A CONSERVATION BLUEPRINT FOR CHRISTCHURCH

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Introduction

To be 'living in changing times' is nothing new. But each new technological revolution brings an increasingly frantic pace of change. There has been a growing separation of decision-makers from the environmental consequences of their actions; there is a general alienation of people from the land, and there has been a corresponding quantum leap in environmental and social impacts. The sad and simple truth is that the huge advances in power and sophistication of our technology have not been matched by an equivalent advance in understanding and wise use of its immense power.

From a natural history perspective the colonies of the European empires suffered their most dramatic changes compressed into just a few short centuries. In New Zealand over the past millenium, the Polynesians certainly left their mark on the avifauna in addition to burning the drier forests and shrublands. But this hardly compares with the biological convuolsions of the last century or so as European technology transformed just about all arable, grazable, burnable and millable land into exotic or degraded communities, regardless of their suitability for the new uses. Even today, 2 000 ha of scrub is burnt annually in North Canterbury alone. It is equally tragic, since the lessons from past mistakes are all too obvious, that there has persisted an ongoing, but barely discernible, attrition of those natural areas that survived the initial onslaught. Inevitably the greatest pressures have occurred in and around the major urban centres.

The European settlers were primarily concerned with survival, development, and attempts to tame the unfamiliar countryside. Later efforts were directed to refinement and comfort in the style of mother England or Scotland; revealed in Christchurch by the continuing preoccupation with exotic trees, shrubs and flower gardens. Now the nation is going through the growing pains of becoming a bicultural society with an identity of its own. This has coincided with a wider understanding and appreciation by the pakeha of the intrinsic and unique natural values of Aotearoa.

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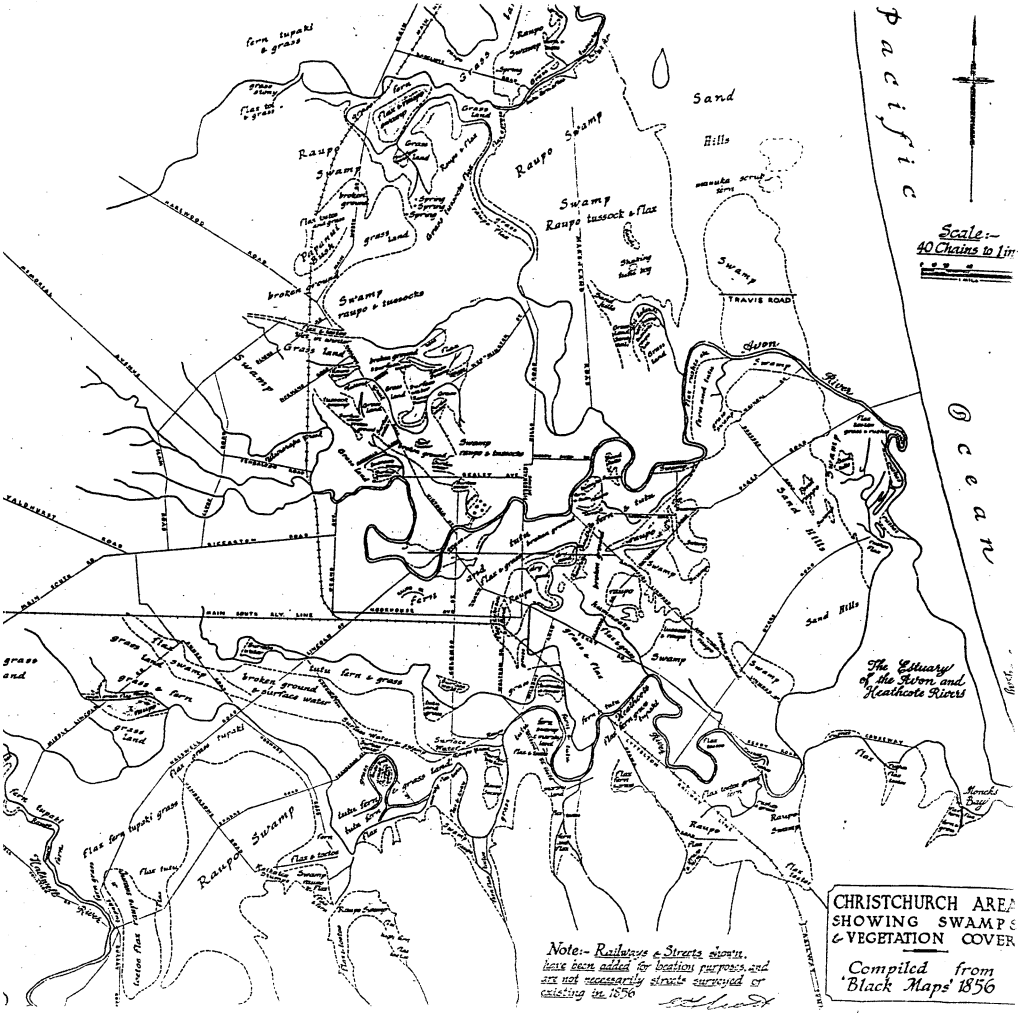
Locally and worldwide there is growing concern for the loss of natural habitat and wild places, especially those within reach of city dwellers and with respect to the draining or filling in ('reclamation') of wetlands. On the other side of the world we have the spectacle of Europeans realizing too late that, little by little, over the centuries, they have destroyed their biologically rich peatlands. Dutch environmentalists are reconstituting bogs at immense cost and it will still take centuries for their original condition to be restored. The Dutch have also raised nearly $500 000 to purchase Irish bog sites (virtually the last of their type in Europe) for nature reserves, and the Irish Government is faced with a bill of over $100 million if it is to protect a viable tract of bogland from afforestation and peat mining for fuel (The Press, December 1987). Across the Atlantic the US Government is preparing to spend $US15 million on a prairie grassland park so that future generations will be able to appreciate this distinctive biome.

The New Zealand Situation

The same process of nibbling away at an irreplaceable resource has occurred on the better classes of land in New Zealand (Norton 1988), although over a shorter time-span than in Europe. If this continues, eventually there will be nothing left in developed regions to remind us of bygone landscapes and vegetation; our natural heritage. However, this trend is to some extent being countered by the current spirit of the Protected Natural Areas programme, designed to identify and protect representative examples of all natural ecosystems in each district of New Zealand (Park *et al.* 1986). The realization of this goal would give future generations a secure link with their history and the means to understand the processes that shape their natural and physical environment.

The Christchurch Scene

"The site of the future city was more or less a swamp, interrupted in various parts by shingle-beds and sand-dunes, through which the little river Avon, then variously known as Te Onotopo or Potoringamotu, wound its way amidst a thick growth of *Phormium*, niggerheads, and raupo" (Herriott 1919). This historical statement, together with the valuable vegetation cover information on the 1856 'Black Maps' (Fig. 1), reminds us that the Christchurch landscape has been transformed from pre-European mosaics of short tussock grassland and shrubland of shallow gravel soils of the plains; duneland vegetation of scrub, fern, pingao and spinifex; intervening freshwater wetlands which also occupied the broad, meandering flood plains of the Avon, Heathcote and Waimakariri Rivers and their tributaries; brackish and salt marsh communities fringing the estuary; and pockets of kahikatea forest where there



Composite map of Christchurch showing the distribution of vegetation and the dominance of swampland in 1856 as derived from "The Black Maps". Source: Department of Survey and Land Information and E.T. Scott's Christchurch Drainage Board mosaic.

was the right combination of rich alluvium and reliable watertable (at Papanui, Rangiora and Riccarton).

The plains tussocklands are now reduced to a few scattered silver tussocks along the roadside near Chertsey and a few hard tussocks with danthonia grassland at Bankside and Eyrewell Scientific Reserves (totalling 5 ha; Molloy 1970, Molloy and Ives 1972), and some remnants near Wigram, at Harewood and McLeans Island (Molloy 1971; also being considered for development), on a roadside picnic area north of the Orari River, and on Rangitata Island. Related grasslands are found on the Port Hills, but these are on deeper moister loess soils. The dunelands have been 'swamped' by marram grass, lupins and pines. The salt marshes are much reduced or degraded by reclamation (as at Ferrymead) or mismanagement (as in the Cockayne Reserve). One of the forests is miraculously preserved at Riccarton, but the formerly extensive freshwater tussock sedge, flax and raupo swamps have been drained or filled in to form the foundation of Christchurch city and its market gardening and dairying belt. A few wetland remnants occur in the Groynes and odd plants of sedge, fern and toetoe battle with Drainage Board mowers along the river banks. The most significant remaining freshwater wetland is Travis Swamp (Meurk 1988).

There have been continual steady losses to our natural heritage ever since Christchurch was established. Part of the reason for establishing Hagley Park was to preserve some of the plains vegetation and a small area of swampland. However, the grass and shrubland succumbed to stock, ploughing, cropping and oversowing by the end of the Great War, and the swamp was flooded to make Lake Victoria for the 1906 Christchurch Exhibition. The Ferrymead industrial reclamations have been continuing into the 1980's. The banks of our rivers lose more of their natural character each year as a result of zealous cutting and construction of stone or brick retaining walls. One of the last natural stands of manuka in Christchurch was destroyed at Burwood in the 1980's under a Post Office reserve reclamation (G. Collett pers. comm. 1988).

Because the recent loss of natural remnants in the Christchurch area has been gradual or imperceptible, and the impacts dispersed throughout the city, it is often only after a lifetime that one is able to look back and assess what has been lost. A Christchurch resident recalls from his youth fishing in the Bryndwr Stream lined with tussock (presumably purei, *Carex secta*). These distinctive riparian sedges have been gradually exterminated until now, 50 years later, one realises that virtually none are left.

Thus, the inestimable value of the fragments that have survived, even when they are in a degraded state, underlies the urgency with which steps must be taken to hold the line. While few natural habitats exist in Christchurch it will nevertheless be easier and relatively less expensive to restore sites that at least preserve elements of the natural hydrology, soils and flora. This will contrast markidly to the expensive mistakes the Europeans are now attempting to rectify by "recreating nature" from scratch. In some circumstances reconstruction may be a worthwhile option. Out of England came formality in gardens and avenues, but in recent times innovative landscape techniques have been employed, such as at Warrington, Lancashire (Hansman, 1987) and Camley Nature Park, London, where created wild habitats are being integrated within new town residential areas and derelict industrial sites. These restorative and reconstructional techniques, now widely used in Europe (Bradshaw and Chadwick 1980, Bradshaw 1983), will be applicable to New Zealand.

Wildlife and Habitat

Whereas this document has dealt primarily with native vegetation, a thought should be spared for the even more dire condition of the native fauna, in particular forest birds, fish and insects. All animals require habitat so we can be sure that host-specific insects will have suffered along with their hosts. Indeed, 95% of our indigenous insect fauna are dependent on native plants at some point in their life-cycle (A. Savill pers. comm. 1988) Conversely, if there is a spread of native broadleaved and podocarp trees (and exotic food plants) or an extension of forested areas, there will be a corresponding improvement in habitat for some native insects and the birds which presently have a precarious footing in Christchurch (e.g. woodpigeon - kereru, fantail - piwakawaka, bellbird - korimako, greywarbler - riroriro).

With regards to native fish, we are reminded (D.J. Jellyman and G.A. Eldon pers. comm. 1988) that one of the probable causes for declining whitebait (inanga) catches in recent years has been the ongoing destruction of breeding and rearing habitat, notably estuaries and tidal reaches of the quieter, spring-fed rivers. Given the past prominence of these environments and the dependence on them by the whitebait, a national delicacy, and also eel (tuna), a traditional food, we have a duty to prevent further depletion, indeed we should endeavour to enhance the Christchurch environment for these aquatic animals.

A Conservation Strategy For Christchurch

In order to leave some natural historical touchstones for future generations of citizens, educators and researchers, a strategy is needed in the city; firstly a policy to identify and cling tenaciously to any natural nuclei that survive and secondly to restore, rebuild and even to extend around those nuclei. We detect sympathy for this view as a more naturalistic approach to managing our parks and gardens evolves. Although the city was founded on a transplanted European concept of landscape and a strong colonial attachment to the motherland, world history shows that with mature nationhood comes identification with the things that naturally characterise the adopted country.

The means of achieving these conservation goals then are: (1) central, legislative, bureaucratic, departmental, (2) local, planning, managerial, and (3) through private group or individual initiatives.

1) Legislative protection for existing sites Where there are remnants of native vegetation in public ownership, formal protective status should be given. Examples are parts of the Groynes and other wetlands associated with estuaries, lagoons, lakes and dune slacks near Christchurch. In some cases control of willows will be necessary. Areas near Harewood (Shipley's Block; Molloy 1971) and McLeans Island - which retain 'savannah' woodland (of kowhai, kanuka, ti, tumatakuru and *Olearia*) and tussockland species (including ancient dunes along the Old West Coast Road) deserve protection. In the case of private land the QEII Trust and Department of Conservation have provisions for covenanting which may be acceptable for some owners. Canterbury road verges are another repository of native plants (Meurk and Lucas in prep.) and urgently need some legal recognition against inadvertent or deliberate destruction. Appendix 1 is a list of known actual, possible and potential natural areas in Christchurch city and immediate surroundings. Further investigation is needed to verify and extend this list.

2) Planning and management initiatives by local bodies These could do much to prevent further depletion of natural assets and indeed to restore what has been lost through past actions or neglect. The most obvious needs pertain to management of the Avon and Heathcote rivers (e.g. the flat terrace of the Avon River near the island, downstream from Millbrook Reserve, has a substantial area of native sedge, but is periodically mown). Other clumps of toetoe, purei, harakeke or raupo along the riverbanks should be given a chance to grow and extend. This would also have the effect of reducing the lateral erosive capacity of the river. The manmade

oxbows at Kerrs Reach and that created by the Woolston cut would also be suitable for managing as native wetlands; again willows would need control.

Wetland restoration should also be considered in conjunction with the resettling of houses situated in the Heathcote flood plain, as an alternative to turning the river into a drain comparable to the Leith River channel that gashes through Dunedin. Finally, attempts should be made to reestablish in the adjacent Albert Lake the wetland that formerly occupied Lake Victoria. Plants could be imported from Ellesmere, Cockayne Reserve, Horseshow Lake and Travis Swamp. Again willow control is a prerequisite.

The New Zealand section of the Christchurch Botanical Gardens could be extended out to the banks of the Avon River and planted up with swamp forest species from Riccarton Bush and with harakeke, purei, kiokio *(Blechnum minus)* and raupo along the banks. Already some native plants are establishing there spontaneously (e.g. mapau) and a small cluster of kahikatea has been planted. A grove of kanuka, tumatakuru, kowhai, porcupine scrub, mikimiki and short tussocks, reminiscent of the original plains vegetation, could be established in the gardens and/or on the Lincoln DSIR campus. Such plantings would complement other restoration projects at Rangiora, Papanui (Cartman 1981) and Kaiapohia, and the pocket handkerchief Scientific Reserves on the Canterbury plains. An ecological park has also been mooted for Sydenham. These apparent duplications are necessary precautionary measures against catastrophe in any one of the individual localities, and will allow transfer of genetic material to maintain viable plant populations.

3) Encouragement to private initiatives Private individuals need not feel left out of the conservation process in Christchurch. Indeed, grassroots action is vital. Home gardeners should be encouraged to let parts of their gardens revert to a predominantly native character, especially featuring the broadleaved shrub and tree species typical of Riccarton Bush if the available area is insufficient to support large podocarp trees. Stocks of certified, local, native material needs to be more readily available in nurseries, and actively promoted by showing the role individuals can take in conservation. Plantings at the University campus at Ilam and the recent landscaping of the DSIR grounds at Lincoln demonstrate the diverse and attractive nature of New Zealand's plants in a semi-formal setting. Once some cover is established and continual disturbance of the ground, and/or mowing, is discontinued, spontaneous regeneration can be quite impressive (depending on distance to seed sources). For example, a small front garden/lawn

of 12 x 9 m in south Christchurch has over 3 years yielded seedlings of cabbage tree (ti), poroporo, broadleaf (kapuka), karamu, *Pittosporum* spp. (kohuhu, tarata), *Hebe* (koromiko), lowland ribbonwood or manatu, *Lophomyrtus* (rohutu), *Pseudopanax* (horoeka), pohuehue, *Libertia* (mikoikoi) and, from the lawn, *Dichondra* (possibly Australian), *Oxalis exilis* and *Hydrocotyle*.

The time may be near when some streets, that have for decades enjoyed formally planted avenues of plane trees, elms, oaks, birches, beeches, sycamores, limes etc. and wide mown grass verges, may, by neighbourhood agreement, become planted with corridors of native vegetation. We may then look to a bicultural dimension to the cityscape. Another worthwhile role that the home gardener could perform would be to help spread the population base of some of our rare and endangered plants such as *Teucridium*, *Scutellaria*, pittosporums, hebes, olearias, tree brooms etc. It needs emphasis that this is not a trivial concept, as the long term viability of nature reserves around the city will depend on a connecting fabric of native plants that can maintain a wider, less precarious population base and genetic continuity, between habitat islands.

In all such schemes it will be schools, community groups and individuals who will have to generate the interest, knowledge and respect for our dwindling natural areas and indeed give effect to an evergreen revolution across the suburbs of Christchurch. Indeed Leonard Cockayne in 1924, advocated planting native patches in school grounds for educational purposes. This concept has only been very lethargically taken up and even those recent experiments such as at Briggston School have received opposition. This city has fine English traditions, but it has to grow up and recognise the bicultural nature of our society and, out of the blend of indigenous and exotic elements, forge an independent, distinctive style; a landscape that has a recognisable identity, characteristic of Aotearoa and especially Canterbury.

Conclusions

Christchurch has some fine role models (Harry Ell and the Deans family) to emulate in their visionary appreciation of our natural heritage, but we will have to work hard to live up to their shining examples. To guide the evolution of this city's natural environment into the next century, there needs to be a partnership and dialogue between the local and regional councils and their works and parks departments, local Government representatives (DOC, Landcorp, MAF, DSIR), the universities, Kaitahu people, landscape architects, developers, business people, tourist operators, conservation groups,

schools and other community groups or individuals. Moreover we should look closely at the innovative and creative ways urban ecology is being approached in older more densely populated countries.

Ecologists in New Zealand have not been slow to bring international wisdom on conservation issues to this country (e.g. Atkinson 1961), but our politicians and bureaucrats have been slow to implement the advice in their planning, developments, maintenance and other works. These matters must now be addressed urgently. We can do little better than conclude with a quote from the late Gordon Williams who wrote in 1971: "provision should be made for incorporating natural communities and as much ecological diversity (in our cities) as possible ... we ... have the technical power to introduce (natural communities) on a small scale, or, with our knowledge of community ecology and succession, to create close and viable facsimiles, as is already being done in Holland."

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Appendix

Actual, potential or possible natural areas, and localities of native plant populations, in Christchurch and surrounding areas. The area considered is contained within Map Series NZMS260, Maps M35 and M36, excluding Banks Peninsula, most of the (protected) Port Hills and the Lake Ellesmere (Waihora) wetlands and dunes. Management categories are: Protection more or less in present state (P); Enrichment and Extension (E); Control of adventive species (C); and Restoration/Reconstruction of native communities (R).

Site	Grid Ref.	Vegetation	Category
Cust River	M35/550680	wet pasture with rushes	?E
Kaiapohia/ Waikuku Beach - Tutai paku lagoon	M35/862665	dune + slack	PCE
Matawai Park, Rangiora	M35/771655	planted bush and swampforest	PR
Flaxton	M35/800614	?remnant flax swamp	?E
Lees Rd	M35/851610	?wetland	?PC
Eyre River	M35/5--6--	?riparian	?PC
Pines Beach	M35/860598	wetland	PC
Kaiapoi River	M35/835577	?riparian	?PEC
Stewarts Gully	M35/845567	wetland	PC
Eyrewell Forest	M35/5--5/6	?kanuka remnants	?PEC

?Wilsons Swamp	M35/818533	?Carex secta under willow	?PC
?Wilsons Swamp	M35/812527	?Carex secta under willow	?PC
N. Motorway	M35/814532	area between carriageway could be planted in kanuka etc.	R
Spencer Park/ Brooklands Lagoon	M35/860530	saltmarsh, sand dunes	PC
McLeans Island (many sites)	M35/5--4/5	plains 'savannah' and grassland	PEC
Groynes/Waimairi walkway	M35/782506	wetland and riparian	PC
Bottle Lake Forest Park	M35/855500	dunes and woodland understorey	PEC
Styx River (whole length)	M35/825495	riparian	PC
Bottle Lake	M35/838494	wetland	PC
Willowbank	M35/777492	planted natives	PER
Peacock springs	M35/717488	planted natives	ER
Halkett Reserve	M35/55-48-	"savannah" woodland	PC
Orana Park	M35/670482	"savannah" woodland/grass land	PR
"Shipleys Block", Harewood	M35/723477	grassland-shrubland	PC
Harewood	M35/705475	grassland-shrubland	PC
Travis Swamp	M35/850468	wetland	PEC
?Clare Park	M35/842463	wetland grassland	R
Wairakei Road/ Ashby's Pit	M35/753460	?	RC
Horseshoe Lake	M35/837456	wetland	PEC
Old West Coast Road	M35/5--4--	duneland, *Sophora prostrata, Carmichaelia*	PC
Cockayne Reserve	M35/867446	brackish/fw swamp	PC
?Jellie Park	M35/763442	planted	?
Kerrs Reach and below	M35/846435	wetland, riparian	PE

Riccarton Race-course	M35/71-43-	native plantings	P
Monavale	M35/784427	native plantings	PE
Millbrook Reserve	M35/791427	native plantings	PE
Avon bank + island	M35/792427	riparian sedges	P
ChCh Girls High School	M35/787426	riparian planted	PER
Ilam University	M35/760425	native plantings	PE
Riccarton Bush	M35/773422	kahikatea forest	PC
Albert Lake	M35/797422	wetland	REC
Botanical Gardens	M35/792417	native plantings	ER
Te Huingi Manu Wildlife Refuge	M35/867417	islands and edges	PER
Estuary, lower Avon, The Spit, Ferrymead	M35/36/8--	saltmarsh, brackish, riparian	PEC
South Brighton	M36/896402	pingao dune patch	PC
W. of Estuary	M36/858395	*Plagianthus* marshland	PREC
Sunnyside Hospital Spreydon	M36/77239-	?	R?
Waltham Park	M36/823394	?	ERC?
Heathcote River all banks affected by tide/salinity)	M36/831392	reestablishing saltmarsh spp.	ERC
Calder Green Reserve, Heath-cote R.	M36/852392	saltmarsh	P
Hogben School/ lakes	M36/749388	?	R?
Heathcote R., S. bank	M36/828384	*Cotula maniototo, C. dioica, Pratia* etc in mown riparian turf	ERC
Beckenham Park	M36/814384	?	ER?
St Martins School/ Park, N. bank	M36/826383	?	ERC?

Owaka Rd lakes	M36/728382	?	R?
Thorrington School/Heathcote R.	M36/808378	native plantings	PE
Ferrymead Museum land	M36/862378	marshes in northern part	REC
Nottingham Stream lakes	M36/740373	?	R?
Ashgrove Park	M36/792372	native and exotic plantings	PE
Heathcote R.	M36/791371	native and exotic plantings	REC
Cashmere Stream	M36/785366	?riparian	R?
Sign of the Takahe	M36/805363	native and exotic plantings	PE
Port Hills - Westmoreland	M36/804302	kowhai-tumatakuru	PEC
Burnham plantations	M36/5--3--	?	?
Heathcote R.	M36/804302	native and exotic plantings	REC
L1 stream	M36/688293	purei-raupo wetland	P
Lincoln farm	M36/701288	Coprosma-harakeke-ti-manuka	PEC
Ellesmere Rd	M36/70028-	raupo in ditch	P
Otahuna	M36/763276	?	?
Taitapu	M36/737273	riparian natives	PCE
Selwyn River	M36/5--2--	riparian	CE

(+ other rivers: Irwell, Boggy, Birdlings, Harts, Wood; all drainage ditches) see also Knox and Kilner (1973) recommendations for reservation.