This suggests that the lack of signs and information about a reserve ensures recreational use is kept low. However to ecologists, managers and restoration organisations, Ahuriri was regarded as extremely important, and possibly as significant as Riccarton Bush.

Kennedy's Bush Scenic Reserve is a larger reserve, and designed more for public use. It has signs detailing the four different tracks, which pass through it. There is a large picnic area, a large formal carpark, and now a toilet. Considerably more recreationists knew about Kennedy's Bush Scenic Reserve than Ahuriri Scenic Reserve. The supply of signs, brochures and facilities therefore creates demand, as people are more likely to go to places that are advertised. Mountain bikers were especially familiar with and had used Kennedy's Bush Scenic Reserve and Kennedy's Bush Road Reserve for biking. Although the Scenic Reserve is not designed for bikes, and a fence is there to prevent their use, the attributes of the reserve attract bikers.

The third objective was to observe users. My observations revealed that passive activities, scenic appreciation and sightseeing were major uses of the Port Hills. Therefore it is strange that Ahuriri Scenic Reserve was unknown to so many users, as it offers these

activities. A lot of people drove along the Summit Road stopping on the side of the road every now and then, sometimes stepping out of the car, to just look at the view. Recreational use of this road by cyclists seemed very high. I observed some Sundays that half the traffic that used the Summit Road was mountain bikers.

The forth objective involved investigating impacts from three different perspectives, present users, users with a long historical association with the Hills, and from a management perspective. Perceptions of impacts differed between these groups. Impacts were divided into social, and ecological. Recreationists were in the best position to identify if social impacts were occurring. Due to use being very high and clustered at weekends, crowding and conflict was perceived by some users. Conflict between users was reported, although the degree to which this conflict bothered people varied. Some people only noticed it, where as others were quite adamant the recreational conflict decreased their experience. Commonly, conflict was perceived to occur between walkers and mountain bikers and between bikers and four-wheel drive users. Management has realised that conflict occurs, and provides wider multi-use tracks and single purpose tracks. Crowding was mentioned by one user, and displacement to other areas was reported as strategy to avoid the crowds.

Recreationists mentioned that recreation can negatively affect the natural environment (Figure 5). Recreationists perceived vehicles to produce rutting on tracks, which they thought lead to soil erosion and run-off. The soils on the Port Hills are based on volcanic bedrock and loess. They have very low stability and are susceptible to tunnel gullying and other forms of erosion. Because the soil structure is so poor the chance of recreation adversely affecting the soil is therefore increased.

Users felt that with the present levels of use vegetation and fauna were not being adversely impacted. However, the Port Hills rangers and people who have had a long association with the Port Hills did perceive that recreation impacts on the vegetation. For example, rock climbers have been identified as a problem by managers, as they remove vegetation to allow for easier climbing. The areas where they climb are also the location of many locally endemic plants, which raises conflict of interests. Kearsley (1981) claimed that recreationists using the urban area to recreate in, do so because it is convenient, and they may not be interested in the environmental aspects of the area, and therefore not notice impacts towards them. This could explain the wide range of perceived impacts on the Port Hills.

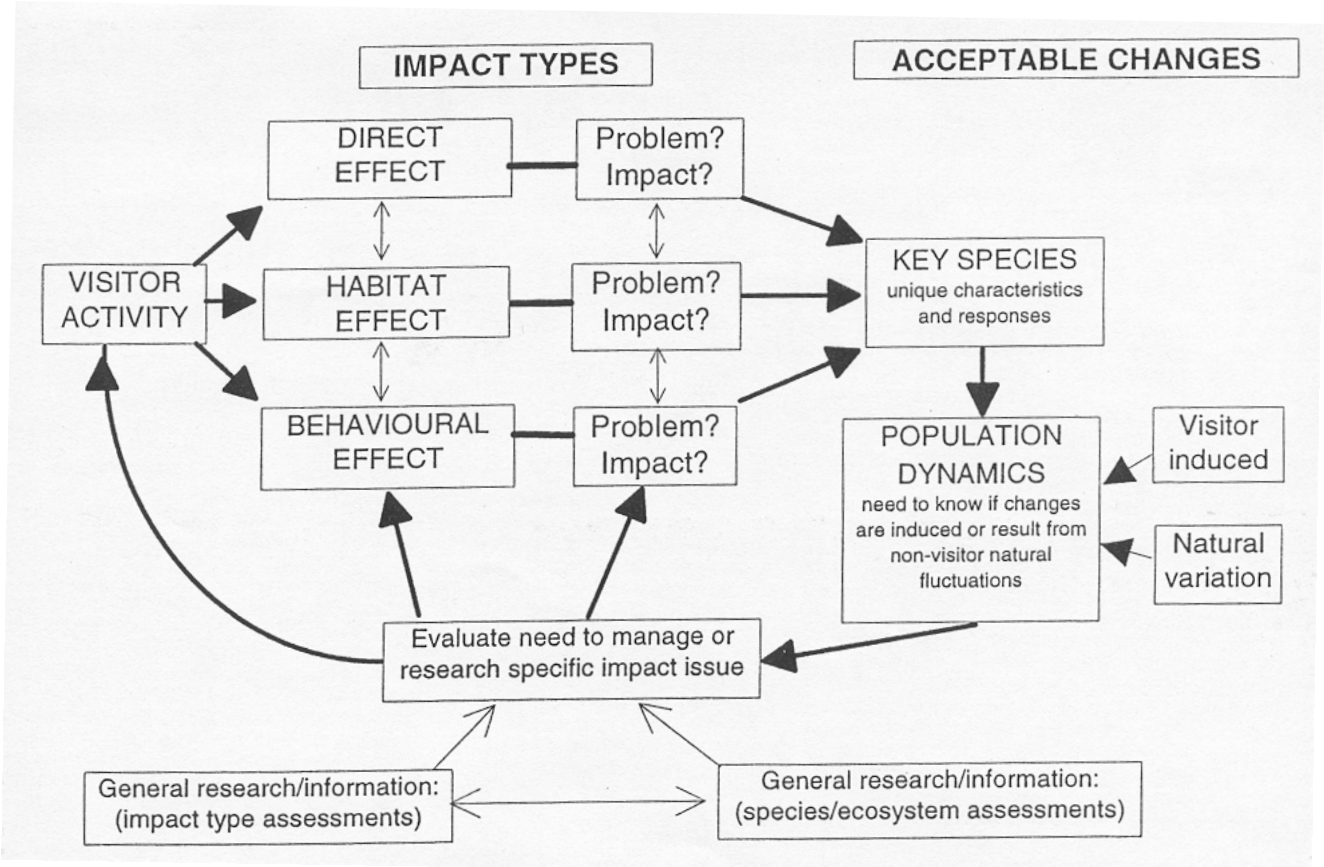


Figure 5. Summary of the key interactions among impact issues (Cessford and Dingwall, 1997).

Another objective was to see if other land uses adversely effect on the natural environment, and on recreationists experiences. Pests and natural disaster events were perceived to produce biophysical and ecological impacts and built structures to produce visual impacts.

However, the results suggest that recreationists do not perceive introduced pests to be adversely effecting the environment. On the other hand the Port Hills rangers, farmers, members of the Summit Road Society and Port Hills 2000 committee believe impacts from pests is a huge problem on Port Hills.

No interviewees could decide whether forestry blocks adversely impacted on the visual appearance or ecological quality of the Port Hills. Everyone I interviewed seemed to rationalise any negative impacts of forestry with the economic benefits it produced. It was also perceived as a suitable land use for an area, which could not be intensively farmed, and was subject to high rates of soil erosion. The benefits of forestry seemed to outweigh any negative impacts it may cause.

Since the 1970s, subdivision on the lower flanks of the Port Hills has occurred. The visual impact of built structures has been raised in many reports as contributing to negative visual effects of the landscape. Because scenic appreciation is such a large part of use that occurs on the Port Hills, this could explain why recreationists perceived built structures to be negatively impacting on the recreational experience. People visit the Port Hills to get away from the city into the natural environment. From this study it appears that visitors do not want to see the built environment encroaching on what they perceived as the natural environment. Users perceived that Port Hills was no place for built structures.

Past literature concerning the Port Hills mentioned that trespass was an issue that affected landowners. This impact is one-sided as recreationists benefit from trespassing as this often means a short cut, but the landowner only stands to lose from people trespassing. Recreationists did not perceive there to be a conflict between farming and recreation, although the Summit Road Society and the Landcare landowners group perceive this to be quite a substantial problem. The risk of fire, gates being left open and stock escaping, people scaring stock and people wandering off the tracks are perceived by landowners as impacts that recreation produces. Recreationists depend on the goodwill of landowners to provide access to some recreational sites; therefore conflict should be minimised.

It is in the interests of all stakeholders on the Port Hills; the Christchurch Regional Council, the Christchurch City Council, the Selwyn District Council, the Banks Peninsula District Council, the Summit Road Society and landowners to reduce negative impacts, whether they result from recreation use or pests. An integrated, co-ordinated approach to managing the Port Hills is needed. A regional approach on the Port Hills would combine all users and uses to ensure a more integrated approach to management and protection of the environment. In the mean time, interpretation will help to inform and educate users and therefore will go part the way to reducing potential conflict and social impacts.

It is good to see then that in the past five years the Port Hills ranger service has increased the number and range of signs, and information boards on the Port Hills. The Summit Road Society has also produced maps and brochures informing users where on the Port Hills different activities occur. Other people for instance, Pickering (1994 and 1999) and Ground Effect (1997), have gone into great detail describing walking and mountain

biking tracks on the Port Hills. This all helps towards educating the public and reducing negative impacts, and increasing the benefits which result from recreating in the outdoors.

6.2 Further Research

There is a need for further research on the perceptions of impacts. There has not been a lot of research into the perceptions of recreational impact in New Zealand, and this study is the first which looks into the perceived impacts of recreationists and other land uses on the Port Hills. As recreational use increases, the perceptions of impact can be expected to increase as well. Therefore, there is a need for managers to know what the perceptions of recreationists are, so that they can aim to minimise or eliminate them.

However, due to the displacement and succession of users as crowding and conflict occurs it is impossible to find out whether social impact has occurred. So as well as needing to know what impacts people perceive, it is also necessary to monitor indicator species and sites to obtain actual data relating to change.

A substantial amount of information is known about the geological history, soil type, and flora and fauna of the individual reserves on the Port Hills. For example, research has been done on how different soil types are affected by different types of impact. But what is not known is what level of impact is perceived to be acceptable. Kearsley (1981) points out that the primary problem with assessing carrying capacity lies in the estimation of determining perceptions. Social impacts are harder to observe, since people adopt coping strategies, such as displacement and rationalisation, in order to minimise conflict. The problems associated with determining perceived social impact need to be understood before the levels of unacceptable impact can be recognised by management.

The effects of Polynesian and early European colonisation and use of the Hills provide a stark reminder of how drastically the landscape was adversely impacted upon. Use levels will continue to increase, and conflict and crowding will become more obvious, especially at the weekends. Research and correct management of the area is needed to ensure that further human use of the Port Hills does not continue this pattern of degradation.

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Burrows, Colin. Member of Port Hills 2000 committee. Taped interview with author, 27 September 1999.

Devlin, Paul. Head Park Ranger at Port Hills. Taped interview with author, 9 September 1999.

Jameson, John. Grandson of Harry Ell and Summit Road Society member. Taped interview with author, 18 August 1999.

Kirk, Gordon. President of the Summit Road Society. Taped interview with author, 27 August 1999.

O'Connor, Kevin. Retired from teaching in 1991 at Lincoln University where he had taught nature conservation, land classification and utilisation and park planning. Taped interview with author, 30 September 1999.

McGuigan, Paul. Landowner on the Port Hills, with 160 hectares of land used for forestry, sheep and cattle farming, A member of the Port Hills Landcare Group, a member of the Selwyn District Focus Group who are looking into the City Plan, and runs an outdoor shop in Christchurch. Taped interview with author, 18 October, 1999.

Ricketts, Helen. Works for the New Zealand Landcare Trust. Email communication with the author 11-19 October, 1999.

Singleton, Nick. Park Ranger at Port Hills. Personal Communication with author, 3 August 1999.

Sowman, Lindsey. Lecturer in Landscape Department, Lincoln University. Personal Communication with author, 20 September 1999.

Recreationists on the Port Hills

The names of some of the users were not obtained and instead are represented by a number here. If users said that they had been to Kennedy's Bush Scenic Reserve or Ahuriri Scenic Reserve, the respective abbreviations are used to show this, KBSR and ASR. One person said they used Kennedy's Bush Road Reserve and this is shown by KBRR

Bevan: A male who does not use the Port Hills much. He was on his third visit.

2: A male who visits the Port Hills nearly every weekend to go mountain biking, because he likes the steep terrain and single-use tracks. KBSR

Tim: A male who visits the Port Hills about once a month to go mountain biking, usually around Victoria Park. KBSR

Sarah: A female who uses the Port Hills about once every two to three weeks over summer, but less in winter to go mountain biking. KBSR

RJ: This person uses the Port Hills for mountain biking and road biking at least once a week, mainly at weekends. It is a convenient place for them to access. KBRR

6: This person uses the Port Hills for a range of activities; walking, mountain biking, BBQ/picnics and sightseeing. Although they only go about 3 times a year, they have been using the Port Hills for about 21 years to carry out these recreational activities. KBSR

7: This person uses the Port Hills about once to twice a week at the moment for rock climbing, because they are so close to home.

8: This person uses the Port Hills for a range of activities; rock climbing, walking, running and scenic observation. KBSR ASR

9: This male uses the Port Hills for various activities; tramping, shooting, rock climbing and abseiling. KBSR ASR

10: This person uses the Port Hills for mountain biking and running about two to three times a week. KBSR

11: This person uses the Port Hills for mountain biking, running and walking every weekend.

Mel: A female who uses the Port Hills for mountain biking and running, once during the week and both Saturday and Sunday. She has favourite tracks, which she uses. KBSR

13: This person uses the Port Hills for a variety of activities; walking, mountain biking, rock climbing, looking at the view, botanising, comet-watching, paragliding and sleeping out used the stars. They usually go up in the afternoons or evenings.

Joy: A female who uses the Port Hills to go tramping and very occasionally cycling or driving. She has been using the Port Hills for 15-20 years and goes about once a month at the moment. KBSR ASR

Melinda: A female who uses the Port Hills for rock climbing, but only goes about three to four times a year.

Freddie: A male who goes to the Port Hills to walk, rock climb, drive and relax. He goes about four times a year.

Lionel: A male who users the Port Hills about once every two weeks in summer to do walking. He chooses places close to home to visit. KBSR

Lyndsay: A female who uses to Port Hills for walking, four-wheel driving, mountain biking. She also takes visitors up to show them the view. She visits them about once a month. KBSR

19: This person uses the Port Hills for tramping, rock-climbing and mountain biking. They visit about once a week and always during the weekend.

Anne: This female visits the Port Hills about once a month, and has been doing this for the past eight years. She uses the Port Hills to power walk, to sit and think, photography, drawing and driving. KBSR ASR

Nicholas: This male uses the Port Hills for mountain biking and road biking every week. KBSR

James: This male visits the Port Hills when he has to do assignments, which are connected with the area, and takes photos of the view and plants. He only goes up there a couple of times a year. KBSR

APPENDIX

Occurence of native birds in Port Hills habitats

C= common (present in good numbers)
LC= less common (present in small numbers)
R= rare (irregular visitor)
A= absent (does not generally occur)

SPECIES	BUSH REMNANTS		SHRUB	SCRUB	TUSSOCK/ GRASSLAND	PINE FOREST
	Chch side	Lytt side				
NZ Falcon (*Faloc novaeseelandiae*)	A	A	R	R	R	A
Harrier (*Circus approximans*)	A	A	LC	LC	LC	A
NZ Pigeon (*Hemiphaga novaeseelandiae*)	LC	C	R	A	A	A
Shining Cuckoo (*Chrysococcyx lucidus lucidus*)	C	C	LC	R	A	LC
NZ Kingfisher (*Halcyon sancta vagans*)	LC	LC	R	R	R	A
W. Swallow (*Hirundo tahitica neoxena*)	A	A	R	LC	C	A
NZ Pipit (*Anthus n. novaeseelandiae*)	A	A	A	A	A	A
Brown Creeper (*Finschia novaeseelandiae*)	R	R	R	A	A	A
Grey Warbler (*Gerygone igata*)	C	C	C	C	A	C
SI Fantail (*Rhipidura fuliginosa fuliginosa*)	C	C	C	C	A	C
SI Tomtit (*Petroica macrocephala macrocephala*)	R/LC	R/LC	R	A	A	A
Silvereye (*Zosterops lateralis lateralis*)	C	C	C	C	A	C
Bellbird (*Anthornis melanura*)	C	C	LC	R	A	A
Occurence of introduced birds in Port Hills habitats						
Pheasant (*Phasianus clochicus*)	R	R	LC	LC	R	LC
California Quail (*Lophortyx californica brunnescens*	LC	LC	C	C	R	LC
Rock Pigeon (*Columba livia*)	A	A	A	A	LC	A
Little Owl (*Athene noctua*)	LC	LC	R	A	LC	LC
Skylark (*Alauda arvensis arvensis*)	A	A	A	A	C	A
Dunnock (*Prunella modularis occidentalis*)	C	C	C	C	C	LC
Blackbird (*Turdus merula merula*)	C	C	C	C	LC	C
Song Thrush (*Turdus philomelos clarkei*)	LC	LC	LC	LC	LC	LC
Yellowhammer (*Emberiza citrinella caliginosa*)	R	R	C	C	C	LC
Cirl Bunting (*Emberiza cirlus cirlus*)	A	A	R	R	R	A
Chaffinch (*Fringilla coelebs gengleri*)	C	C	C	LC	LC	C
Greenfinch (*Carduelis chloris chloros*)	LC	LC	C	C	C	LC
Goldfinch (*Carduelis carduelis britannicia*)	LC	LC	C	C	C	LC
Redpoll (*Carduelis flammea cabaret*)	C	C	C	C	C	C
House Sparrow (*Passer domesticus domesticus*)	R	R	R	R	LC	LC
Common Starling (*Sturnus vulgaris vulgaris*)	R	R	LC	C	C	LC
White-backed Magpie (*Gymnorhina hypoleuca*)	R	R	LC	R	C	LC
Rook (*Corvus frugilegus frugilegus*)	A	A	A	A	R	A

Crossland (1996,pp.8) and Wilson (1992, pp.337-340)

Appendix 2.

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This PUBLIC BILL *originated in the* HOUSE OF REPRESENTATIVES, *and, having this day passed as now printed, is transmitted to the* LEGISLATIVE COUNCIL *for its concurrence.*

House of Representatives.
28th October, 1903.

[AS AMENDED BY THE LEGISLATIVE COUNCIL.]

Rt. Hon. R. J. Seddon.

SCENERY PRESERVATION.

ANALYSIS.

A BILL INTITULED

AN ACT to provide for the Acquisition of Lands of Scenic or Historical Interest, *or on which there are Thermal Springs.* Title.

BE IT ENACTED by the General Assembly of New Zealand in Parliament assembled, and by the authority of the same, as follows:—

1. The Short Title of this Act is "The Scenery Preservation Act, 1903." Short Title.

2. The Governor may *from time to time* appoint such suitable persons, not exceeding five, as he thinks fit to be a Commission under this Act. Appointment of Commission.

3. Such Commission may, if it deems necessary, inspect any lands possessing scenic or historic interest or on which there are thermal springs, and shall make inquiries respecting the same and report to the Governor, and shall from time to time recommend what lands, whether Crown, private, or Native lands, in their opinion should be permanently reserved as scenic, thermal, or historic reserves. Commission to report as to lands to be reserved.

4. (1.) The Governor may from time to time by Proclamation declare that any lands so recommended to be reserved shall be a reserve under this Act, and thereupon such lands shall be inalienable unless by special Act of Parliament passed in that behalf, and no person shall cut or remove timber or in any way interfere with such lands or damage the scenic features thereof; and such lands may be fenced, preserved, and conserved intact as and for an inalienable patrimony of the people of New Zealand. Reserves may be proclaimed.

(2.) Every such Proclamation shall be publicly notified, and a copy thereof, together with a schedule of the lands thereby reserved, shall be laid before Parliament within twenty days after the commencement of the next ensuing session.

New subclause.

(3.) Every person who after the public notification of any such Proclamation cuts or removes timber, or in any way interferes with any land mentioned in the Proclamation, or damages the scenic features thereof, is liable to a fine not exceeding *one hundred* pounds.

5. (1.) Any land required to be taken for the purposes of this Act may be taken as for a public work under "The Public Works Act, 1894." Land may be taken under Public Works Act.

(2.) Where any such land is Native land within the meaning of the last-mentioned Act the land shall be taken and compensation therefor ascertained in the manner prescribed by sections eighty-eight to ninety of that Act, except that the compensation payable to the Native owners shall be paid to the Public Trustee, who shall invest the same, and shall pay the income from such investment, as and when it arises, to the persons entitled thereto.

Costs of administration.

6. All expenses of or incidental to conserving, preserving, and maintaining wholly or in part the timber, plants, bush, landmarks, pallisades, mounds, trenches, or other marks in, on, or around the historic spots and within such reserves, and any compensation for lands taken under this Act, shall be paid out of the Consolidated Fund, and for these purposes the Consolidated Fund is hereby appropriated to the extent on the whole of *one hundred thousand* pounds, and not exceeding in any financial year ending the thirty-first day of March the sum of *twenty-five thousand* pounds:

Provided that to the extent to which the full sum of *twenty-five thousand* pounds is not raised in any one financial year to the same extent the sums raised in any subsequent financial year may exceed *twenty-five thousand* pounds.

Providing funds.

7. (1.) In order to provide funds for the purposes of this Act the Colonial Treasurer is hereby empowered from time to time to raise by the creation or issue of inscribed stock under "The New Zealand Consolidated Stock Act, 1877," or of debentures or other Government securities, as he thinks fit, such sums of money not exceeding in the whole the sum of *one hundred thousand* pounds.

(2.) The provisions of "The Aid to Public Works and Land Settlement Act, 1902," relating to the raising of the loan authorised under that Act, and the creation and issue of the securities therefor, shall, *mutatis mutandis*, apply to the raising of the loan authorised by this section, and to the creation and issue of the securities therefor.

Control of reserves.

8. The Governor may from time to time by notice in the *Gazette* vest the control of any land reserved under this Act in any local authority or in any special Board constituted by him for that purpose, and in either case upon such trusts and with such powers and subject to such conditions as may be declared by such notice.

Offences.

9. Every person who fells any bush or without the consent of the Governor, or of some person authorised by the Governor to give such consent, or of the authority in whom the control of the reserve is vested (the proof whereof shall rest on such first-mentioned person), lights a fire on any land reserved under this Act, or who, being the owner or occupier of any land adjoining such reserve, lights or permits to be lighted upon his land a fire which spreads into and destroys any bush on or seriously damages such reserve, is liable to a fine not exceeding *one hundred* pounds, and shall in addition be liable to pay for all damage done.

Statement of land acquired to be submitted to Parliament.

10. Within twenty-one days after the opening of each session a statement shall be submitted to both Houses of Parliament showing the land acquired and the reserves made under this Act, together with a statement of accounts showing the amounts expended and the purposes to which the moneys so expended have been applied.

By Authority: John Mackay, Government Printer, Wellington. 1903

OUR GOAL

"Our goal is to leave to future generations an extensive and very well-protected forest area which will be authentically similar to that present in 1840. It will provide a visually-pleasing landscape, and beautiful vistas from the roadside and walking tracks. It will also provide a habitat in which native organisms (plants, birds, lizards, invertebrates) can survive and increase.

The whole area of the central Port Hills Crater Rim will be a very attractive place, benefitting the citizens of the Lyttelton Harbour basin and the Christchurch region, as well as visitors from near and far."

Diane Menzies
Chair
Port Hills 2000

PORT HILLS 2000 gratefully acknowledges significant donations and support in-kind for the Crater Rim Native Forest project from:

The Community Trust
Broadcast Communication Limited
Ron Greenwood Trust
Riccarton/Wigram Community Board
State Insurance
Summit Road Society
Riccarton Rotary Charity Trust
Canterbury Botanical Society
Christchurch City Council
Canterbury Regional Council
Rudolf Steiner School

For further information please contact
Port Hills 2000
c/- Turning Point 2000
PO Box 237, Christchurch
Tel: (03) 379 2008
Fax: (03) 379 7131
email: turningpoint2000@ccc.govt.nz

Visit the Turning Point 2000 website for more information

http://www.tp2000.org.nz

Turning Point 2000
CANTERBURY - WAITAHA

PORT HILLS 2000

CRATER RIM NATIVE FOREST

Appendix 3.

A PORT HILLS 2000 PROJECT

Background

Turning Point 2000

Port Hills 2000 is a group of volunteers with professional skills in forestry, landscape architecture and ecology, who are engaged in developing five distinct projects along the Port Hills as part of Canterbury's overall millennium endeavour.

Port Hills 2000 is one of fourteen Turning Point 2000 Advisory Groups. Turning Point 2000 was established by Christchurch City Council to identify, co-ordinate and develop significant events and long-lasting projects to celebrate the:

- heralding of the new millennium
- 150th anniversary of European settlement in Canterbury
- 160th anniversary of the signing of the Treaty of Waitangi by Ngai Tahu and

The Projects

Crater Rim Native Forest	Forming and protecting the nucleus of a native forest in reserves between Sugar Loaf and Cass Peak on the Crater Rim.
Penguin Colony	Establishing a well-protected colony for hundreds of endangered white flippered penguins near Godley Head.
Castle Rock/ Whakaraupo Reserves	Providing tracks, facilities such as car parking, and restoring extensive areas of native vegetation.
Mt Vernon Disabled Accessway	Providing disabled people with access to Port Hills landscapes at Mount Vernon.
Bridle Path	Developing groves of kowhais, flax and other bird-attracting plants along the historic pathway from Lyttelton to Heathcote.

The central Port Hills, from Mount Vernon to Cass Peak were once covered by a beautiful, continuous forest containing a variety of trees, shrubs, vines, ferns and smaller plants.

It was inhabited by many bird species; bellbird, pigeon, fantail, grey warbler, shining cuckoo, which still survive on the Hills, and others now locally, or totally extinct - tui, kaka, kararíki, saddleback, morepork, kokako, tomtit, robin, weka, rifleman, yellowhead and piopio.

In 1850, when Christchurch was founded, large tracts of forest remained on the Lyttelton side of the Hills but on the drier northern side it was less extensive and confined to the valleys. The bird fauna was already in decline. The trends of reduction of forest and bird-life have continued. Most of the land has been farmed for nearly 150 years and planted pine forests are extending on the northern slopes. However, there are still significant native forest areas, some privately owned, but most in some form of public reserve.

The long ridge of the Port Hills - the Crater Rim - is treasured by residents of our region as a great scenic and recreational asset. Its landscapes and vistas are beautiful and varied and the native woodland and its animal inhabitants, especially birds, are a resource beyond value.

The Crater Rim project aims to develop an extensive protected area of about 500 hectares on the land from Sugarloaf to Cass Peak.

Crater Rim Native Forest

Concept Plan

The aim of the Port Hills 2000 group in the central Port Hills area is to preserve, enhance and increase the native forest, both for recreation and nature preservation, by:

- Improving basic facilities (tracks, stiles, toilets, signage) and obtaining greater protection for the integrity of each existing reserve in this area through secure fencing, pest animal and weed control, and fire prevention measures.
- Purchase of areas of land that come up for sale (or encouragement of purchase of such areas by other parties with a view to the areas attaining reserve status).
- Encouragement of covenants for nature preservation on private land that is not for sale.
- Minor planting of native forest to enhance the local ecology by improvement of habitat and provision of actual and visual links between existing forested areas.

Expression of Interest

Yes, I would like to assist Port Hills 2000's work to preserve and protect the Port Hills heritage for future generations.

I am interested in the following projects:

- ❑ Crater Rim Native Forest
- ❑ Penguin Colony
- ❑ Castle Rock / Whakaraupo Reserves
- ❑ Mt Vernon Disabled Accessway
- ❑ Bridle Path

I would like to:

- ❑ Make a monetary donation.
  My cheque for $ _____ payable to Port Hills 2000 is enclosed.
  Donations over $50 are tax deductible.
  A receipt will be issued for your donation.
- ❑ Make a donation of goods or provide services
  Details: _____
- ❑ Receive more information

NAME: _____

ADDRESS: _____

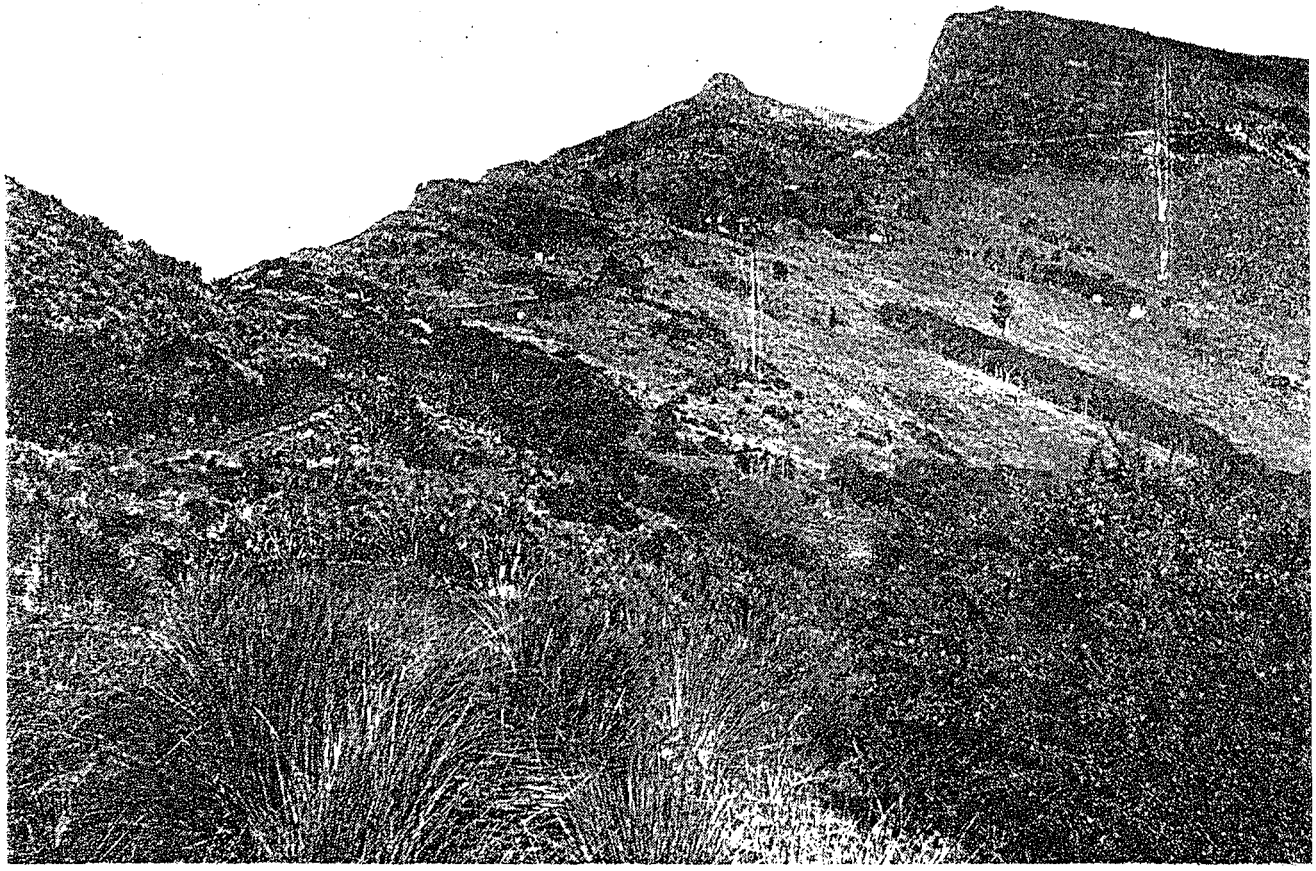
_____

PHONE (W) _____

PHONE (H) _____

Appendix 4.

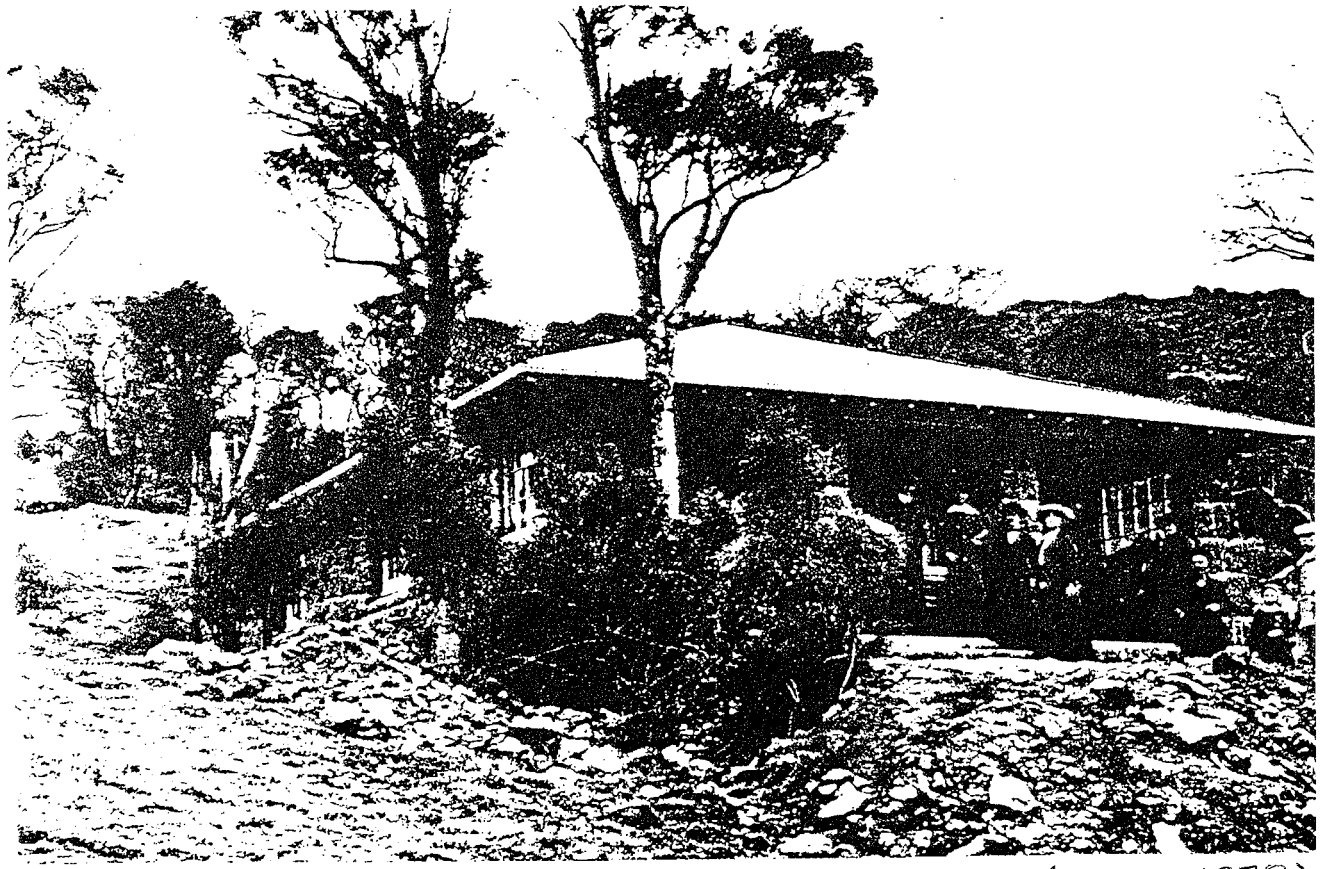
Kennedy's Bush early 1900's



(Coker, 1939)

Appendix 5.

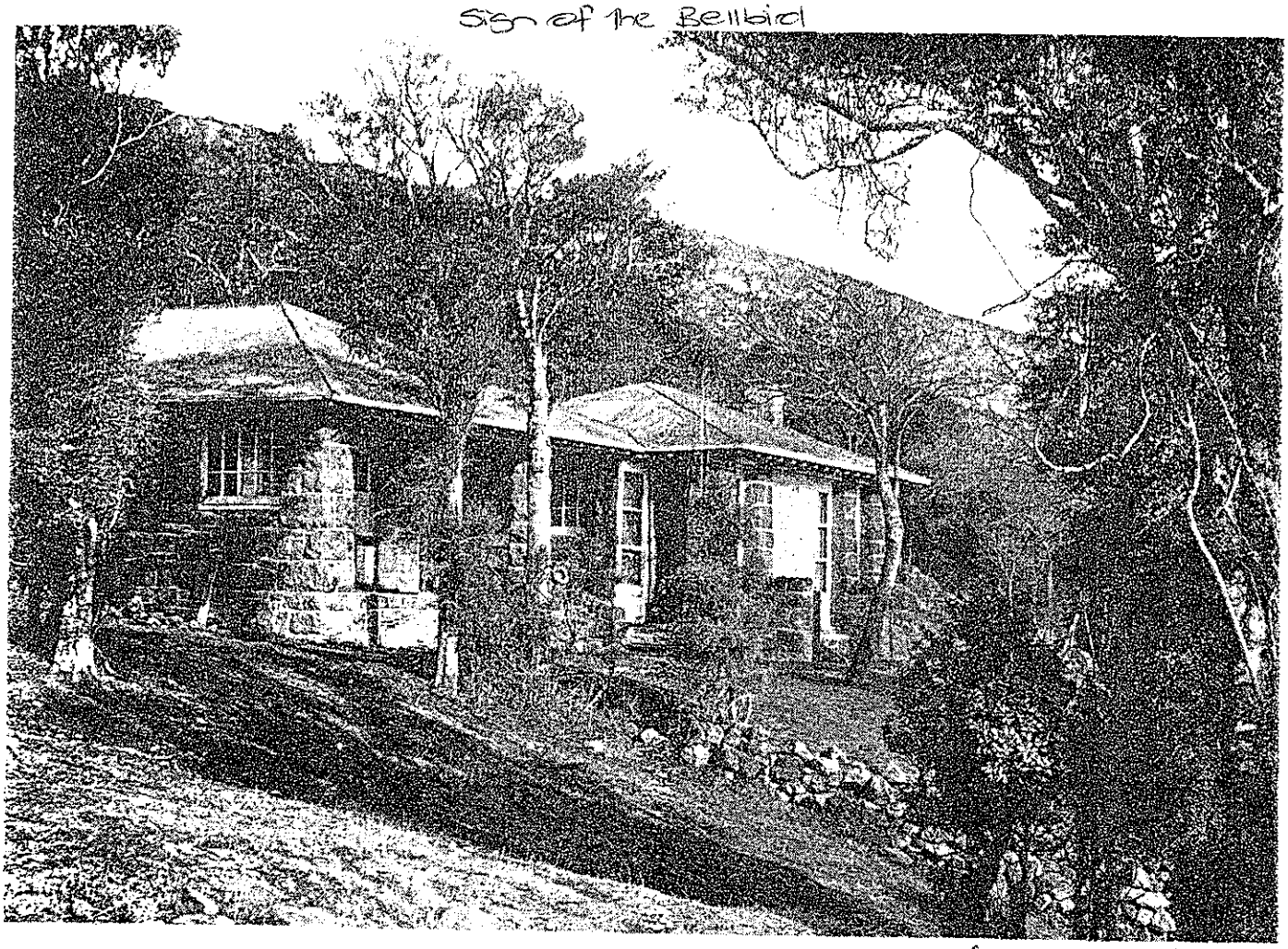
Sign of the Bellbird in 1914



(Oligive, 1978)

Appendix 6

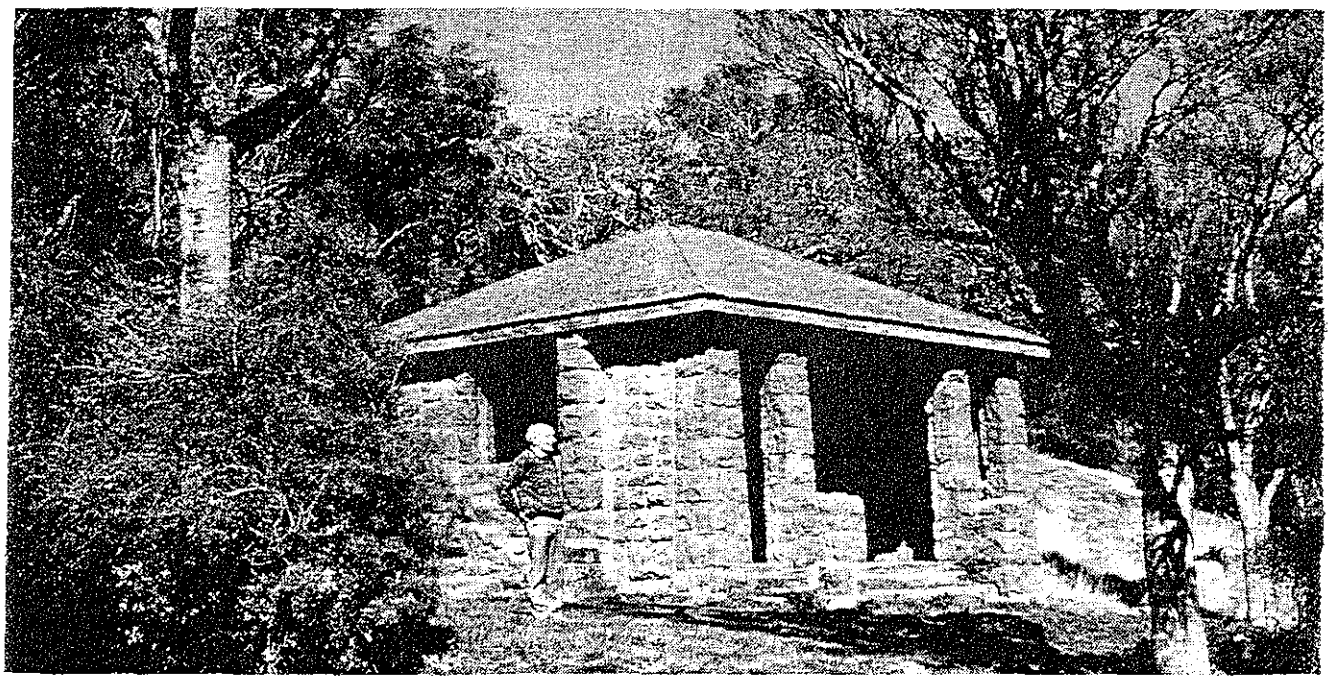
Sign of the Bellbird



(Lonsdale, 1939)

Appendix B

Present Day Sign of the Bellbird



(Loughton, 1998)

Appendix 7.

Sign at the Bellbird during the period of disrepair

(McCaskill, 1974)

Appendix 9.

FLORA – FLOWERING PLANTS, CONIFERS, FERNS, FERN ALLIES. Summit Road KENNEDYS BUSH

PLANTS	ANGEL	BRACGL	app	wall	CORALL	DEYEUX	cin	ses	cant	ang	fil	stip	una
	sec	rep	arb	CHEIL	cras	auck	cock	GAULTH	chat	chat	lat	thom	vir
ABROT	sen	BULBIN	aren	dist	CORDYL	aven	conf	ant	chee	cras	LEPLN	MICROS	NOTHOF
caes	want	ang	ast	sieb	aust	brac	cras	col	cil	n-z	bil	scap	fusc
fil	ros	gibb	comp	ten	bank	bill	dawb	cras	coar	obov	LEPTOC	MICROT	menz
inco	serf	hook	corr	CHENOP	ind	glab	eleg	dep	cock	HPHYLM	sim	elig	sol
lin	ANISOT	mod	cunn	all	kesp	quad	erec	opp	col	arms	LEPTOL	parv	(cli
musc	aust	ross	curt	amb	pum	ten	areb	pan	corr	atro	n-z	unif	trun
pus	ant	talb	egm	det	CORIAR	yong	find	rup	cup	biv	LEPTOS	MIDA	NOTOSP
ros	arom	BULBPH	enys	pus	ang	DIANEL	forb	subc	dec	dem	eric	sal	carm
spat	arev	pygm	flel	CHILOG	arb	nigr	glab	GENIOS	diel	dil	scop	MIMULS	glab
ACAENA	cap	tub	flag	corn	king	DICHEL	grac	lig	dios	ierr	sinc	rep	tor
adsc	carn	CALADN	flor	form	lur	crin	hect	GENTNA	div	flab	LEUCOG	MITRAS	NOTOTH
ans	celt	carn	glab	CHIONO	plum	sci	hirt	antc	elip	flex	gran	ment	aust
buch	citr	lyal	gran	acic	pott	DICHON	ins	antp	epac	hirs	leon	n-z	ros
caes	cnys	CALEAN	holl	ant	ptar	brev	krut	ast	even	lyal	LIBERT	MONTIA	OLEARA
fiss	col	min	hook	aust	sarm	rep	linn	bell	frut	mal	gran	font	alb
glab	crab	CALLIT	kirk	bedd	COROK	DICKSN	mac	car	gibb	min	ix	MORELT	all
hirs	daas	ant	lac	brom	budd	fib	math	chat	glau	ment	per	aff	ang
iner	ambr	auck	mon	chee	cot	lan	mel	conc	grac	mult	pulc	MUEHLN	arb
mic	ent	mual	nig	con	macr	squa	mic	cory	haas	pelt	LIBOC	ast	avic
min	eat	petr	odor	cras	CORTAD	DISCAR	nert	div	hect	pulc	bid	aust	buch
n-z	eval	stag	orb	fves	fulv	toum	n-z	fil	hulk	rar	plum	axil	cap
pall	evil	CALOCH	ovat	fvic	rich	DISPHY	numm	gibb	imb	rev	LILEOP	comp	chat
pus	ANOGRM	camp	pet	junc	'spin'	aust	pall	grac	ins	ruf	lac	eph	chee
sacc	ept	pal	pron	mac	toe	DODON	ped	gris	lang	sang	n-z	MYOPOR	col
ACIANT	ASIUM	rob	ram	oreo	CORYBS	visc	pern	lin	lav	scab	orb	deb	cor
forn	aest	CALOR	riv	ovat	acon	DONAT	perp	math	lig	vill	LIMOSL	laet	cros
ren	cil	min	rob	pall	cryp	n-z	pict	mont	lyco	HYPER	curd	MYOSTD	frag
vir	APOROS	CALTHA	silv	pung	macr	DOODIA	poly	pat	mact	gram	lin	hort	furf
ACIPHL	Ast	n-z	sol	rig	obl	caud	porp	sax	macp	jap	LINDSA	MYOSOT	hect
anom	ARCHER	obt	sut	rub	orb	med	pub	ser	math	HYPOL	lin	elbo	ilic
aur	arec	CALYST	unif	'stew'	riv	DRACOP	purp	spen	obt	dist	tric	emab	lac
col	atav	marg	viol	spir	tril	acer	pycn	ten	ochr	mill	vir	ang	lyal
cong	ARISTO	sep	virg	ter	ung	adam	rost	ter	odor	punc	LINUM	ant	mac
cren	aut	sold	will	CHORDO	CORYNO	arb	rot	town	parv	rug	mon	era	mosc
cros	berr	tug	CARPHA	stev	laev	dens	rubr	vern	pauf	ten	LIPARO	aust	numm
diss	ARTHPD	CANAVL	alp	CLAYTN	COTULA	fil	sim	GERAN	paur	HYPOXS	gunn	cap	odor
div	band	obt	CARPOD	aust	ang	flor	tas	aust	petr	pus	LITSEA	chee	opor
dobs	birr	CARDAM	serr	CLEMAT	atr	kirk	ten	mic	pim	HYPSEL	cal	col	pach
ferx	ARTHTS	bil	CASSIN	afol	aust	lat	thym	pil	ping	riv	LOBEL	conc	pan
flex	cen	cory	amoe	aust	cor	less	vern	sess	popp	IMPERA	anc	eld	ran
glau	ASCAR	deb	fulv	foet	dio	long	wils	trav	prop	chee	linn	exim	semi
grac	ac	dep	lept	fors	feat	math	ERECHT	GEUM	pub	IPHIG	roug	expl	sol
hect	ASPLEN	sub	ret	hook	fil	men	arg	div	rak	n-z	LOGAN	fors	thom
hook	anom	uni	vauv	mar	goy	mus	div	leio	ram	IPOMEA	dep	glab	town
horr	bulb	CAREX	CASSYT	pan	haas	oliv	kerm	parv	roul	palm	LOPHOM	goy	trav
ind	calc	acic	pan	parv	lan	pald	min	pus	rec	pes	bull	laet	virg
iner	clab	alb	CELMIS	petr	lin	pals	quad	uni	rig	ISACHN	obc	lang	OPHIOG
int	clac	alln	adam	quad	man	pat	scab	urb	rup	aust	LORANT	lyal	cor
kirk	hook	app	all	CLIANT	min	pear	sonc	GLEICH	salf	ISCHNO	mic	mac	ped
lat	lamp	berg	alp	pun	pect	pol	wair	circ	salc	n-z	LOXOMA	math	OPLISM
laig	lec	brev	ang	COCKAY	perp	pron	ERYNG	cunn	spec	ISOETE	cunn	monr	comp
lyal	natu	buch	arg	grac	plum	pros	ves	flab	strc	alp	LUZULA	oreo	imb
mour	rich	cap	arms	laev	pot	pub	ERYTHR	lin	stma	kirk	bank	pet	OREOB
mult	shut	cars	bell	COLLSP	pyr	pyrm	aust	mic	suba	ISOTOM	cel	pulv	imp
pinn	tric	chat	bonp	hast	ren	rec	pum	GLOSSO	subs	flav	col	pygm	pect
pol	ASTEL	cirr	brev	mic	ser	rosm	EUGEN	elat	tetg	IXERBA	cren	rak	strc
scot	bank	cock	cock	COLOB	squa	scop	mair	sub	tets	brex	crin	sax	OREOMY
siml	chat	col	cord	acic	trai	sinc	EUPHOR	GNAPH	top	JOVELL	lept	spat	col
simp	crag	com	cor	aff	vill	strc	glau	coll	town	rep	pict	suav	ram
sped	gram	cor	dall	apet	will	sub	EUPHRS	hook	trav	sinc	pum	ten	rig
squa	gran	dall	dens	brev	COXELL	town	aust	inv	trun	JUNCUS	rufa	trav	OREOST
subf	lin	dec	disc	buch	dief	trav	chee	ker	tum	ant	trav	unif	sub
tak	nerv	dev	dub	can	CRASPD	trim	cock	lut	urv	aust	ulo	ven	ORTHOC
town	niv	dian	du-r	hook	inc	unif	cun	nit	ven	caes	LUZUR	MYSOUR	strc
trai	net	dips	gibb	mas	lan	urv	disp	pal	vern	dist	parv	n-z	OURIS
trav	skot	diss	glab	mont	maj	vir	druc	sub	HECTOR	greg	LYCOPO	MYRIOP	caes
trid	sol	druc	glan	muel	min	DRAPET	dyer	trav	caes	hol	aust	elat	cock
vert	sub	ech	grac	musc	rob	dief	intg	trin	HEDYC	mar	bill	ped	col
ACKAMA	trin	edg	gram	strc	unif	lax	lang	GRAMTS	arb	n-z	carn	prop	cros
tos	ATHYR	elng	haas	wall	CTENIT	lyal	monr	bill	brun	pauc	dout	rob	glan
ADENOC	aust	enys	hect	CONVOL	dec	mult	petr	cil	HEIMER	pall	fast	vot	macc
grac	cap	fasc	hier	frac	glab	vill	rep	cras	HELICH	plan	lat	MYRSIN	macp
ADIANT	ATRIPL	fil	holo	ver	vel	DROSER	rev	het	bell	pris	n-z	aust	mod
aeth	buch	flag	hook	COPROS	CUSCUT	arct	town	pum	cor	pus	ram	chat	sess
cunn	n-z	flav	inc	acer	suav	aur	zel	GRATLA	dep	sar	scar	cox	vulc
disp	AUSTRL	fors	insg	acut	CYTHEA	bin	EWART	nana	dim	schz	serp	div	OXALIS
form	aus	fret	lanc	ant	col	pyg	sinc	sexd	fil	usit	ver	kerm	corn
fulv	AVICEN	gaud	lari	arb	cunn	spat	EXOCAR	GRISEL	glom	KIRKNL	vol	mont	lact
hisp	res	gem	lat	areo	deal	sten	bid	litt	mic	n-z	LYGOD	numm	strc
AGATH	AZOLLA	goy	lind	ast	kerm	DRYMOA	FESTUC	luc	plum	KIRKOP	art	oliv	PACHYC
aust	rub	hect	lyal	aust	med	adv	cont	GUNNRA	sel	lyal	LYPER	sal	cren
AGROPY	AZOREL	inop	mack	bank	miln	DYSOXY	cox	albo	HEMIPH	rob	ant	NEOMYR	n-z
enys	sel	inv	macm	brun	smit	spec	dun'	aren	suff	KNIGHT	MACHER	ped	PACHYS
kirk	BAUMEA	kal	maj	chat	CYATOD	EARINA	math	dens	HERPOL	exc	sinc	NEOPAN	ins
prab	ert	kerm	mon	chee	col	aut	lgran	dent	n-z	KOELER	MACROP	anom	PAESIA
rten	comp	kirk	morg	cil	emp	muc	mult	flav	HIBISC	chee	exc	arb	scab
'coas'	nutt	lach	parv	col	fasc	ECHINO	e.c.'	ham	div	novo	MARATT	col	PARAHB
'roug'	junc	lamb	pat	cras	fras	ovat	n-z	mix	trio	KORTHL	sal	kerm	birl
'tall'	rub	less	petr	cren	jun	ELAEOC	petr	mon	HIEROC	lind	MARSIP	laet	can
'yong	sen	lib	prae	cun	parv	dent	'rua'	pro	brun	sal	grac	simp	cat
AGROST	ser	lit	pro	dep	pum	hook	'two'	stri	n-z	LACHNA	MAZUS	NEPHLP	chee
alp	BEILSM	long	ram	dod	rob	ELATIN	FORST	GYMNEL	'slen'	fil	pum	cord	dec
dyer	car	maor	rig	foet	CYPERS	grat	bid	apet	redl	(semi	rad	exal	hook
(deli	cawa	muel	rup	int	ust	ELATOS	mack	cunn	(rec	'hum'	MELCPE	NERTER	lin
imb	SIDERS	ochr	rut	lin	CYSTOP	rug	sad	lanc	'copp	lept	simp	balf	lyal
mag	sil	petr	sess	luc	frag	ELEOCH	ten	mont	'egm'	litt	tern	cil	plan
musc	SLECH	plei	sinc	macr	DACRYD	acut	FIMBRS	HAAST	'gold'	lyal	MELCYT	cunn	spat
pall	bank	pter	spec	micr	bid	grac	squa	pulv	'silv'	rich	lanc	dep	trif
pet	cap	pum	sped	obc	bif	neoz	FREYCN	roc	HISTIO	stri	mac	dich	PARATR
sub	disc	pyr	thom	parv	col	pus	bank	sinc	inc	LAGENO	mic	set	bank
ALECTR	dur	roul	trav	(dum	cup	sphc	FUCHSA	HALOR	HOHER	cun	ram	NOTOD	mic
exc	fil	res	verb	pet	int	ELINGA	col	cart	ang	lan	MENTHA	aur	smit
gran	fluv	rub	vern	petr	kirk	john	exc	col	glab	pet	cunn	bian	PARIET
ALSEUO	fras	sect	visc	(atro	lax	ELYTRN	pers	dep	lyal	pinn	MERYTA	buch	deb
atri	lanc	sacd	walk	poly	DACTYL	adam	proc	arec	pop	pum	sinc	†caes	PARSON
bank	memb	sinc	CENCHR	prop	tay	col	GAHNIA	inc	sex	LEMNA	METROS	clav	cap
lig	min	sol	caly	pseu	DAUCUS	flav	lac	mic	HOMAL	min	alb	†gen	het
lin	nigr	spin	CENTEL	pum	gloc	tet	pauc	proc	poly	LAUREL	carm	grac	PASPAL
mac	norf	subd	inif	rep	DAVALL	ENTEL	proc	HEBE	HYDAT	n-z	col	†lae	orb
pal	pat	tern	CENTIP	rham	tasm	arb	rig	acut	inc	LEPIDM	diff	mac	PELARG
pus	penn	test	†orb	rig	DENDRB	EPACRS	set	alb	HYDROC	bank	exc	nig	inod
quer	vulc	trac	CENTRO	rob	cunn	alp	xan	all	amer	flex	fulg	nud	PELLEA
ALTERN	SOEHM	trav	cil	rot	DESCHM	caes	GAIMAR	ampl	diss	kawa	kerm	†pen	falc
†dent	deal	trif	min	rub	caes	EPILOB	set	ann	elon	kirk	park	†pil	rot
AMPHIB	SOTRYC	unc	pall	rug	chap	als	GALIUM	arm	mic	mat	perf	pulc	PENANT
flui	aust	vent	strg	serr	grac	ant	perp	bark	mos	obt	rob	†pur	cory
ANARTH	lun	virg	CHEES	spat	n-z	bill	prop	ben	n-z	oler	umb	trac	PENTAC
lanc	BRACME	wak	enys	tenc	pen	brev	ten	boll	pter	sisy	MICROL	set	pum
ANEMON	lin	CARMIC	fast	tenf	ten	caes	GASTRD	brac	trip	ten	aven	strc	PEPERO
ten	rad	alig	gibb	vir	DESMOS	chio	cunn	brev	HTHERA	LEPIDO	col	ten	tet
G.C.K.	sin	ang	lat	wall	spir	chlo	min	buch	alp	aust	poly	thom	urv

FLORA (concl), MAMMALS. BIRDS. REPTILES. AMPHIBIA. FISH plus MAJOR WEEDS.

PLANTS (cont.)	PSORUS	PRASOP	lyal	masc	SPARGN	TRISET
PERNET	rut	col	macp	nit	sub	ant
mac	POA	nud	macl	pauc	SPERG	(lasi
nana	acic	pat	monr	tend	marg	(ten
PERSOO	anc	pum	niv	SCIRP	SPINIF	'red'
toru	(cond	PRATIA	n-z	amer	hirs	'rob'
PHEBAL	(deb	ang	pach	ant	SPIRAN	spic
nud	(elat	aren	pauc	auck	sin	yong
PHORM	(fol	mac	petr	bas	SPIROD	TUPEIA
cook	antp	perp	ping	cald	olig	ant
ten	astn	phys	porr	cali	SPOROD	TYPHA
PHRYG	'dun'	PPANAX	rec	corn	trav	orie
roul	'hard'	chat	riv	chlo	STACKH	UNCINA
ten	auck	cras	royi	cras	min	aff
PHACNE	brev	disc	seri	flui	STELL	ang
clav	buch	edg	sinc	fluv	dec	ast
col	chat	fer	sub	hab	elat	auck
rub	chee	gill	tern	inun	grac	bank
PHCLAD	cock	less	urv	lac	min	caes
alp	col	lin	RAOUL	med	parv	clav
glau	(brev	PWINTA	aust	nod	roug	dist
tric	'sout'	axil	bry	plat	STILBO	div
PHGLOS	dip	col	buch	pott	pol	druc
drum	exig	trav	cin	prae	STIPA	egm
PHYMAT	fol	PSILOT	exim	prol	arun	eleg
div	guth	nud	glab	ret	petr	ferr
n-z	ham	PTERID	goy	subt	ter	fil
scan	imb	aq	gran	sulc	SUAEDA	fusc
PICRIS	'tar'	PTERIS	haas	SCLERA	n-z	grac
Thier	'cap'	com	hect	bifl	SWAINS	hook
PILUL	incr	mac	hook	broc	n-z	inv
n-z	kirk	trem	mamm	unif	TARAX	lax
PIMEL	(col	PTEROS	monr	SCUTEL	mag	lept
aren	'blim'	alob	park	n-z	TECOME	long
arid	'old'	areo	petr	SEBAEA	spec	nerv
bux	laev	aust	rub	ovat	TETRAC	purp
conc	(fil	bank	subs	SELIER	ham	rub
cros	'egm'	barb	subu	rad	TETRAG	rup
gnid	'sout'	brum	ten	SENEC	tet	scab
long	'coa'	cycn	yong	adam	trig	silv
lyal	lind	fol	RHABDO	ant	TETRAP	sinc
popp	lit	gram	sol	bank	tet	strc
pros	mack	hum	RHAGOD	bell	TETRAR	unc
pseu	'arth'	irs	tri	benn	cap	vir
ser	man	mic	RHOPAL	bidw	TEUCRD	zot
sut	math	mont	chee	bif	parv	URTICA
tom	(ten	mut	sap	cass	THELYM	asp
trav	n-z	nana	RIPOGN	cock	carn	auck
PITOSP	(des	nut	scan	col	dec	aust
anom	(sub	oliv	RORIPP	com	dent	fer
buch	(wall	trul	isl	elae	form	inc
col	orar	ven	styl	glau	hat	lin
corn	poly	PUCCIN	ROSTKV	grey	int	UTRIC
ccal	popp	ant	mag	haas	ix	col
cfol	pus	chat	RUBUS	hect	long	del
dull	'old'	macq	aust	hunt	math	lat
div	pygm	n-z	ciss	kirk	pauc	mair
elip	ram	scot	parv	lag	pulc	mon
eug	sett	strc	schm	lap	ven	n-z
fair	'west'	PYGMEA	squa	laut	THELEO	prot
fasc	'man'	arms	RUMEX	lax	bill	subs
hutt	tara	cil	flex	lyal	THELYP	vulc
inr	tenn	myos	neg	math	dent	VIOLA
kirk	trio	pulv	RUMOHR	monr	gong	cunn
lin	wall	tet	ad	myr	pal	fil
mich	PODOC	thom	aris	perd	penn	lyal
obc	acut	PYRRHA	hisp	rad	ulig	VITEX
pat	dac	exig	RUPPIA	rein	THISM	luc
pim	ferr	PYRROS	mega	rem	rodw	VITTAD
ralp	hall	serp	poly	rev	TILLEA	aust
rig	niv	QUINT	SALIC	rul	acut	WAHLEN
ten	spic	acut	aust	sax	deb	albo
turn	tot	elip	SAMOL	scia	helm	broc
umb	POLYG	serr	rep	scor	kirk	cart
virg	†dec	RANUNC	SCAEV	sout	mosc	col
PLAG	POLYST	acau	grac	sped	mult	con
bet	cyst	auck	SCHEFF	ster	purp	grac
div	rich	berg	dig	stew	pus	math
PLANCS	silv	bit	SCHZEA	trav	sieb	pygm
novu	vest	buch	bif	turn	sinc	simp
PLANT	POMAD	cars	dich	SICYOS	TMESIP	tric
auck	apet	chee	fist	ang	tann	WEINM
lan	ham	chor	SCHIZL	SIEGSB	TRAVER	rac
n-z	kum	cliv	all	†orie	bacc	silv
pic	orar	crit	cock	SIMPLC	TODEA	WOLFIA
rou	phyl	dep	col	lax	barb	arrh
spat	prun	enys	exig	'buch'	hym	XERON
trid	rug	fol	haas	SOLAN	sup	call
trit	PORANT	gadl	hydr	avic	TRICH	YOANIA
uni	alp	grac	nit	lac	col	aust
PLECTO	mic	grah	pall	†nod	alon	ZANNIC
bay	POTAMG	haas	reni	SONCH	endl	pal
PPHYLL	chee	hirt	roug	gron	ren	ZOSTER
crin	ochr	inst	trif	litt	strc	capr
hook	pect	insg	SCHOEN	SOPHOR	ven	muel
spec	sub	kirk	apog	mic	TRIGLO	ZOYSIA
	POTENT	lapp	brev	pros	pal	min
	ans	lim	cars	tet	stri	pauc
		lob	flui			

MAMALS	KIWI	PRION	(n/is	EEL	WEEDS
*hhog	brow	auck	(chat	l-fn	(troublesome species)
*kior	(s/is	b/bl	(auck	e-fn	barberry
lbat	(n/is	fair	(snar	FLOUND	blackberry
sbat	stew	fulm	TROPIC	(inanga)	briar
	larg	(chat	TUI	GALAXS	cape ivy
fur	litt	PUKEKO	(chat	arg	elder
selp	KNOT	*QUAIL	*TURKY	brev	gorse
slep	KOKAKO	*bobw	TURNST	div	Hakea acic
slin	s/is	*brow	WARBLR	fasc	H. pub
	(n/is	*calf	chat	grac	H. saligna
BIRDS 22	*KOOKB	RAIL	grey	mac	holly
ALBATR	*MAGPI	auck	WEKA	pauc	marram
roy	*blck	band	west	post	nasella
(sthn	*whit	*REDPL	(n/is	prog	periwinkle
(nthn	MOLLYM	RIFLEM	(east	usi	Selaginella
soot	blck	s/is	(stew	vulg	sycamore
wand	bull	(n/is	WELCOM		trav. joy
BELLBD	grey	ROBIN	WHIMBL	LAMPRY	wandering Jew
(3kg	w/cp	chat	asia	*MOSQO	willow – crack
BITTRN	(g/bk	s/is	WH/HD	(mudfish)	– other
*BLKBD	(chat	(n/is	WREN	WEOCHN	yellow lupin
*BUNTG	MOREPK	(stew	bush	apod	
*CHAFF	*MYNA	*ROOK	(s/is	burr	
*CHUKR	NODDY	*ROSEL	(n/is	div	
*CKTOO	OWL	*crim	(sted		
COOT	laug	*east	rock	*PERCH	
CRAKE	*litt	SADDLB	*YELLO	*SALMN	
mars	OYST-C	s/is	YEL/HD	*atln	
spot	chat	(n/is		*quin	
CREEPR	pied	SANDLG	REPTLS	*sock	
CUCKOO	vari	SANDPI	TUATRA	(smelt)	(water weed)
long	P'KEET	curl	(gecko)	RETROP	cape pondw
shin	ant	sib	HETOPH	osm	Elodea
CURLEW	orng	SHAG	gemm	retp	Lagarosiphon
l/bl	red	blck	manu	STOKEL	w. hyacinth
DABCHK	(kerm	camp	rud	anis	
DOTTRL	(chat	(auck	stel	*TENCH	
band	(rchk	king	tub	*TROUT	(others)
bl/f	yell	(stew	HOPLO	*brow	acacia spp
n.z.	(forb	(chat	duv	*rain	aust sedge
r/cp	*PARTR	(boun	gran		box thorn
DUCK	PENGUN	litt	pac		broom
blue	blue	l/bl	NAULT		brush wattle
brow	(sthn	pied	aleg		buddleia spp
(auck	(nthn	spot			burdock
(camp	fior	(blue	(skink)		Carpobrotus
grey	(snar	(pitt	LEIOLO		dead sea ap
g/tl	(erec	SHEARW	aen		eucalyptus spp
*mall	rock	alld	gran		fennel
para	w/fl	(kerm	homa		fleabane
scup	yell	(chat	infr		hawthorn
shov	*PEAFL	bull	lati		heather
FANTL	PETREL	fles	l-oc		hemlock
s/is	blck	flut	moco		him. honeysuck
(n/is	cape	hutt	oliv		montbretia
(stew	chat	sh/t	orn		ivy lettuce
(snar	(b/wg	soot	smit		ling
GANNET	cook	wedg	sut		macrocarpa
boob	gian	SW/EYE	zel		Phytolacca
gann	grey	SKUA			pinus spp
GODWIT	g/fc	arct	FROGS		poplar – black
amer	kerm	sthn	*HYLA		– silver
asia	*SKYLK	SNIPE	*aur		– other
east	mott	auck	*caer		ragwort
*GOLDF	pycr	(ant	*ewng		spanish heath
*GOOSE	sund	(snar	LEIOPE		tall fescue
*cape	west	(chat	arch		thistles
*cndn	w/ch	(stew	ham		californian
GREBE	w/hd	*SPARR	hoch		marsh
*GREEN	(DIVNG)	SPOONB			milk
GULL	nthn	*STARL			nodding
b/bk	(sthn	STILT			ox tongue
b/bl	(sub	blck			scotch
redb	geor	pied			winged
HAWK	(STORM)	STINT			other
falc	b/by	STITCH	FISH		tree lucerne
harr	g/bk	*SWAN	(bully)		
(fiji	w/by	*blck	GOBIOM		
*HEDGE	w/fc	*whit	alp		
HERON	(kerm	TAKAHE	bas		
blue	*PHEAS	TATTLR	gobi		
l/eg	PIGEON	sib	hutt		
whit	*dove	TERN	PHILYP		
w/fc	n.z.	ant	brev		
KAKA	(chat	bl/f	hubb		
(s/is	*rock	casp			
(n/is	PIOPIO	fair	*CARP		
KAKAPO	s/is	grey	*carp		
KEA	(n/is	litt	*gold		
KINGFR	PIPIT	soot	*cruc		
	PLOVER	whit	*CATFH		
	gold	wh/f	CHEIM		
	shor	*THRSH	*CHAR		
	spur	TIT	*broo		
	wryb	s/is	*lake		

e. 26 June, 1940, Field Inspector's report: "The bush is inferior quality being mainly Manuka with Ribbonwood, Konini, Matipo, small native shrubs and Lawyer with only a very occasional broadleaf and Totara. This bush is of little scenic value and with the free access of stock will become progressively worse. Gorse is very bad especially on the shady faces and firing is the only means of control used which has in part checked the spread of gorse but has probably been the cause of the disappearance of the Native Bush." [for manuka read kanuka]

(Kelly, 1972)

G.C.K.

Appendix 10.

PORT HILLS RESERVES

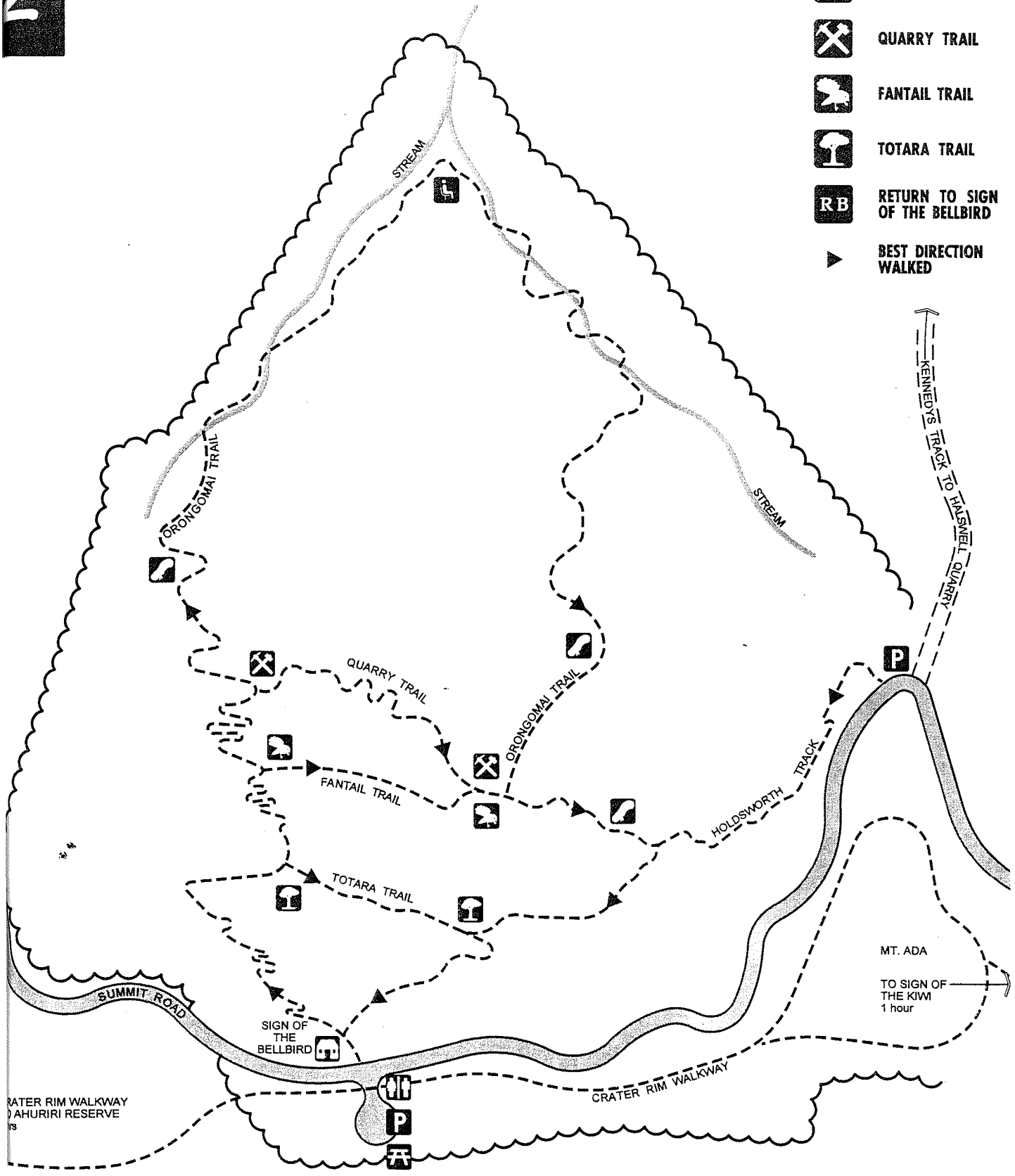
PARKS UNIT

2

Kennedys Bush Scenic Reserve Trails & Facilities

Trail Key

- ORONGOMAI TRAIL
- QUARRY TRAIL
- FANTAIL TRAIL
- TOTARA TRAIL
- RB — RETURN TO SIGN OF THE BELLBIRD
- ▶ — BEST DIRECTION WALKED



Appendix 11.

FLORA – FLOWERING PLANTS, CONIFERS, FERNS, FERN ALLIES. Summit Road AHURIRI – COOPERS KNOB

PLANTS	ANGEL	BRACGL	app	wall	CORALL	DEYEUX	cin	ses	cant	ang	fil	stip	una
	dec	rep	arb	CHEIL	cras	auck	cock	GAULTH	chat	chat	lat	thom	vir
ABROT	gen	BULBIN	aren	dist	CORDYL	aven	conf	ant	chee	cras	LEPLN	MICROS	NOTHOF
caes	mont	ang	ast	slab	aust	/brec	cras	col	cil	n-z	bil	scap	fusc
fil	ros	gibb	comp	ten	bank	bill	crass	cras	coar	obov	LEPTOC	MICROT	menz
inco	trif	hook	corr	CHENOP	ind	glab	aleg	dep	cock	HPHYLM	sim	olig	sol
lin	ANISOT	mod	cunn	all	kasp	quad	erac	opp	col	arms	LEPTOL	parv	/clif
musc	acut	ross	curt	amb	pum	ten	erab	pan	corr	atro	n-z	unif	trun
pus	ant	talb	egm	det	CORIAR	yong	find	rup	cup	biv	LEPTOS	MIDA	NOTOSP
ros	arom	BULBPH	enys	pus	ang	DIANEL	forb	subc	dec	dem	eric	sai	carm
spat	brev	pygm	fiel	CHILOG	arb	nigr	glab	GENIOS	diuf	dll	scop	MIMULS	glab
ACAENA	cap	tub	flag	corn	king	DICHEL	grac	lig	dios	ierr	sinc	rap	tor
adsc	carn	CALADN	flor	form	lur	crin	hect	GENTNA	div	flab	LEUCOG	MITRAS	NOTOTH
ans	delt	carn	glab	CHIONO	plum	sci	hirt	antc	elip	flax	gran	mont	aust
buch	div	lyal	gran	acic	pott	DICHON	ins	antp	epac	hirs	leon	n-z	ros
caes	enys	CALEAN	holl	ant	ptar	brev	krul	ast	even	lyal	LIBERT	MONTIA	OLEARA
fiss	fil	min	hook	aust	sarm	rep	linn	bell	frut	mal	gran	font	alb
glab	flab	CALLIT	kirk	bedd	COROK	DICKSN	mac	cer	gibb	min	ix	MORELT	all
hirs	haas	ant	lac	brom	budd	fib	math	chat	glau	mont	per	aff	ang
iner	imbr	auck	mon	chee	cot	lan	mel	conc	grac	mult	pulc	MUEHLN	arb
mic	int	muel	nig	con	macr	squa	mic	cory	haas	pelt	LIBOC	ast	avic
min	lat	petr	odor	cras	CORTAD	DISCAR	nert	div	hect	pulc	bid	aust	buch
n-z	lyal	tsteg	orb	fves	fulv	toum	n-z	fil	hulk	rar	plum	axil	cap
pall	pil	CALOCH	ovat	fvic	rich	DISPHY	numm	gibb	imb	rev	LILEOP	comp	chat
pus	ANOGRM	camp	pet	junc	'spin'	aust	pall	grac	ins	ruf	lac	sph	chee
sacc	lept	pal	pron	mac	toe	DODON	ped	gris	lang	sang	n-z	MYOPOR	col
ACIANT	APIUM	rob	ram	oreo	CORYBS	visc	pern	lin	lav	scab	orb	deb	cor
forn	aust	CALOR	riv	ovat	acon	DONAT	perp	math	lig	vill	LIMOSL	laet	cros
ren	fil	min	rob	pall	cryp	n-z	pict	mont	lyco	HYPER	curd	MYOSTD	frag
vir	APOROS	CALTHA	silv	pung	macr	DOODIA	poly	pat	mact	gram	lin	hart	furf
ACIPHL	bif	n-z	sol	rig	obl	caud	porp	sax	macp	jap	LINDSA	MYOSOT	hect
anom	ARCHER	obt	sut	rub	orb	med	pub	ser	math	HYPOL	lin	albo	ilic
aur	rec	CALYST	unif	'stew'	riv	DRACOR	purp	spen	obt	dist	tric	amab	lac
col	trav	marg	viol	spir	tril	acer	pycn	ten	ochr	mill	vir	ang	lyal
cong	ARISTO	tsap	virg	ter	ung	adam	rost	ter	odor	punc	LINUM	ant	mac
cren	frut	sold	will	CHORDO	CORYNO	arb	rot	town	parv	rug	mon	arn	mosc
cros	serr	tug	CARPHA	stev	laev	dens	rubr	vern	pauf	ten	LIPARO	aust	numm
diss	ARTHPD	CANAVL	alp	CLAYTN	COTULA	fil	sim	GERAN	paur	HYPOXS	gunn	cap	odor
div	cand	obt	CARPOD	aust	ang	fior	tas	aust	petr	pus	LITSEA	chee	opor
dobs	cirr	CARDAM	serr	CLEMAT	atr	kirk	ten	mic	pim	HYPSEL	cal	col	pach
forx	ARTHTS	bil	CASSIN	afol	aust	lat	thym	pil	ping	riv	LOBEL	conc	pan
flex	ten	cory	amoe	aust	tcor	less	vern	sess	popp	IMPERA	anc	eld	ran
glau	ASCAR	deb	fulv	foet	dio	long	wils	trav	prop	chee	linn	exim	semi
grac	luc	dep	lept	fors	feat	math	ERECHT	GEUM	pub	IPHIG	roug	expl	sol
hect	ASPLEN	sub	ret	hook	fil	men	arg	div	rak	n-z	LOGAN	fors	thom
hook	anom	uni	vauv	mar	goy	mus	div	leio	ram	IPOMEA	dep	glab	lawn
horr	bulb	CAREX	CASSYT	pan	haas	oliv	kerm	parv	roul	palm	LOPHOM	goy	trav
ind	falc	acic	pan	parv	lan	pald	min	pus	rec	pes	bull	laet	virg
iner	flab	alb	CELMIS	petr	lin	pels	quad	uni	rig	ISACHN	obc	lang	OPHIOG
int	flac	alln	adam	quad	man	pat	scab	urb	rup	aust	LORANT	lyal	cor
kirk	hook	app	all	CLIANT	min	pear	sonc	GLEICH	salf	ISCHNO	mic	mac	ped
lat	lamp	berg	alp	pun	pact	pol	wair	circ	salc	n-z	LOXOMA	math	OPLISM
leig	luc	brev	ang	COCKAY	pron	ERYNG	cunn	spec	ISOETE	cunn	monr	comp	
lyal	obtu	buch	arg	grac	plum	pros	ves	flab	strc	alp	LUZULA	oreo	imb
monr	rich	cap	arms	laev	pot	pub	ERYTHR	lin	stma	kirk	bank	pet	OREOB
mult	shut	cars	bell	COLLSP	pyr	pyrm	aust	mic	suba	ISOTOM	cel	pulv	imp
pinn	tric	chat	bonp	hast	ran	rec	pum	GLOSSO	subs	fluv	col	pygm	pect
pol	ASTEL	cirr	brev	mic	ser	rosm	EUGEN	glat	tetg	IXERBA	cren	rak	strc
scot	bank	cock	cock	COLOB	squa	scop	mair	sub	tets	brex	crin	sax	OREOMY
simi	chat	col	cord	acic	trai	sinc	EUPHOR	GNAPH	top	JOVELL	lept	spat	col
simp	frag	com	cor	aff	vill	strc	glau	coll	town	rep	pict	suav	ram
sped	gram	cor	dall	apet	will	sub	EUPHRS	hook	trav	sinc	pum	ten	rig
squa	gran	dall	dens	brev	COXELL	town	aust	inv	trun	JUNCUS	rufa	trav	OREOST
subf	lin	dec	disc	buch	dief	trav	chee	ker	tum	ant	trav	unif	sub
tak	nerv	dev	dub	can	CRASPD	trim	cock	lut	urv	aust	ulo	ven	ORTHOC
town	niv	dian	du-r	hook	inc	unif	cun	nit	ven	caes	LUZUR	MYSOUR	strc
trai	pet	dips	gibb	mes	lan	urv	disp	pal	vern	dist	parv	n-z	OURIS
trav	skot	diss	glab	mont	maj	vir	druc	sub	HECTOR	greg	LYCOPO	MYRIOP	caes
trif	sol	druc	glan	muel	min	DRAPET	dyer	trav	caes	hol	aust	elat	cock
vert	sub	ech	grac	musc	rob	dief	intg	trin	HEDYC	mar	bill	ped	col
ACKAMA	trin	edg	gram	strc	unif	lax	lang	GRAMTS	arb	n-z	cern	prop	cros
ros	ATHYR	elng	haas	wall	CTENIT	lyal	monr	bill	HEIMER	pall	deut	rob	glan
ADENOC	aust	enys	hect	CONVOL	dec	mult	petr	cil	brun	pauc	fast	vot	macc
grac	jap	fasc	hier	frac	glab	vill	rep	cras	HELICH	glan	lat	MYRSIN	macp
ADIANT	ATRIPL	fil	holo	ver	val	DROSER	rev	het	bell	pris	n-z	aust	mod
aeth	buch	flag	hook	COPROS	CUSCUT	arct	town	pum	cor	pus	ram	chat	sess
cunn	n-z	flav	inc	acer	tsuav	aur	zel	GRATLA	dep	sar	scar	cox	vulc
diap	AUSTRL	fors	insg	acut	CYTHEA	bin	EWART	nana	dim	schz	serp	div	OXALIS
form	pus	fret	lanc	ant	col	pyg	sinc	sexd	fil	usit	ver	kerm	corn
fulv	AVICEN	gaud	lari	arb	cunn	spat	EXOCAR	GRISEL	glom	XIRKNL	vol	mont	lact
hisp	res	gem	lat	areo	deal	sten	bid	litt	mic	n-z	LYGOD	numm	strc
AGATH	AZOLLA	goy	lind	ast	kerm	DRYMOA	FESTUC	luc	plum	XIRKOP	art	oliv	PACHYC
aust	rub	hect	lyal	aust	med	adv	cont	GUNNRA	sel	lyal	LYPER	sal	cren
AGROPY	AZOREL	inop	mack	bank	miln	DYSOXY	cox	albo	HEMIPH	rob	ant	NEOMYR	n-z
enys	sel	inv	macm	brun	smit	spec	'dun'	aren	suff	XNIGHT	MACHER	ped	PACHYS
kirk	BAUMEA	kal	maj	chat	CYATOD	EARINA	math	dens	HERPOL	exc	sinc	NEOPAN	ins
scab	art	kerm	mon	chee	col	aut	/gran	dent	n-z	KOELER	MACROP	anom	PAESIA
(ien	comp	kirk	morg	cil	emp	muc	mult	flav	HIBISC	chee	exc	arb	scab
'coas'	hutt	lach	parv	col	fasc	ECHINO	'o.c.'	ham	div	novo	MARATT	col	PARAHB
'roug'	junc	lamb	pet	'cras'	fras	ovat	n-z	mix	trio	KORTHL	sal	kerm	birl
'tall'	rub	less	petr	cren	jun	ELAEOC	petr	mon	HIEROC	lind	MARSIP	laet	can
'yong	ten	lib	prae	cun	parv	dent	'rue'	pro	brun	sal	grac	simp	cat
AGROST	ter	lit	pro	dep	pum	hook	'two'	stri	n-z	LACHNA	MAZUS	NEPHLP	chee
alp	BEILSM	long	ram	dod	rob	ELATIN	FORST	GYMNEL	'slen'	fil	pum	cord	dec
dyer	tar	maor	rig	foet	CYPERS	grat	bid	apet	redl	(semi	rad	exal	hook
(deli	tawa	muel	rup	int	ust	ELATOS	mack	cunn	(rec	'hum'	MELCPE	NERTER	lin
imb	BIDENS	ochr	rut	lin	CYSTOP	rug	sod	lanc	'copp	lept	simp	balf	lyal
mag	pil	petr	sess	luc	frag	ELEOCH	ten	mont	'egm'	litt	tern	cil	plan
musc	BLECH	plei	sinc	macr	DACRYD	acut	FIMBRS	HAAST	'gold'	lyal	MELCYT	cunn	spat
pall	bank	pter	spec	micr	bid	grac	squa	puiv	'silv'	rich	lanc	dap	trif
pet	cap	pum	sped	obc	bif	neoz	FREYCN	rac	HISTIO	stri	mac	dich	PARATR
sub	disc	pyr	thom	parv	col	pus	bank	sinc	inc	LAGENO	mic	set	bank
ALECTR	dur	roul	trav	(dum	cup	sphc	FUCHSA	HALOR	HOHER	cun	ram	NOTOD	mic
exc	fil	ros	verb	pet	int	ELINGA	col	cart	ang	lan	MENTHA	aur	smit
gran	fluv	rub	vern	petr	kirk	john	exc	col	glab	pet	cunn	bian	PARIET
ALSEUO	fras	sect	visc	(atro	lax	ELYTRN	pers	dap	lyal	pinn	MERYTA	buch	deb
atti	lanc	secd	walk	poly	DACTYL	adam	proc	arec	pop	pum	sinc	(caes	PARSOM
bank	memb	sinc	CENCHR	prop	tay	col	GAHNIA	inc	sex	LEMNA	METROS	clav	cap
lig	min	sol	caly	pseu	DAUCUS	flav	lac	mic	HOMAL	min	alb	(gen	het
lin	nigr	spin	CENTEL	pum	gloc	tet	pauc	proc	poly	LAUREL	cerm	grac	PASPAL
mac	norf	subd	inif	rep	DAVALL	ENTEL	proc	HEBE	HYDAT	n-z	col	(lae	orb
pal	pat	tern	CENTIP	(asm	rham	arb	riq	acut	inc	LEPIDM	diff	mac	PELARG
pus	penn	test	forb	rig	DENDRB	EPACRS	set	alb	HYDROC	bank	exc	nig	inod
quer	vulc	trac	CENTRO	rob	cunn	alp	xan	all	amer	flax	fulg	nud	PELLEA
ALTERN	BOEHM	trav	cil	rot	DESCHM	pauc	GAIMAR	ampl	diss	kawa	kerm	(pon	falc
(dent	deal	trif	min	rub	caes	EPILOB	set	ann	alon	kirk	park	(pil	rot
AMPHIB	BOTRYC	unc	pall	rug	chap	eis	GALIUM	arm	mic	mat	perf	pulc	PENANT
flui	aust	vent	strg	serr	grac	ant	perp	bark	mos	obt	rob	(pur	cory
ANARTH	lun	virg	CHEES	spat	n-z	bill	prop	bon	n-z	oler	umb	trac	PENTAC
lanc	BRACME	wak	anys	tenc	pen	brev	ten	boll	ptar	sisy	MICROL	set	pum
ANEMON	lin	CARMIC	fast	tenf	ten	caes	GASTRO	brac	trip	ten	aven	strc	PEPERO
ten	rad	alig	gibb	vir	DESMOS	chio	cunn	brev	HTHERA	LEPIDO	col	ten	tet
G.C.K.	sin	ang	lat	wall	spir	chlo	min	buch	alp	aust	poly	thom	urv

FLORA (concl), MAMMALS, BIRDS, REPTILES, AMPHIBIA, FISH plus MAJOR WEEDS.

PLANTS (cont.)

PERNET
mac
nana
PERSOO
toru
PHEBAL
nud
PHORM
cook
ten
PHRYG
roul
ten
PHACNE
clav
col
rub
PHCLAD
alp
glau
tric
PHGLOS
drum
PHYMAT
div
n-z
scan
PICRIS
thier
PILUL
n-z
PIMEL
aren
arid
bux
conc
cros
gnid
long
lyal
popp
pros
pseu
ser
sut
tom
trav
PITOSP
anom
buch
col
corn
ccal
cfol
dall
div
elip
eug
lair
fasc
hutt
int
kirk
lin
mich
nuc
pat
pim
ralp
rig
ten
turn
umb
virg
PLAG
tet
div
PLANCE
nov
PLAN
cuck
lan
n-z
pict
roul
spat
trid
trif
uni
PLECTO
bay
PPHYLL
crin
hook
spec

PSORUS
rut
POA
acic
anc
(cond
(deb
(elat
(fol
antp
astn
'dun'
'hard'
auck
brev
buch
chat
chee
cock
col
(brev
'sout'
dip
exig
fol
guth
ham
imb
'tar'
'cap'
incr
kirk
(col
'blim'
'old'
laev
(fil
'egm'
'sout'
'coa'
lind
lit
mack
'arth'
man
math
(ten
n-z
(des
(sub
(wall
orar
poly
popp
pus
'old'
pygm
ram
seti
'west'
'man'
tara
tenn
trio
wall
PODOC
acut
dac
ferr
hall
niv
spic
tot
POLYG
tdec
POLYST
cyst
rich
silv
vest
POMAD
apet
ham
kum
orar
phyl
prun
rug
PORANT
alp
grac
grah
mic
POTAMG
chee
ochr
pect
sub
POTENT
ans

PRASOP
col
nud
pet
pum
PRATIA
ang
aren
pauc
petr
perp
phys
PPANAX
chat
cras
disc
edg
fer
gill
less
lin
PWINTA
axil
col
trav
PSILOT
nud
PTERID
aq
PTERIS
com
hect
hook
trem
PTEROS
alab
areo
aust
bank
barb
brum
cycn
fol
gram
hum
irs
mic
mont
mut
nana
nut
oliv
trul
ven
styl
PUCCIN
ant
chat
macq
n-z
scot
strc
PYGMEA
arms
cil
myos
pulv
tet
thom
PYRRHA
exig
PYRROS
serp
QUINT
acut
elip
serr
RANUNC
acau
auck
berg
bit
buch
cars
chee
chor
cliv
crit
dep
enys
fol
godl
grac
grah
haas
hirt
inst
insg
kirk
lapp
lim
lob

lyal
macp
macl
monr
niv
n-z
pach
pauc
petr
ping
porr
rec
riv
royl
seri
sinc
sub
tern
urv
RAOUL
aust
bry
buch
cin
exim
glab
goy
gren
haas
hect
hook
mamm
monr
park
petr
rub
subs
subu
ten
yong
RHABDO
sol
RHAGOD
tri
RHOPAL
chee
sap
RIPOGN
scan
RORIPP
isl
styl
ROSTKV
mag
RUBUS
aust
macq
n-z
parv
schm
squa
RUMEX
flex
neg
RUMOHR
ad
aris
hisp
RUPPIA
mega
poly
SALIC
aust
SAMOL
rep
SCAEV
grac
SCHEFF
dig
SCHZEA
bif
dich
fist
SCHIZL
all
cock
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SCHOEN
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SCIRP
amar
ant
auck
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cald
call
cern
chlo
cras
flui
fluv
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lac
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nod
plat
pott
prae
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suic
SCLERA
bifl
oroc
unif
SCUTEL
n-z
SEBAEA
ovat
SELIER
rad
SENEC
adam
ant
bank
bell
benn
bidw
bif
cass
cock
col
com
elae
glau
grey
haas
hect
hunt
kirk
lag
lap
laut
lax
lyal
math
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myr
perd
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ulig
rein
rem
rev
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sped
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SICYOS
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SIEGSB
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SIMPLC
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SPIRAN
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SPIROD
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SPOROD
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pol
STIPA
arun
petr
ter
SUAEDA
n-z
SWAINS
n-z
TARAX
lax
TECOME
spec
TETRAC
ham
TETRAG
tet
trig
TETRAP
tet
stuc
unc
vir
zot
TEUCRD
parv
THELYM
carn
dec
dent
form
hat
int
ix
long
math
pauc
pulc
ven
THELEO
bill
THELYP
dent
gong
pal
penn
ulig
THISM
rodw
TILLEA
acut
deb
helm
kirk
mosc
mult
purp
pus
sieb
sinc
TMESIP
tann
TRAVER
bacc
TODEA
barb
hym
sup
TRICH
col
elon
endl
ren
strc
ven
TRIGLO
pal
stri

TRISET
ant
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(ten
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'rob'
spic
yong
TUPEIA
ant
TYPHA
oris
UNCINA
aff
ang
ast
auck
bank
caes
clav
dist
div
druc
egm
eleg
ferr
fil
fusc
grac
hook
inv
lax
lept
long
nerv
purp
rub
rup
scab
silv
sinc
stuc
unc
vir
zot
URTICA
asp
auck
aust
ter
inc
lin
UTRIC
col
del
lat
mair
mon
n-z
prot
subs
vulc
VIOLA
cunn
fil
lyal
VITEX
luc
VITTAD
aust
WAHLEN
albo
broc
cart
col
con
grac
math
pygm
simp
tric
WEINM
rac
silv
WOLFIA
arrh
XERON
call
YOANIA
aust
ZANNIC
pal
ZOSTER
capr
muel
ZOYSIA
min
pauc

MAMALS
*hhog
*kior
lbat
sbat

fur
selp
slep
slin

BIRDS
ALBATR
roy
(sthn
(nthn
soot
wand
BELLBD
(3kg
BITTRN
*BLKBD
*BUNTG
*CHAFF
*CHUKR
*CKTOO
COOT
CRAKE
mars
spot
CREEPR
CUCKOO
long
shin
CURLEW
l/bl
DABCHK
DOTTRL
band
bl/f
n.z.
r/cp
DUCK
blue
brow
(auck
(camp
grey
g/tl
*mall
para
scup
shov
FANTL
s/is
(n/is
(chat
(bl)
FERNBD
s/is
(n/is
(stew
(snar
GANNET
boob
gann
GODWIT
amer
asia
east
*GOLDF
*GOOSE
*cape
*cndn
GREBE
*GREEN
GULL
b/bk
b/bl
redb
HAWK
falc
harr
(fiji
*HEDGE
HERON
blue
l/eg
whit
w/fc
KAKA
(s/is
(n/is
KAKAPO
KEA
KINGFR

KIWI
brow
(s/is
(n/is
stew
larg
litt
KNOT
KOKAKO
s/is
(n/is
*KOOKB
*MAGPI
*blck
*whit
MOLLYM
blck
bull
grey
w/cp
(g/bk
(chat
MOREPK
*MYNA
NODDY
OWL
laug
*litt
OYST-C
chat
pied
vari
P'KEET
ant
orng
red
(kerm
(chat
(rchk
yell
(forb
*PARTR
PENGUN
blue
(sthn
(nthn
fior
(snar
(erec
rock
w/tl
yell
*PEAFL
PETREL
blck
cape
chat
(b/wg
cook
gian
grey
g/fc
kerm
magt
mott
pycr
sund
west
w/ch
w/hd

(DIVING)
nthn
(sthn
(sub
geor

(STORM)
b/by
g/bk
w/by
w/fc
(kerm
*PHEAS
PIGEON
*dove
n.z.
(chat
*rock
PIOPIO
s/is
(n/is
PIPIT
PLOVER
gold
shor
spur
wtyb

PRION
auck
b/bl
fair
fulm
(chat
PUKEKO
*QUAIL
*bobw
*brow
*calf
RAIL
auck
band
*REDPL
RIFLEM
s/is
(n/is
ROBIN
chat
s/is
(n/is
(stew
*ROOK
*ROSEL
*crim
*east
SADDLB
s/is
(n/is
SANDLG
SANDPI
curl
sib
SHAG
blck
camp
(auck
king
(stew
(chat
(boun
litt
l/bl
pied
spot
(blue
(pitt
SHEARW
alld
(kerm
(chat
bull
fles
flut
hutt
sh/t
soot
wedg
SW/EYE
SKUA
arct
sthn
*SKYLK
SNIPE
auck
(ant
(snar
(chat
(stew
*SPARR
SPOONB
*STARL
STILT
blck
pied
STINT
STITCH
*SWAN
*blck
*whit
TAKAHE
TATTLR
sib
TERN
ant
bl/f
casp
fair
grey
litt
soot
whit
wh/f
*THRSH
TIT
s/is

(n/is
(chat
(auck
(snar
TROPIC
TUI
(chat
TURNST
WARBLR
chat
grey
WEKA
west
(n/is
(east
(stew
WELCOM
WHIMBL
asia
WH/HD
WREN
bush
(s/is
(n/is
(sted
rock
*YELLO
YEL/HD

REPTLS
TUATRA

(gecko)
HETOPH
gemm
manu
rud
stel
tub
HOPLO
duv
gran
pac
NAULT
oleg

(skink)
LEIOLO
aen
gran
home
infr
lati
l-oc
moco
oliv
orn
smit
sut
zel

FROGS
*HYLA
*aur
*caer
*ewng
LEIOPE
arch
ham
hoch

FISH

(bully)
GOBIOM
alp
bas
gobi
hutt
PHILYP
brev
hubb

*CARP
*carp
*gold
*cruc
*CATFH
*CHEIM
*CHAR
*broo
*lake

EEL
l-fn
s-fn
FLOUND
(inanga)
GALAXS
arg
brev
div
fasc
grac
mac
pauc
post
prog
usi
vulg
LAMPRY
*MOSQO

(mud fish)
NEOCHN
apod
burr
div

*PERCH
*SALMN
*atln
*quin
*sock

(smelt)
RETROP
osm
retp
STOKEL
anis

*TENCH
*TROUT
*brow
*rain

WEEDS (troublesome species)
barberry
blackberry
briar
cape ivy
elder
gorse
Hakea acic
H. pub
H. saligna
holly
marram
nasella
periwinkle
Selaginella
sycamore
trav. joy
wandering Jew
willow – crack
– other
yellow lupin

(water weed)
cape pondw
Elodea
Lagarosiphon
w. hyacinth

(others)
acacia spp
aust sedge
box thorn
broom
brush wattle
buddleia spp
burdock
Carpobrotus
dead sea ap
eucalyptus spp
fennel
fleabane
hawthorn
heather
hemlock
him. honeysuckle
montbretia
ivy lettuce
ling
macrocarpa
Phytolacca
pinus spp
poplar – black
– silver
– other
ragwort
spanish heath
tall fescue
thistles
californian
marsh
milk
nodding
ox tongue
scotch
winged
other
tree lucerne

G.C.K.

(Wells, 1972)

APPENDIX 12

Ahuriri Bush Species List

MOSSES

Calyptopogen mnioides
Camptochaere angustata
Camptochaere arbuscula
Camptochaere pulvinata
Camptochaere ramulosa
Cryphaea tenella
Cyathophorun bulbosum
Dicranoloma menziesii
Echinodium asperipes
Homalia pulchella
Hypnum cupressiforme var. filiforme
Lembophyllum divulsum
Leptodon smithii
Leptostomum inclinans
Lopidium concinnum
Macromitrium asperulum
Macromitrium gracile
Neckera laevigata
Neckera pennata
Papillaria crocea
Papillaria flexicaulis
Racplium strumiferum
Rhynchosterigium laxatum
Rhynchosterigium tenuifolium
Sematophyllum amoenum
Sematophyllum contigum
Tetrephidopsis pusilla
Tortula abruptinervis
Tortula papillosa
Tortulla serrulata
Trachyloma planifolium
Zygodon rufescens
Zygondon menzieseii

LIVERWORTS

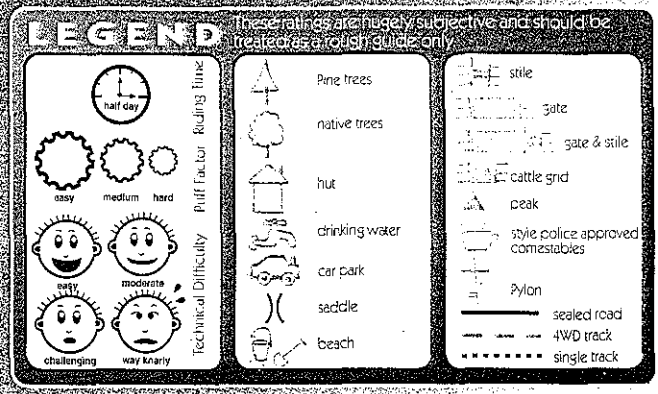
Frullania deplanata
Frullania hampeana
Frullania patula
Frullania spinifera
Lepidolaena taylorii
Lophocolea muricata
Metzgeria fucata
Metzgeria decipiens
Porella elegantula

Adapted from Visch (1979, pp.60-61)

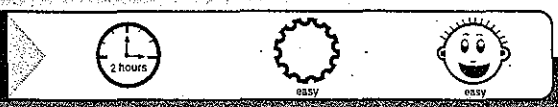
Appendix B.

Flat City Mountain Biking
HRISTCHURCH TRAIL GUIDE

place that's about as flat as a two day old can of Coke, 's a surprising amount of great mountain biking around stchurch. The rides described here are all close to the city, car ain't essential ... but is mighty handy to avoid the itable pre & post-ride road bash. Most rides end up being day affairs - entailing 30 to 40 minutes of hill climbing and, nding on your love of gravity, considerably less time to end. A single climb to the Summit Road coupled with a oaring descent is enough to wear out most people - e wanting to burn more calories can link a couple of bs together.



ottle Lake Plantation



... nary a hill in sight laddie" - bite its billiard table type terrain, le Lake is a great playground for nd is especially cool for night g. The tracks are firmly packed which drains quickly - making excellent riding in the winter n the Port Hills can be wetter n a fish's gills.

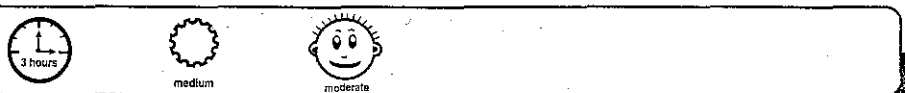
Getting there

Head north from The Palms Mall on Marshlands Road, turning right at a gas station into Prestons Road. About 1km later hang a left on Alpine View Road, then left again at the roundabout into Waitakari Drive. The Bottle Lake Plantation car park is 1km further away on your right.

Getting Dirty

Grab a map from the notice board in the car park and go crazy exploring the twisty single track and forestry roads. The trails are well marked but, as one bunch of trees looks much the same as the next, you can get a little lost. The area is well used by other recreationalists. Be considerate of others and be especially aware of logging trucks doing their thing.

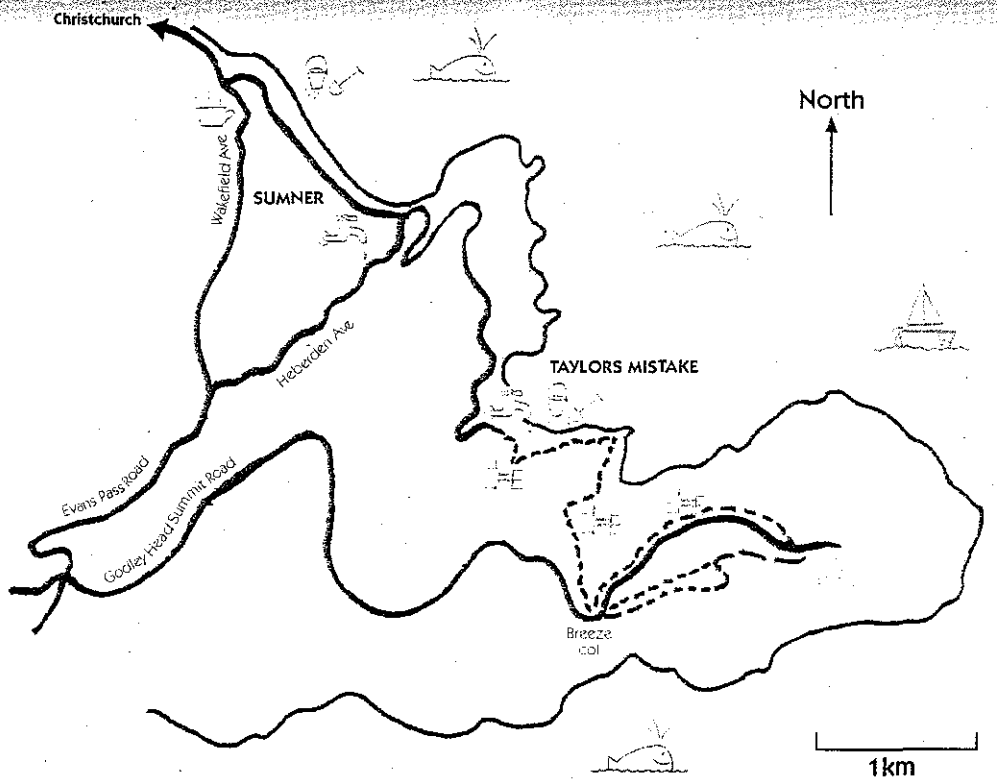
odley Head



g your bucket and spade for a ctacular circuit which takes you n high above the sea and down ne of Christchurch's best surf ches. It's especially pleasant at ise on a crisp clear morning pending on what you got up to night before).

your way to Sumner. Continue on Wakefield ue up to Evans Pass - a short punchy climb on l. At the top veer left and continue on the y Head Road for a few k's until you reach the notice board at Breeze Col.

ountain bike trails are marked on the map. a loop to suit your mood. A good option is ow the single track below the road to Godley then return to Breeze Col on either of the two on the hill behind the car park. Back at Breeze. rapid descent will see you quickly in Taylors e. The bottom section of the track is shared walkers - travel slowly and be especially nice m. Climb out of Taylors Mistake on the sealed and return to Sumner via the esplanade for a latory coffee and cake at Coffee Culture.



Huntsbury Spur

half hour · medium · easy · see back page for detailed map

This track has become a victim of subdivision mania and recently much of the track has been sealed, though it still a good route to the Summit Road.

Getting there
Hoon left along Centaurus Road from the Dyers Pass roundabout, then swing right up Ramahana Road which magically changes into Huntsbury Avenue. Cross a flat bus turning area before climbing once more to a mound of volcanic rock and dirt on your right which has some great little jumps and drop offs to play on. Veer left up the steep sealed road, past the four concrete water tanks to the unsealed track with red rocks directly in front.

Getting dirty
Continue up following the rutted clay and gravel track. At the three way intersection near a pylon choose the left track which takes you over to the east side of the spur, through a few gates to the airstrip just below the Summit Road.
Either continue up to the Traverse Track and the Summit Road, or pop over the other side of the spur and plummet down the zig zags on the Bowenvale MTB track.

Rapaki

half hour · medium · moderate

This is the most popular track on the Port Hills as it provides easy access to the Summit Road and many other trails. However it's also a good track in its own right.

Getting there
Cruise east along Centaurus Road from Colombo Street then turn right up Rapaki Road. It's sealed at the bottom but soon gives way to gravel, rock and clay.

Getting dirty
The rocky track is technically undemanding, but the 250m height gain might leave you gasping for air. You're bound to meet walkers, runners, four wheel drives and motorbikes - so practise your defensive riding skills (especially when blasting downhill).

Worsleys Spur

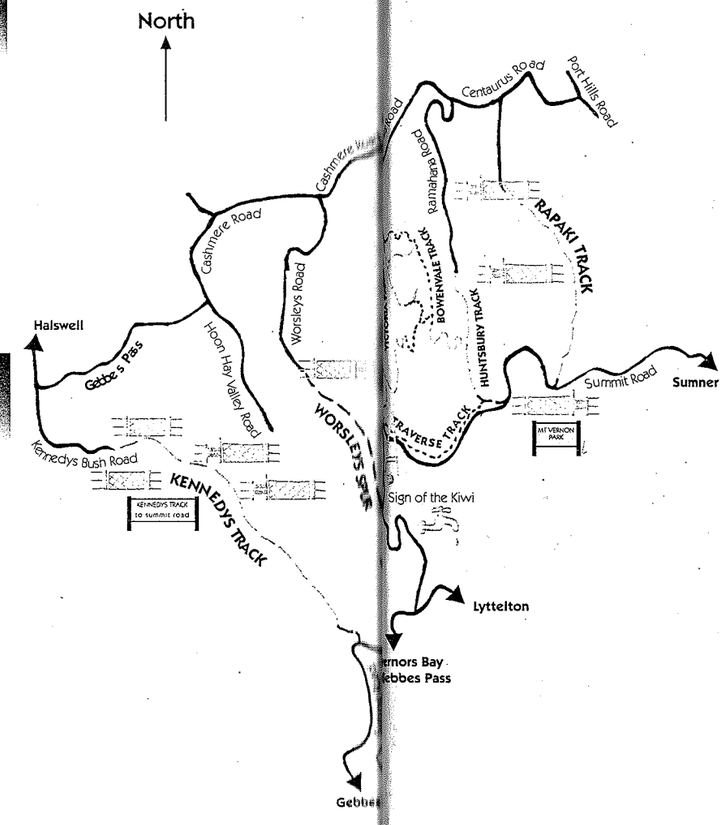
UP: 1 hour · hard · challenging

DOWN: half hour · easy · challenging

Ahh, a dynamic track. Never the same - always a new rut and unlike your life, if you're stuck in one of these suckers don't attempt to get out - ride it.

Getting there
Ride along Cashmere Road from Dyers Pass roundabout. After crossing a bridge turn left on Worsleys Road and cycle to the start of a steep climb on the sealed road. At the end of the seal continue up the gravel road to a gate.

Getting dirty
Climb the rutted clay track to the Summit Road. The ruts are huge - big enough to swallow you and your bike. The challenge is to "clean" this ride all the way up.
It's harder than it looks and requires mucho concentration. No cheating now because we're watching you. To access this trail from the Summit Road, zip up Worsleys Road (a short sealed road near Marleys Hill) and clamber over the rickety white iron gate.
The first section is called "body bag" ... and with good reason.
Be afraid - or at least circumspect.



Kennedys Track

UP: 1 hour · medium · easy

DOWN: half hour · easy · easy

This is the longest ascent on the Port Hills. Recent grading has reduced its technical interest but hasn't made the climb any less of a grind.

Getting there
Follow Cashmere Road around the river, past the hospital, over a bridge and past the Westmorland subdivision. At the Y intersection veer left - a continuation of Cashmere Road skirting around the base of the hills. Turn right at the next intersection, still on Cashmere Road. After climbing over a couple of small spurs turn left into Kennedys Bush Road and head up the hill to the end of the tarseal.

Getting dirty
Chuck you and your bike over the stile and mosey up the grass track. After the third gate (remember to leave all gates as you find them) the track begins to climb a short steep pitch.
At the crest of this hill veer right, still on the main track, down a small hill to a row of pine trees, cross the gate and follow the main track up to the Summit Road. If you are descending from the Summit Road, locate the start of the track by heading south west from the Sign of the Kiwi, past Marleys Hill, until you reach a saddle with a sign on the right hand side of the road.
Kennedys Track is closed during lambing August to September.

ictoria Park Mtb Track

half hour · easy · moderate

descent or rugged hill climb, trail has it all - twisty single k through trees and wide edy double tracks. Please ember that sections of the k are multi-use so respect er users.

Getting there
From the Summit Road - find the car park below the Sugarloaf transmitter and leap over the stile to meet the end of the Traverse Track.

Getting dirty
Follow the red MTB icons downhill through the trees on a steep clay double track to an open flat skidder site. From here you can blast off down the sealed Dyers Pass Road by going straight ahead.
Alternatively test ya brakes and shoot off to the right - down the MTB marked 4WD track (the other trails in this forest are for hikers only) which takes you into the Bowenvale Valley. Turn left at the bottom, following the stream for 70m. Cross the stream before the gate, climbing a single track up the side of the valley where you can either continue up to the Bowenvale MTB track or drop down a single track to the gravel road at the end of Bowenvale Avenue.

Traverse Mtb Track

half hour · easy · moderate

This purpose built single track links the top of the Bowenvale MTB Track with the top of the Victoria Park MTB Track. The twisty trail traverses below the Summit Road. It's a hoot travelling in either direction - it only takes 15 minutes each way so do both.

Bowenvale Mtb Track

half hour · easy · way knarly

There's only one sensible direction to ride this track ... and that's downhill.

Getting there
On the Summit Road, at the top of Huntsbury Spur, there's a sign announcing the Bowenvale MTB Track. Follow the gravel road down to the old airstrip and take the track on the left signposted to Bowenvale Valley.

Getting dirty
Rock on down the zig zags. No Saudi Arabian court ever meted out punishment like the beating you'll get down here. It's steep and rough with a few ruts thrown in.
At the end of the 4WD track you'll zip by a pylon - continue across a narrow cattlestop and swing right into a narrow single track that winds its way down the valley. At the end of the single track either climb up to the forest and tackle the extremely steep Bowenvale tree slalom, or drop down the "spray track" on your left into the valley.

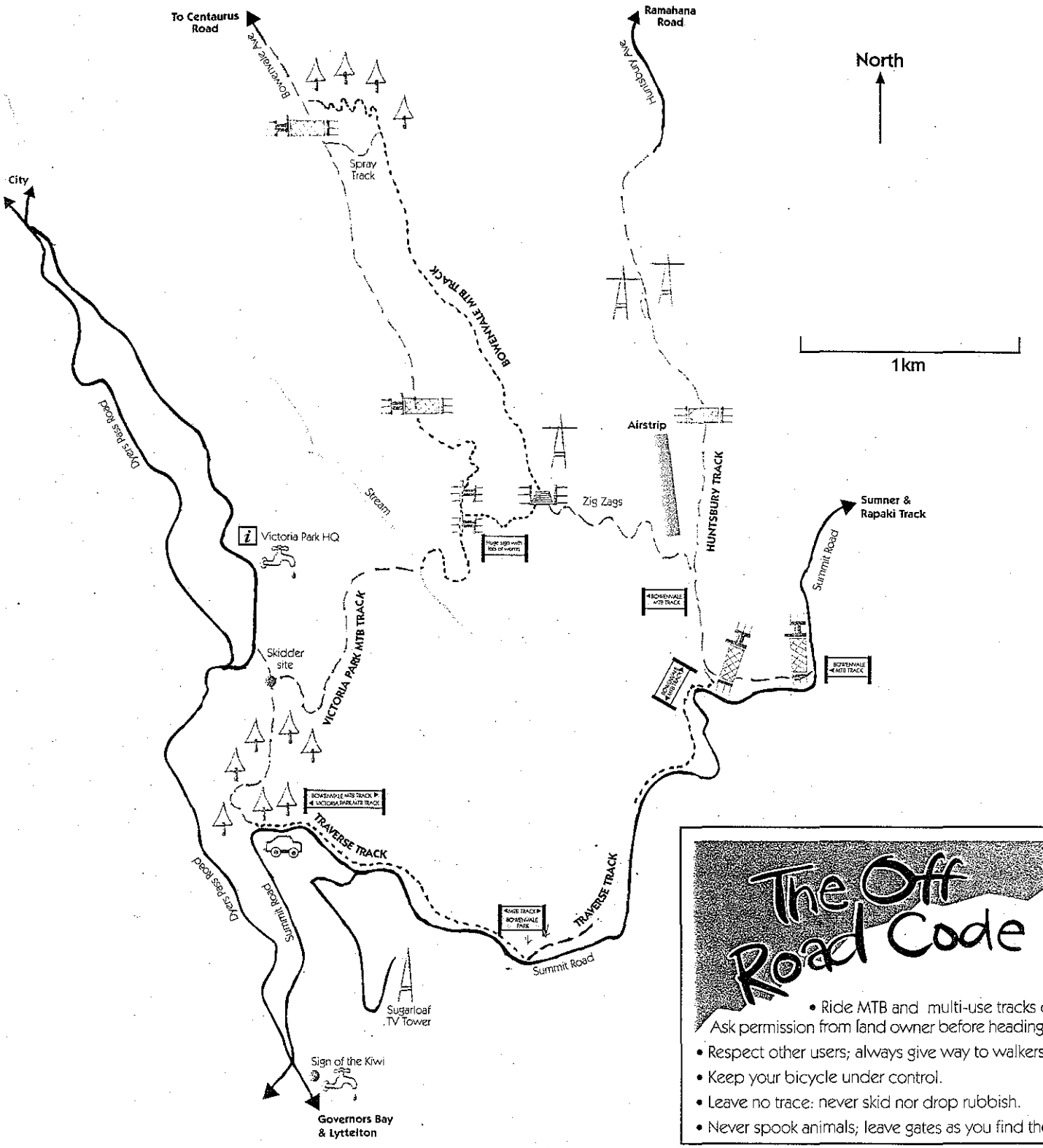
Watch out for:
The Bowenvale tree slalom can be a health hazard in the wet.

s guide is anything but austive, but it does cover more popular rides on offer und Christchurch. Check the "Canterbury Trail ide" for the mountain bike ygrounds a little further out own. Or get your hands on opy of "Classic New Zealand untain Bike Rides" oth available from und Effect 0800 655 733.

Also consider joining a club. Excellent for discovering new tracks, improving your skills and of course hanging out with other pedal heads.

There are three in Christchurch:

- **Canterbury Mountain Bike Club**
  P O Box 9287, Christchurch
- **Canterbury University Mountain Bike Club**
  c/o UCSA, 90 Ilam Road, Christchurch
- **Women on Wheels**
  c/o Mandi Anderson, Sport Canterbury, Christchurch.



The Off Road Code

- Ride MTB and multi-use tracks only. Ask permission from land owner before heading out.
- Respect other users; always give way to walkers.
- Keep your bicycle under control.
- Leave no trace: never skid nor drop rubbish.
- Never spook animals; leave gates as you find them.

Ground effect

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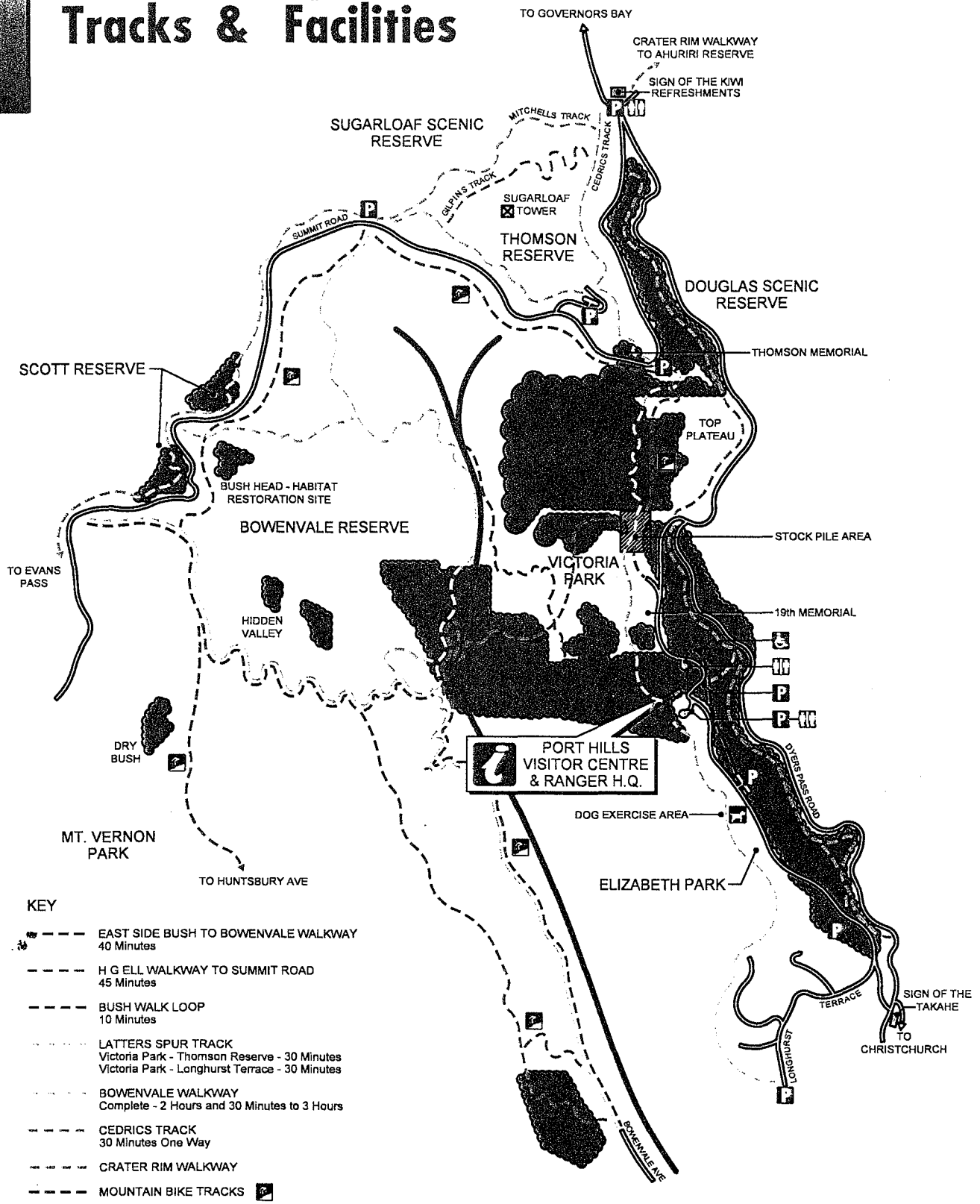
Appendix 14.

PORT HILLS RESERVES

PARKS UNIT

1

Cashmere Spur Reserves Tracks & Facilities



KEY

- EAST SIDE BUSH TO BOWENVALE WALKWAY — 40 Minutes
- H G ELL WALKWAY TO SUMMIT ROAD — 45 Minutes
- BUSH WALK LOOP — 10 Minutes
- LATTERS SPUR TRACK — Victoria Park - Thomson Reserve - 30 Minutes; Victoria Park - Longhurst Terrace - 30 Minutes
- BOWENVALE WALKWAY — Complete - 2 Hours and 30 Minutes to 3 Hours
- CEDRICS TRACK — 30 Minutes One Way
- CRATER RIM WALKWAY
- MOUNTAIN BIKE TRACKS
- ACCESSIBLE TRACK
- GILPINS TRACK
- BOWENVALE STREAM

See overleaf for track information

FOR MORE INFORMATION PLEASE CONTACT: PARK RANGERS, PORT HILLS RESERVES, C/o 101 VICTORIA PARK ROAD. PH 332 9889

EAST SIDE BUSH

This track starts below the Port Hills Visitor Centre and follows the **crimson** markers. Within minutes of entering this track, you are surrounded by tall regenerating forest and the sound of birdlife. Crossing two 4WD trails, the track ends at the Bowenvale Walkway.
Special note: This track is infamous for being the site of the Parker/Hulme murder in 1954.

BOWENVALE TRACK

This track has several entry points. From Victoria Park follow crimson markers until the **green** markers of the Bowenvale walkway start. The track cuts downhill briefly before sidling up to the head of the valley. From here you can either turn left to come out at Bowenvale Avenue or turn right to walk to the Summit Road. This track system winds its way through silver tussock dominated country, typical of the modified Port Hills environment.
Special note: The lower section of the Bowenvale track is multi use.

LATTERS SPUR TRACK

Follow the **yellow** markers down the stone steps to the Latters Spur track sign. From here you can veer left and follow the track down through an old quarry and open tussock lands to Longhurst Terrace, near the Sign of the Takahe. Alternatively turn right and follow the track through regenerating bush and tussock along the spur to a gum plantation. For a short distance the track is multi use and follows the spur up to the Summit Road. Cross the road and head into a small pocket of bush where Thomsons memorial is located. The track veers right just before the memorial and leads you to the carpark beneath the Sugarloaf tower where Cedrics track begins.

CEDRICS TRACK

From the Sugarloaf carpark the **lilac** markers of Cedric track go either direction. To the south the track will tak you to the Sign of the Kiwi and Mitchells Track. To th east the track traverses Sugarloaf Reserve and als leads you to Mitchells track and the Crater Rim Walkwa

BUSH WALK

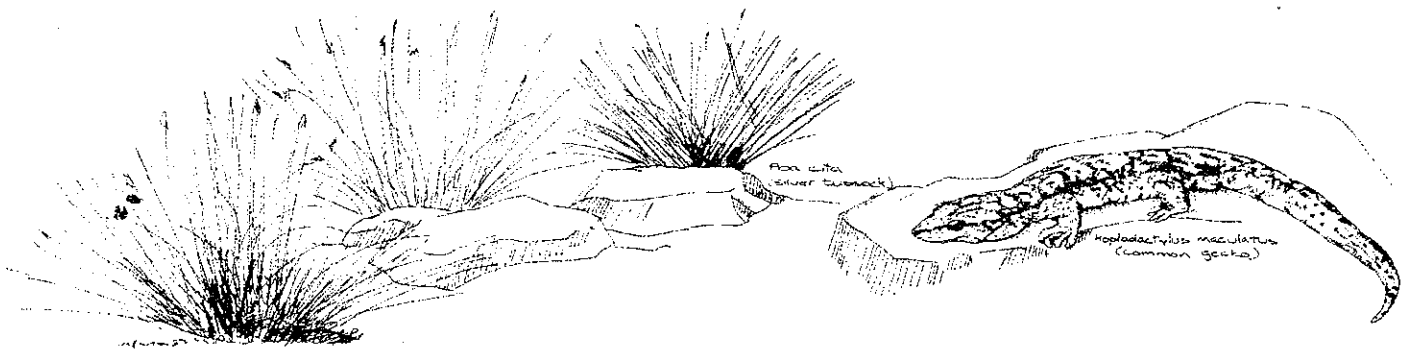
This short loop track starts from below the Port Hill Visitor Centre, and follows the **brown** markers. Usin the self guided brochure available from the Visit Centre, follow the track through native regeneratin bush, typical of New Zealand lowland forest. Korimak (Bellbird), Piwakawaka (Fantail), Tauhou (Silver Ey and Kereru (Wood Pigeon) are often seen and hear through this bush.

GILPINS TRACK

This track connects either end of Cedrics track an provides a steep but interesting walk along the harbou side of Sugarloaf Reserve.

H.G. ELL WALKWAY

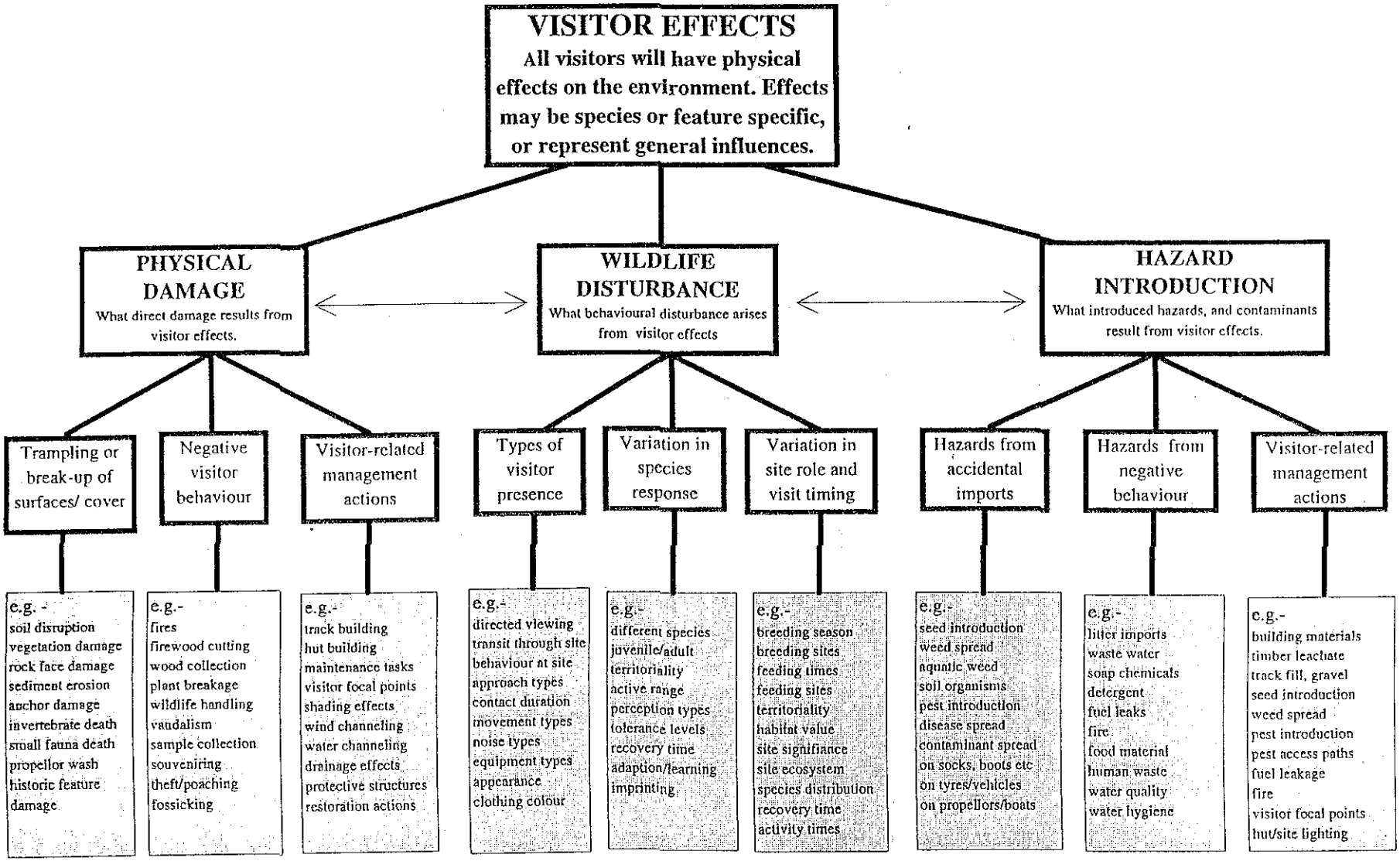
There are many access points to enter this **blue** colou coded track. The main entrance from Victoria Park i near the accessible track and takes you down old ston steps and onto the historic entrance road for park. At th junction of the walkway you can turn right to walk to th Sign of the Takahe or left to reach the Crater Rim Walkway and Sign of the Kiwi. An easy gradient with mix of exotic and native cover plus open views make thi the most popular track in Canterbury.



MOUNTAIN BIKE TRACKS

Victoria Park system: Follow the road along to the 19th Memorial where a shingle track leads into an open stockpil area. From here **red** mountain bike logos mark the tracks. A track to the left leads down a steep 4WD track and int the bottom of the valley where it connects with a multi use section of the Bowenvale Walkway and out to Bowenval Avenue. Another track goes up the hill from the stockpile and follows a 4WD track up to the Summit road where it join with the MTB Traverse track.

Bowenvale Mountain Bike track: Follow the traverse track below the Summit Road until you reach the gravelled Huntsbury Spur track. Follow the 4WD track downhill to a routed sign. Turn left to go down to Bowenvale Avenue right to Huntsbury Avenue.



(Cesspool + Disposal, Page 14)

Appendix 15.

HALSWELL
HOON HAY
CASHMERE
HEATHCOTE VALLEY
Barnett Park
SUMNER
N
KENNEDYS BUSH ROAD
HACKTHORNE ROAD
DYERS PASS ROAD
BOWENVALE AVE
TUNNEL ROAD
MT. PLEASANT RD.
MONCKS SPUR RD.
Sign of the Takahe
Mt Vernon Park
Dry Bush
Elizabeth Park
Car Park
Victoria Park
Bowenvale
Douglas Park
Thomson Park
Skellerup Park
Scott Reserve
Sugar Loaf 496m
Sugar Loaf Reserve
Taukahara
Sign of the Kiwi
Coronation Hill 330m
Marleys Hill 504m
Hoon Hay Park
SUMMIT ROAD
Castle Rock (Te Tihi-o-Kahukura) 436m
Mt Cavendish
Mt Pleasant 499m
Jollies Bush
SUMNER ROAD
Taylors Mistake
Boulder Bay
GODLEY HEAD (Awaroa)
Witch Hill (Te Upoko-o-Kuri) 421m
The Tors 452m
Whaka Raupo Reserve
O-Kete Upoko
Evans Pass
Buckleys Bay Reserve
Mechanics Bay
Breeze Bay
Livingston Bay
Gollans Bay
GOVERNORS BAY RD
RAPAKI
Rapaki Bay
Cass Bay
Corsair Bay
LYTTELTON
LYTTELTON HARBOUR (Whaka-raupo)
Little Port Cooper
Camp Bay
Ripapa Island
Diamond Harbour
Purau Bay
Church Bay
QUAIL ISLAND (Otamahua)
GOVERNORS BAY
Governors Bay
Charteris Bay
PORT LEVY ROAD
Mt Ada 460m
Kennedys Bush
Sign of the Bellbird
Cass Peak (Orongomai) 546m
Ohinetahi Bush
ALLANDALE
Head of the Bay
TEDDINGTON ROAD
SUMMIT ROAD
Living Springs
TAITAPU ROAD
OLD TAITAPU ROAD
RHODES ROAD
Gibraltar Rock
Coopers Knobs (Omawete) 573m
Prendergasts Bush
TAITAPU
Ahuriri Reserve
TEDDINGTON
CHARTERIS BAY ROAD
Orton Bradley Park
Ahuriri Bush
Conical Hill (Te Tara-O-te-Rakitaia) 275m
GEBBIES PASS ROAD
Gebbies Pass (Kawa Taua)
Mt Herbert 920m (Ahu Patiki)
Mt Bradley 855m
Shelter
Remarkable Dykes
Sign of the Packhorse

LEGEND

Important Roads

Parks and Reserves:

Local Authority

Summit Road Society

National Trust (Private)

Major Peaks and Altitudes (metres) — Cass Peak (Orongomai) 546 m

Public Walking Tracks — 15
(For further details and names of tracks please refer to the numbered descriptions on the back of this map)

Mountain bikes

1000m 500m 0 1km 2km

SCALE 1:45 000

Drawn by P Hennessey April 1991
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