

## Banks Peninsula — a connected island

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#### ABSTRACT

Banks Peninsula is tied to Christchurch in many ways — physically, socially and politically. Yet both are also islands — Christchurch a city of trees and people surrounded by the Canterbury plains, Banks Peninsula a historic island only recently connected to the mainland. This creates both risks and opportunities.

Banks Peninsula is a volcanic landscape that was an island for much of its 15 million years existence. As such it has a number of endemics, including six plants and about 2–4% of its insects. Banks Peninsula has undergone extensive changes since the arrival of humans. Most of its forest cover was lost through logging and burning. Only about 1% of the original forests have survived. More recently many areas have begun to regenerate, with about 15% now under some form of regenerating bush.

One group very involved in biodiversity on the Peninsula is the Banks Peninsula Conservation Trust, which emerged out of the district planning process. Composed mainly of farmers and local landowners, its aims are to promote conservation, biodiversity enhancement, and sustainable land management on the Peninsula through voluntary means, rather than rules. A variety of methods are being used to achieve these goals including conservation covenants, fencing, eradication of goats, possum control, weed control, and newsletters. More recent initiatives include field days, workshops, and local bay meetings.

There are risks to Banks Peninsula biodiversity from its proximity to Christchurch, including weeds (especially from gardens), the abandonment of pets, and overuse from tourists and city dwellers alike. Water availability and water quality are also issues for residents of the Peninsula. Land uses may change as land values rise and areas are subdivided for lifestyle blocks.

Opportunities include the restoration of gullies, creation of habitat linkages and restoration back into Christchurch of birds such as brown creeper, tomtit, and rifleman that are resident on the Peninsula. There are also opportunities to increase native animal and plant numbers via pest control, and perhaps one day to even restore tūi back onto the Peninsula.

#### INTRODUCTION

Banks Peninsula is tied to Christchurch in many ways — physically, socially and politically. Yet both can also be considered islands — Christchurch is a city of trees and people surrounded by the Canterbury plains, and Banks Peninsula is a historic island only recently connected to the mainland. This creates both risks and opportunities.

(Wilson 1992). The boundaries are defined by where its volcanic rocks dip under the sea or under the alluvium of the Canterbury Plains — an area of about 100 500 ha (Fig. 1). The two largest inlets, Lyttelton and Akaroa (Fig. 2) Harbours, represent eroded craters of two major volcanoes. The highest peak is Mount Herbert at 920 m, with eight other peaks over 800 m (Fig. 3).

#### GEOGRAPHY AND NATURAL HISTORY

##### The Banks Ecological Region

As a single Ecological Region in its own right, Banks Peninsula is quite unique in Canterbury

It has been an island for much of its 15 million years existence. Some time during the last 20 000 years the expanding shingle plains connected the island to the South Island



**Fig. 1** Aerial view of Banks Peninsula connected to the Canterbury Plains in the background, and the Southern Alps in the skyline. (Photo: Institute of Geological and Nuclear Sciences, July 2002).



**Fig. 2** View of Akaroa Harbour from Hilltop. (Photo: J. Kean).



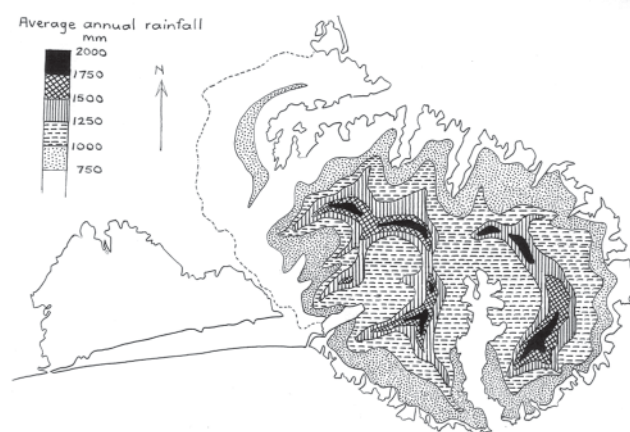
**Fig. 3** Views towards Lyttelton harbour from Summit Road walkway near Mt Fitzgerald (826 m) and Waipuna Saddle. (Photo: J. Kean).

mainland. The soils are mostly of medium to high natural fertility. Permanently flowing streams descend all the main valleys, although smaller valleys have intermittent flows in summer. Rainfall may double over a distance of a few kilometres. The range of average annual rainfall is about 600 mm to about 2000 mm (Fig. 4). Snow often lies for several days above about 500 or 600 m in winter, but very rarely falls at sea level.

### Human history

People were living on Banks Peninsula at least 700 years ago and a thousand years of human occupation is a reasonable assumption. Although sighted in 1770 by Captain James Cook, close European contact did not begin until the late 1820s when trading ships purchased dressed flax from Māori. Formal settlement at Akaroa began with the arrival of French and a few German colonists in 1840.

European settlers found a landscape still largely dominated by forest. They began to clear it immediately, with the twin objectives of harvesting the best timber and creating pasture for their cattle. Logging was overtaken by immense fires, both purposeful and accidental. Exotic grasses were sown in the ashes. From the late 1850s onwards, Banks Peninsula was famous for its dairy products and grass seed. Many of Christchurch's buildings were built from Banks Peninsula timber.



**Fig. 4** Rainfall map for Banks Peninsula. (Drawing and records from Hugh Wilson).

Since 1950 sheep and beef cattle have formed the mainstay of the Banks Peninsula economy. In the last decade, deer farming for meat and antler velvet has become established. Some dairying continues with Barry's Bay factory producing premium cheeses. There is also some exotic forestry, with *Pinus radiata* by far the most widely planted timber tree. Horticulture is present in the form of vineyards, flower growing, and olive groves. Tourism is also a significant and growing area.

### History of vegetation and fauna

In pre-human times, podocarp/hardwood forest covered nearly all the region except locally in the South East sector where beech forest was quite extensive (Wilson 1998). There were significant changes in the landscape by the end of the first 500 years of occupation due to people, their dogs and the Polynesian rat (or kiore; *Rattus exulans*). About one-third of the forest cover had been removed by fire (Fig. 5A) and 30 species of bird had become extinct, including most, if not all of the moa and other large ground dwellers (e.g., flightless geese, many species of duck, the giant *Harpagornis* eagle, and pelicans among others). Probably no plants disappeared during this time though.

The impact of European colonists was even more severe. The removal of virtually all existing forest (Fig. 5B), draining of wetlands, and introduction of many species caused a second wave of local extinctions. About 20–25 plants species disappeared. Several more have been reduced to a few individuals (e.g., rimu; *Dacrydium cupressinum*) or small, vulnerable populations (e.g., miro, *Prumnopitys ferruginea*; and New Zealand cedar, *Libocedrus bidwillii*).

Many forest birds that survived or flourished through Polynesian times, succumbed to the additional destruction of habitat and introduction of predators. Among those which have vanished were: kiwi (*Apteryx* spp.), the New Zealand robin (or toutouwai; *Petroica australis*), red-crowned and yellow-crowned parakeet (or kākārīki; *Cyanoramphus novaezelandiae* and *Cyanoramphus auriceps*), and buff weka (*Gallirallus australis hectori*).

## CURRENT VEGETATION AND FAUNA

### Current vegetation

Many warm-temperate species meet their southern limit of distribution here (Wilson 1998). Six species of vascular plants are endemic to the region: Akaroa daisy (*Celmisia mackaui*), Banks Peninsula fescue (*Festuca actae*), Banks Peninsula hebe (*Hebe strictissima*), round-leaved Banks Peninsula hebe (*Heliohebe laudiana*), button daisy (*Leptinella minor*), and Banks Peninsula forget-me-not (*Myosotis australis* var. *lytteltonensis*).

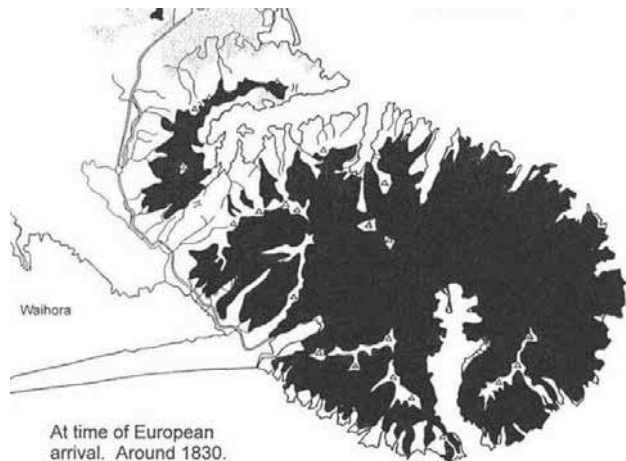
Above about 500 m there is a rather abrupt transition from lowland forest dominated by lowland tōtara (*Podocarpus totara*), kahikatea (*Dacrycarpus dacrydioides*) and mātai (*Prumnopitys taxifolia*), to mountain forest dominated by thin-barked tōtara (*Podocarpus hallii*) with abundant broadleaf (*Griselinia littoralis*), mountain fivefinger (*Pseudopanax colensoi*) and pepperwood (or horopito; *Pseudowintera colorata*). Native tussocklands chiefly occupy land that was deforested during Māori times.

About 74% of the Peninsula is now under pasture, tussockland, open shrubland, fernland, sedge and rushland (Table 1; Wilson 1992). About 53% of this is pasture of some sort varying from ryegrass-clover to browntop-sweet vernal grassland which may include quite a rich diversity of native herbaceous species.

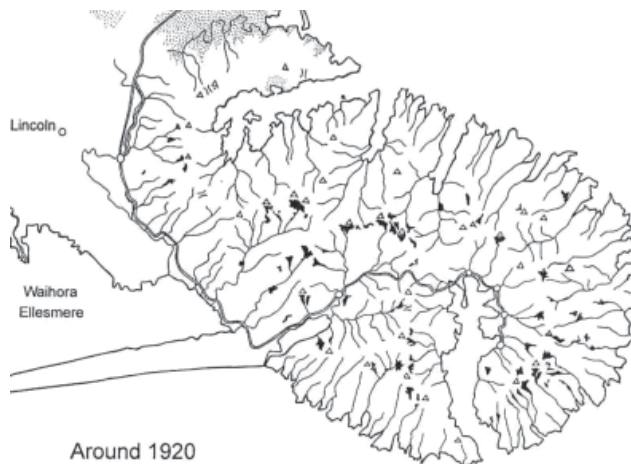
The remnants of old growth forest are tiny fragments, occupying only about 800 ha in all, less than 1% of their pre-human extent.

Most of the bush now on Banks Peninsula has regenerated this century, with 10–15% now under some form of regenerating bush (Fig. 5C). There is about 9000 ha of second growth hardwood forest, of which nearly 3000 ha is predominantly kānuka (*Kunzea ericoides*) canopy, and more than 6000 ha is mixed canopy, especially fuchsia (*Fuchsia excorticata*), māhoe (*Melicytus ramiflorus*), fivefinger (*Pseudopanax arboreus*), lemonwood (*Pittosporum eugenioides*), lacebark (*Hoheria sexstylosa*), ribbonwood (*Plagianthus regius*), pigeonwood (*Hedycarya arborea*),

**A**



**B**



**C**



**Fig. 5** History of vegetation on Banks Peninsula. **A**, by 1830 about one-third of the forest cover was removed; **B**, post-European settlement resulted in the removal of virtually all existing forest; **C**, current vegetation comprises <1% old growth forest and 10–15% regenerating bush. (Figures reproduced by permission from Hugh Wilson).

kōwhai (*Sophora*) and kaikōmako (*Pennantia corymbosa*) (Wilson 1992).

The second growth kānuka and mixed hardwoods, along with scrub of small-leaved shrubs which is also widespread, are very important habitats for wildlife such as brown creeper (or pīpipi; *Mohoua novaeseelandiae*), rifleman (or tītīpounamu; *Acanthisitta chloris*), tomtit (or miromiro; *Petroica macrocephala*), jewelled gecko (*Naultinus gemmeus*) and many invertebrate species. There is considerable regeneration of podocarps under these canopies, but mostly of browse-resistant tōtara which also regenerates in the open. Most of the second growth bush is depleted of palatable elements such as sevenfinger (*Schefflera digitata*), tree ferns and ground ferns because of farm stock, possums and goats (Wilson 1992).

Regeneration of some native trees is favoured by moderate grazing with sheep which remove competition from tall exotic grass. Thus in many places kānuka, ribbonwood, lacebark, tōtara, kōwhai, kaikōmako and pepperwood have established in part because of moderate grazing and form open park-like treeland over grazed pasture. Such treeland covers almost 3000 ha of Banks Peninsula (Wilson 1992).

### Current fauna

Isolation left its mark not only on the flora, but also on the fauna. 'Insular endemics' restricted to

Banks Peninsula occur in cicadas, tree wetas, and ground beetles. Johns (1986) estimates at least 2.2% of the total known arthropod fauna of the Peninsula is endemic, and that figure is probably double this if sufficient information were available.

Tūī (*Prosthemadera novaeseelandiae*) and sooty shearwater (mutton bird or tītī; *Puffinus griseus*) are currently at such low numbers on the Peninsula that their populations may not be viable. Native bats have disappeared in recent years as well. The New Zealand Falcon (or kārearea; *Falco novaeseelandiae*) still occasionally visit. White-flipped penguin (*Eudyptula minor albosignata*; Fig. 6), a local subspecies of little blue penguin, are thought to have declined at least 60–70% on Banks Peninsula between 1980 and 1993.

Some species of native wildlife have benefited from the transformation of the landscape, for example, the harrier hawk (or kāhu; *Circus approximans*) and the black-backed gull (or karoro; *Larus dominicanus*). Other species which have arrived on their own have thrived in the new conditions, earlier known (if at all) as rare stragglers. These include welcome swallows (*Hirundo tahitica neoxena*), spur-winged plovers (*Vanellus miles novaehollandiae*), white-faced herons (*Egretta novaehollandiae*), and monarch butterflies. The native species of lizard — the common gecko and common skink — have probably benefited

**Table 1** Vegetation cover of Banks Peninsula. (Summarised from Wilson 1992, p. 27).

Vegetation Type	Percent (%)
Podocarp/hardwood forest	0.7
Beech forest	0.1
Second-growth hardwood forest	9.1
Treeland	2.7
Native scrub	2.7
Grassland, fernland, open shrubland, sedgeland, rushland [pasture]	74.1 [53.0]
Wetlands	3.0
Exotic scrub	1.7
Exotic plantation	1.7
Other (discontinuous vegetation on rock, roads, cultivated fields etc.)	4.2
<b>Total</b>	<b>100.0</b>

from forest clearance despite the concomitant introduction of predators.

## **BIODIVERSITY THREATS AND CONSERVATION**

### **Threats to indigenous biodiversity**

Nationally weeds and pests now pose the greatest threat to native biodiversity. Banks Peninsula is no exception, and the main mammalian threats are rats, cats, possums, stoats, ferrets, and hedgehogs.

Weeds affect not only native species but production forests and farmland as well. Gorse (*Ulex europaeus*) is the number one noxious scrub weed on the Peninsula, but in places it provides shelter for regenerating native forest (as exemplified at Hinewai Reserve). Darwin's barberry (*Berberis darwinii*) has been identified as a growing threat, but may be still be at a stage where it could be eradicated from the Peninsula.

Grazing, especially by goats, possum and cattle is a threat to some of the threatened plant species and regeneration of many others. Another is fragmentation and the isolation of significant natural areas.

### **Areas under some form of protection**

Approximately 4850 ha in more than 115 different sites were protected in some way (4.4% of the total land area) as of 2002.

Recommended Areas for Protection (RAPs) were identified under the Protected Natural Areas (PNA) programme as the best surviving examples of natural biological communities (examples of the full range of indigenous biological and landscape features including common features as well as unique, special, or rare features). 85 RAPs were identified for the whole region ranging from 3 ha to about 600 ha, total about 9145 ha and about 9.2% of the total land area (Wilson 1992). Protection or recommended management includes a range of activities from fencing to continued farming depending on the site.

### **General trends affecting biodiversity**

Over the last 70 years, the ratio of rural to urban population has halved, and only 15% of the

population now live in rural areas. Incomes from many traditional farm units have declined in real terms. Many farms now require off-farm income. A recent study by MAF (Parminter 1997) reported it as important or essential for 47% of households (Fig. 7). The result is less cash available for discretionary farm spending, which also affects local government.

The Banks Peninsula district has a population of 7833 (2001 Census statistics) and the District Council has one of the smallest rating bases in New Zealand. As a consequence, the Banks Peninsula District will soon merge with the Christchurch District.

'Rural lifestylers' are replacing tradition family farms. The number of small lots (less than 10 ha) throughout New Zealand has increased substantially over the past two decades.

Foreign ownership and plantation forestry are probably not affecting significant areas of the Peninsula yet. The Overseas Investment Commission (OIC) estimates that as of 31 December 1997 less than 4% of all forested and arable land was foreign owned. Plantation forestry accounts for around 6% of total land area nationally, and was about 5% of the Peninsula land area as of 1996. Nationally the rate of new planting has declined since the very high levels of the early 1990s.

### **Community response**

Based on extensive consultation during the 'Bio-What?' process (Ministerial Advisory Committee 2000a,b) it became clear that many rural landowners have already expended considerable personal resources both in time and money on nature conservation (Fig 8). Most engage in some form of nature conservation and are prepared to do more — provided it is on their terms. How they act will depend on the respect they are accorded, the assistance and recognition they receive, the degree of compulsion they perceive to be involved, and the communication style that is employed. There are only a few who have no interest in maintaining indigenous biodiversity and no sense of shared responsibility.

Regulation can only, at best, provide part of a solution. It can prevent some adverse outcomes, but cannot provide for positive outcomes.

One group actively involved in biodiversity conservation on the Peninsula is the Banks Peninsula Conservation Trust, which emerged out of a contentious district planning process. As a result of the predominately regulatory approach of the Proposed Plan, the Banks Peninsula community (especially the farming sector) strongly objected to the proposal. The council received in excess of 700 submissions to the plan.

To avoid Environment Court action and as a result of the community reaction, a rural task force was established to work through the sections of the Proposed District Plan that had caused the most conflict. A number of recommendations came from the task force including the formation of an independent Trust. Composed of members of the local community, its aims are to promote conservation, biodiversity enhancement, and sustainable land management on the Peninsula through voluntary means, rather than rules (Fig. 9).

The Banks Peninsula Conservation Trust currently has more than 11 covenanting projects underway, all in areas identified as highly significant ecological areas. This work includes helping landowners with fencing if needed by providing funds and helping source additional outside funds. It is the first community group to be granted covenanting authority.

The Trust has been instrumental in a current effort to eradicate feral goats from the Peninsula, especially in the area of coordination between agencies and working with the local landowners. The Trust also holds field days and restoration workshops to assist with weed control and planting, and distributes several newsletters per year to about 4000 households on Banks Peninsula plus about 400 others on a separate mailing list.

### **Risks and opportunities**

There are risks to Banks Peninsula biodiversity from its proximity to Christchurch. Land uses may change as land values rise and as areas are subdivided for lifestyle blocks increasing the threats from garden weeds and pets (e.g., cats and dogs). Dogs can disturb and/or kill penguins, especially if allowed to roam at night when the penguins are ashore. Cats are natural hunters and effective predators of native birds, skinks, geckos and insects.

About 75% of invasive weeds in New Zealand are garden escapees. On average, eight garden plants become naturalized in the wild in New Zealand every year. There are more exotic species wild in New Zealand than native plant species. Invasive weeds are one of the main threats to the survival of more than 60 threatened native plants and have an impact on another 16 species. High recreational pressures from activities such as rock climbing can threaten endangered plants restricted to rocky bluffs. Desire for goat hunting opportunities can make eradication more difficult due to reinvasions from private lands.

Opportunities to enhance biodiversity on Banks Peninsula include restoration of gullies (al la Hamilton City<sup>1</sup>) — thereby creating habitat linkages and restoration back into Christchurch of birds such as brown creeper, tomtit, and rifleman that are resident on the Peninsula. Christchurch may also provide volunteers, financial support, expertise, and so forth which can assist biodiversity initiatives on the Peninsula. Currently several members of the Banks Peninsula Conservation Trust restoration working group are Christchurch residents. Partnerships have been formed involving the Christchurch City Council to develop coordinated pest control strategies. Traffic islands in Christchurch could be used to grow threatened Banks Peninsula species<sup>2</sup>. With enough support perhaps one day tūi could even be restored on the Peninsula.

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<sup>1</sup> Editor's note: Hamilton City gully restoration is discussed by Bruce Clarkson in these proceedings.

<sup>2</sup> Editor's note: John Sawyer discusses the role of traffic islands in Wellington for native plant conservation in these proceedings.

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**Fig. 6** White-flipped penguin (*Eudyptula minor albosignata*) at Flea Bay/Pohatu, Banks Peninsula. (Photo: F. Schmechel).



**Fig. 7** Changes in rural incomes are affecting land use and biodiversity trends. A landowner and a Banks Peninsula Conservation Trust member discuss a covenant at The Monument, an outstanding rocky outcrop. Note the forestry plantation on a neighbouring property in the background. (Photo: F. Schmechel).



**Fig. 8** Many rural landowners have already expended considerable personal resources on nature conservation and most are prepared to do more — provided it is on their terms. Landowner and Banks Peninsula Conservation Trust committee members discuss fencing and a potential covenant. (Photo: F. Schmechel).



**Fig. 9** Community response to proposed regulations — Banks Peninsula Conservation Trust committee members consulting with Hugh Wilson, botanist, at Hinewai Reserve on areas of high ecological value around Banks Peninsula. (Photo: F. Schmechel).