

5.2.3 Land Ecosystems

- identifying and protecting ecosystems
- rehabilitating or enhancing degraded ecosystems
- protecting significant landforms, physical processes, geological, fossil and soil sites.

Current Situation

Background

A dramatic transformation of the Canterbury landscape followed the arrival of humans. Before that time, the dominant feature was a diverse forest cover. Kānuka dominated the Canterbury plains, while the foothills and downlands supported mixed podocarp/broadleaf forest. The Mackenzie was predominantly beech forest transforming to tall tussock through fire. Coastal broadleaf forest was extensive, and coastal swamp and semi-swamp forest stretched discontinuously from Christchurch to South Canterbury. In North Canterbury, forest was continuous between the plains and the main divide.

Widespread fires and farming practices have resulted in the near complete loss of these and other lowland associations. In many places pastures or short tussock grasslands have replaced the original communities (in intermontane basins and lower hill country). Stock have destabilised coastal dunes, now almost universally replanted with exotic species, such as the widespread marram grass. Wetlands, (particularly along the coastal fringe of the plains near Christchurch and Te Waihora/Lake Ellesmere) have been extensively drained so that rivers and lakes now retain only a narrow zone of wetland communities.

Today, the overall indigenous character continues to be reduced, affecting both original and introduced communities. For example:

- In recent years, sand mining and marram invasion has damaged the nationally important sand dune association at Kaitorete Spit.
- In the high country, pastoralism and rabbit grazing over 140 years have depleted the indigenous communities. Hieracium is now common, particularly in short tussock grasslands of the Waitaki Basin.
- Podocarp/broadleaf forest remnants are very limited. In some instances they remain only as isolated pockets, exposed to drying winds and browsing that kill adult trees and prevent regeneration.

Map 16 shows present day vegetation and ecological districts.

The Department manages a relatively small proportion of the total land area in Canterbury, which in turn supports a disproportionately large amount of mountain land and intermontane ecosystem types. While these areas contribute greatly to the protection of natural values, they do not reflect the diversity of ecosystems present in Canterbury. Nor do they protect the communities most depleted by human occupation such as dry savannah woodlands (see Table 18).

Table 18: Canterbury Land Ecosystems

Ecosystem class	As % of pre-European vegetation	% remaining in Canterbury now	% remaining which is protected
Broadleaf/podocarp forest	4	<1	42
Beech/podocarp forest	11	5	79
Alpine tussock/ subalpine scrub	29	23	29
Lowland tussock/scrub	50	23	29
Swamp	4	<1	4
Sand	3	<1	4
Crops, exotic scrub/forest, native pasture, other pasture	N/A	41	1

Methods

Protection methods for areas with natural values can be negotiated for individual situations, and include:

- the purchase of fee simple title
- gift of fee simple title
- purchase of conservation covenant
- gift of conservation covenant
- lease
- exchange of land
- protection of private land agreement
- management agreement
- designation with a district plan
- secondary land use under Public Works Act
- Heritage Protection Order

Pastoral Leases

Crown pastoral leases under the 1948 Land Act make up a high proportion of Canterbury's land area. Since the 1850s land has been leased for pastoral purposes from provincial and central government. Lessees hold an exclusive right to the pasturage, the right to occupy, and the right to exclude trespassers. The cumulative impacts of cattle and sheep grazing, periodic rabbit booms, burning, topdressing, oversowing and *Hieracium* have significantly depleted the indigenous tussock cover over the last 140 years.

The 1986 environmental reforms saw changes with an agent (currently Knight Frank New Zealand Limited) being appointed by the Commissioner of Crown Lands to manage the pastoral leases on behalf of the Crown. The Government recently initiated tenure review taking into account that:

- the returns from the administration of Crown pastoral leases were well short of their administration costs
- the Crown may not necessarily wish to continue as landlord of pastoral leases
- some lessees wished to acquire a freehold interest in the most productive parts of their leases
- there is general public interest in protecting natural, historic and recreational values on many Crown pastoral leases

The Government is reviewing the Land Act to facilitate this tenure review process. The opportunity that may be presented by the land tenure review process offers a one-off mechanism to protect a huge range of the tussock grassland, shrubland and forest ecosystem types left in Canterbury. Tenure review processes can also involve other lands, by agreement, such as university endowments and freehold.

Geopreservation

Most protected natural areas in Canterbury were identified for aesthetic or biotic values. New Zealand also has a unique and diverse range of landforms, geological and soil heritage, resulting from a complex geological history. In Canterbury this is enhanced by our location on a zone between two of the earth's major crustal plates. While many earth science sites of significance are present on land managed by the Department, a representative range of the most important sites in Canterbury has not been protected.

Current Management and Advocacy

Existing land ecosystem management programmes of the Department largely reflect the predominance of mountain and beech forest ecosystems on land managed by the Department. Current management and advocacy programmes include:

- fencing protected areas to exclude stock and, where possible, rabbits and maintaining a major fencing network, conservatively estimated to be valued at several million dollars
- periodic PNA survey programmes funded in an *ad hoc* fashion
- negotiation with landholders about the implications of PNA surveys
- involvement in the tenure review processes
- advocacy under the Resource Management Act for effective methods that avoid adverse effects on significant areas of native vegetation and wildlife habitat
- several site restoration programmes, mainly around Christchurch and sponsored on a commercial basis, such as Ōtūkaikino wetland
- major habitat restoration programmes (e.g. Project River Recovery and Hurunui Mainland Island)
- research and management of a dry tussock grassland area, for example, Tekapo Scientific Reserve

- commenting on burning applications in the high country
- involvement with land care groups in high country areas
- pest, weed and fire control as outlined in later sections

Current Limitations

While the Department is involved in all of the above, some of these programmes are operating at maintenance levels only. For example:

- PNA survey programmes have occurred intermittently in the past few years and only 30 per cent of Canterbury has been surveyed (see Map 21)
- there is a lack of progress in protecting RAPs, although greater protection of RAPs should be afforded through the tenure review programme in high country areas
- there are many other restoration opportunities but lack of resources makes them prohibitive
- very little monitoring is occurring
- resource consent advocacy under the Resource Management Act is very low
- there needs to be a comprehensive assessment of the fencing needs and priorities of the Conservancy

Statutory Framework

Section 6 of the Conservation Act enables the Department to preserve and protect, and to advocate the conservation of natural and historic resources. This includes the identification and protection of areas representing New Zealand's natural diversity (Section 3, Reserves Act 1977). This advocacy role also enables the Department to promote implementation of Section 6 of the Resource Management Act 1991 and the New Zealand Coastal Policy Statement through district and regional plans.

Tenure review of pastoral leases in the high country proceeds under the Land Act 1948. Boundary fencing is provided for under the Fencing Act 1978.

The Department has a role in providing advice to the Secretary of Forestry under s.67F of Part IIIA of the Forests Act 1949 in approving sustainable forest management plans and permits.

The permitting of taking rock, soil, plant and animal samples and specimens for non-commercial research, and bioprospecting is addressed in 5.5.5 (Research).

Objectives

- To systematically identify all of Canterbury's land ecosystems by 2010, assess their value for indigenous biodiversity, and seek to protect a range of areas and values that best contribute to maintaining and restoring Canterbury's indigenous biodiversity.
- To systematically identify and seek to protect significant landforms, geological features and related systems on and off land managed by the Department.
- To systematically identify the management needs for natural values on land managed by the Department and prioritise management to maintain or enhance Canterbury's indigenous biodiversity and natural processes.
- To negotiate with Crown pastoral leaseholders, directly or through tenure review, to protect natural values.
- To increase public awareness of the need to protect Canterbury's indigenous biodiversity and promote community awareness and participation in protecting natural systems, values and processes.
- To systematically record the Conservancy fencing network, assess its condition, and prioritise new or maintenance fencing to meet indigenous biodiversity and statutory priorities.
- To restore viable natural communities in order to maintain and enhance Canterbury's indigenous biodiversity.
- To provide advice to the Secretary of Forestry in approving sustainable forest management plans and permits.

Implementation

The Conservancy will:

1. Consider preparing an ecosystem protection strategy. The strategy must be consistent with and assist in the implementation and achievement of this CMS (see 6.1 Conservation Management Plans and Functional Strategies).
2. Systematically identify the values of land managed by the Department.
3. Set priorities for land significance and management by the Department. The following criteria, derived from O'Connor *et al.* 1990, will be used to determine the priorities for area significance:

Rarity	Lack of numbers or occurrence of a species or community.
Distinctiveness	A measure of the 'specialness' of a community or ecosystem.
Diversity	A measure of the different species, communities, ecosystems, habitats, landforms, environmental gradients and processes found in an ecosystem.
Naturalness	A measure of the lack of disturbance by humans and introduced species.
Viability	A measure of the long-term (ecological) viability of a site.
Representativeness	A consideration of all of the above and how well these are reflected for any given ecosystem at a particular site.
Shape and size	A site's shape and size are important factors affecting a species' or community's viability. The principles of biogeography generally mean that larger areas with a compact shape are the most effective for the protection of natural areas for nature conservation purposes.
Other	Any other relevant ecological criteria.

Priorities for management for land ecosystems values will then be set on the basis of:

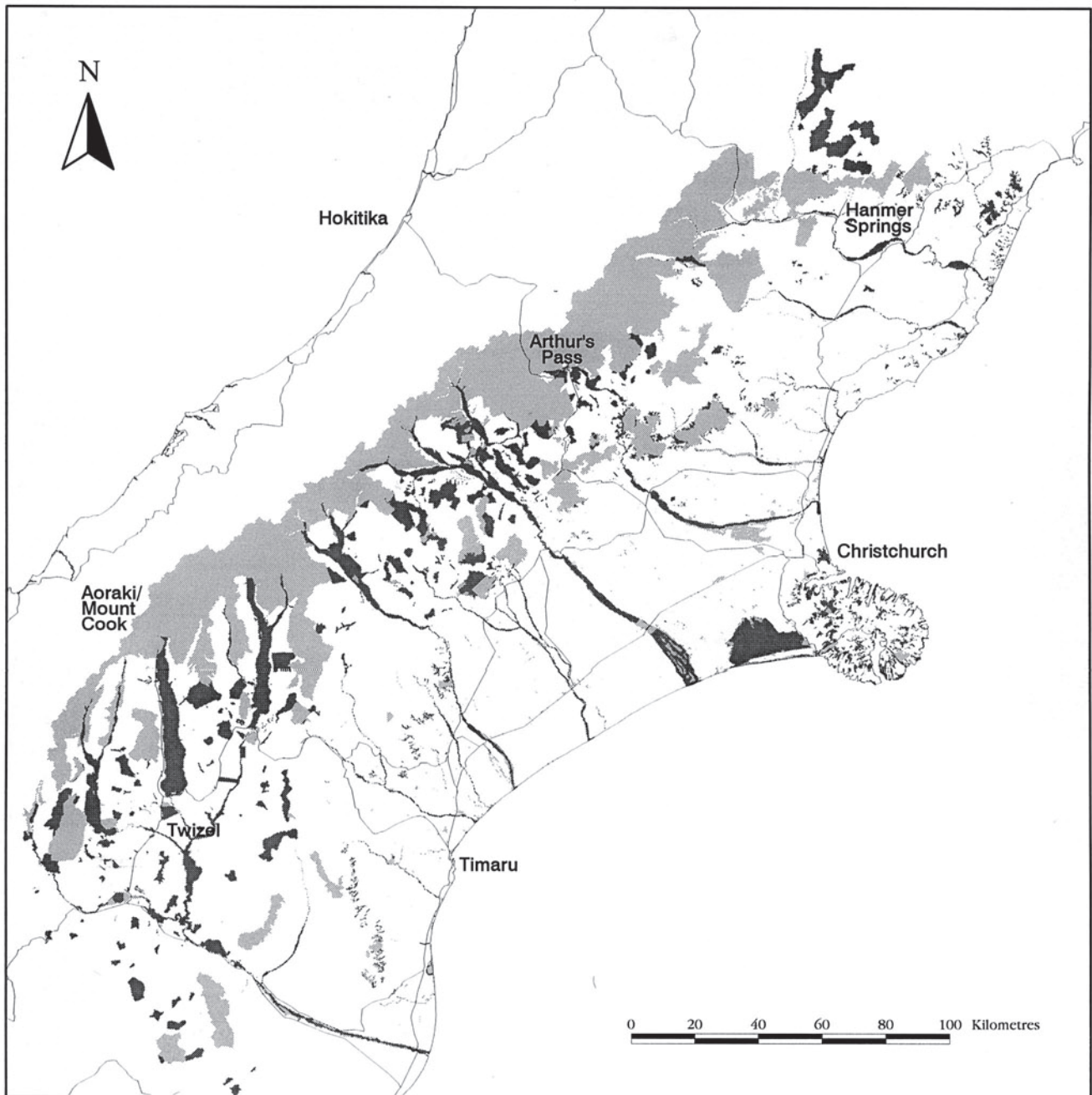
- the natural significance of the value identified
 - the types and level of threat to each identified value
 - the value of the management gain from the effort directed at the threat to each identified value
 - optimising the management gain across the range of values in the Conservancy and nationally
4. Utilise the criteria in Implementation 3 when considering proposals for the formal protection of nature conservation values (see also 5.5.2 Statutory Land Management).
 5. Undertake comprehensive ecological surveys in priority ecological districts across the Conservancy and support initiatives to protect land identified in survey reports (see also 5.5.4 Survey and Monitoring). Criteria that will be used to determine future priorities for ecological surveys include:
 - the relative area remaining of a community type and the level to which it is protected in the conservancy and ecological district
 - the 'naturalness' (diversity, cover composition) of the remaining portions of the community
 - whether there are species in the community of special significance (endemism, nationally threatened, distributional interest)
 - the presumed level of threat to remaining elements of the community, and the ability to control these directly or to re-create the community in a new location
 6. Participate in land care groups to discuss matters of mutual interest, for example, weed control, land degradation, rabbits, ecosystem and landscape conservation, *Hieracium* and wilding tree spread.
 7. Contribute effectively to tenure review of pastoral leases by:
 - identifying and describing natural values
 - providing this information to landholders and Knight Frank (New Zealand) Limited.
 - negotiating to protect the natural values
 8. Share information (such as text and map information) with local authorities to assist with recognising and providing for significant native vegetation, wildlife habitat, significant landforms and geological features for inclusion in regional and district plans.
 9. Advocate for effective and efficient methods in regional policy and regional plans, and district plans, to avoid the adverse effects of development on native vegetation and wildlife habitat. The following database sources provide the basis for assessing significant native vegetation and wildlife habitat:
 - PNA – Protected Natural Area surveys
 - WERI – Wetlands of Ecological and Representative Interest
 - SSWI – Sites of Special Wildlife Interest.

Known sites of natural significance are shown on Map 17.
 10. Develop and maintain positive relationships at an individual farmer-level and with Federated Farmers' branches and offices over nature conservation issues, especially regarding the protecting of significant native vegetation and wildlife habitat; and promote formal protection methods.
 11. Liaise with conservation groups, Fish and Game Councils, QEII Trust, Federated Farmers and other interest groups to enhance opportunities for protecting land with significant native vegetation and wildlife habitat.
 12. Apply to the Land Acquisition, Forest Heritage or Ngā Whenua Rāhui Funds for finance to implement legal protection of areas identified for their natural values. Advice and administrative support will be provided to individuals or groups making applications to the Forest Heritage or Ngā Whenua Rāhui Funds as resources permit. For disposal and exchange criteria see 5.5.2 (Statutory Land Management).

Map 17: Sites of Natural Significance

Map 17

Sites of Natural Significance



- Areas of natural significance outside areas managed by the Department*
- State highway
- Land managed by the Department

Footnote: *Natural Significance areas are those currently identified in the following of:
-SSWI data - Sites of Special Wildlife Interest (ex Wildlife Service Habitat data)
-WERI data - Wetlands of Ecological and Representative Interest
-PNA data - Protected Natural Area Surveys (Lands and Survey, DOC)

13. Meet boundary fencing requirements in accordance with the Fencing Act 1978 where appropriate, following consultation with landholders.
14. Develop a GIS-based fencing inventory and, if needed, a strategy that:
 - outlines the present network, its condition and future effective life
 - details existing maintenance and replacement needs and costs
 - outlines ecosystem protection priority requirements as defined in Implementation 3
 - outlines present statutory priorities

The inventory and strategy will assist in the implementation and achievement of this CMS.
15. Select, where feasible, fence lines on survey boundaries. In other circumstances, such as difficult terrain, select fence lines that will best protect the area's natural, landscape, historic or recreational values.
16. Undertake restoration initiatives in Canterbury where:
 - the restoration approach is planned, monitored and reviewed
 - the focus is to preserve biodiversity (communities and species), as opposed to reacting to unexpected damage
 - consultation with papatipu rūnanga has occurred
 - the project will realise significant gains in enhancing Canterbury's indigenous biodiversity
17. Support restoration programmes on land managed by the Department that:
 - provide opportunities and support for community groups and the public generally to undertake restoration of communities on land managed by the Department.
 - use material of appropriate genetic origin that is ecologically appropriate to the situation
 - use techniques that replicate natural process as closely as possible
18. Foster joint restoration programmes with Ngāi Tahu.
19. Encourage community restoration of native vegetation on privately owned land, for important natural features requiring restoration. As part of this process the Department will:
 - provide information on native species that are useful for restoration
 - provide restoration guidelines
 - contribute to and develop a database of such programmes
 - continue plantings around the Department's Motukarara Nursery that demonstrate the distinctive plant associations of Canterbury
20. Continue oversight and practical contribution to Tū Kakariki projects, such as the existing Ōtūkaikino and Estuary of the Heathcote and Avon Rivers/Ihutai sponsorship programmes, continue restoration research of the Tekapo Scientific Reserve, and continue joint rehabilitation, with rūnanga, of the mined area at Kaitorete Spit (see also 5.1.3 Community Participation and 5.5.5 Research).
21. Maintain, upgrade and make available a departmental GIS database of geopreservation sites prepared by the joint Earth Science Working Group.
22. Liaise with the joint Earth Science Working Group on site recording and management.
23. Develop and implement methods to protect important or vulnerable geological sites and landforms on land managed by the Department.
24. Monitor a range of ecological systems in Canterbury to identify rates and cause of ecological change and, if necessary, identify remedial actions (see 5.5.4 Survey and Monitoring).
25. Support research that contributes to:
 - understanding process and the way natural processes can be sustained in the presence of human-induced threats
 - evaluation of the effectiveness and economics of natural area assessment and protection (see 5.5.5 Research)
26. Provide prompt advice on the natural values, flora and fauna, and representative areas affected by applications for sustainable forest management plans and permits.
27. Provide prompt advice on the natural values, flora and fauna, and representative areas affected by applications for burning permits under the Land Act and Resource Management Act processes.

Priorities

Primary

Ecological surveys will be undertaken in the high country to facilitate tenure review. Where resources permit, surveys will also be undertaken in areas which are little known or where there are the greatest threats to indigenous ecosystems, such as in the North and South Canterbury foothills.

Where boundary fencing is required, the provisions of the Fencing Act 1978 will be met. All fences that meet criteria for rabbit control and stock-proofing will be maintained. A conservancy fencing inventory will be prepared, and a strategy may follow.

Secondary

The main objective of earth science conservation in Canterbury is to ensure the survival of the best representative examples of geological features, landforms, soil sites and active physical processes, so that the geological history of New Zealand, its landforms and the evolution of its biota can be understood. The main barrier to achieving this objective previously has been a lack of information about earth science sites. This situation has now improved following the collection and computerisation of the Geopreservation Inventory in 1992.

Conservancy restoration priorities will continue to have strong support.

Priority Sites and Ecosystems

The priority protection sites have yet to be objectively identified in many areas. Nevertheless there are many sites both within, and outside of, lands managed by the Department that have acknowledged natural features and values which require recognition and protection. These sites and processes are shown in Table 19.

The priority sites and themes have been selected on a qualitative assessment of natural values and areas that require management, using the criteria in Implementation 3. If implemented, an ecosystem protection strategy will provide a more objective focus for management. In the meantime, the programmes shown in Table 19 will contribute to important outcomes of land ecosystems management.

Less Achievable Tasks

Tasks that may not be undertaken or completed include:

- negotiations for protection of natural values
- the purchase of areas containing significant natural features
- full rabbit fencing in important areas and the completion of fencing elsewhere
- major restoration programmes (beyond Project River Recovery and Hurunui Mainland Island Habitat)
- full PNA surveys across all of Canterbury
- participation in all Resource Management Act processes to protect significant natural vegetation and wildlife habitat

Table 19: Key Land Ecosystems Priorities

Theme	Issues	Methods	Results Sought	Place
Landscape Management	How best to protect indigenous biodiversity and landscape values in the Banks Peninsula Unit	<ol style="list-style-type: none"> 1. RMA advocacy 2. Covenants 3. Fencing 4. Purchase 5. Animal control 	Protection of a representative range of Banks Peninsula ecosystems	Banks Peninsula
Sand dune protection: restoration and cultural appreciation	How best to protect the natural and cultural values of Kaitorete Spit	<ol style="list-style-type: none"> 1. Restoration of pingao 2. Plant pest control (specifically marram grass and boneseed) 3. Rabbit control 4. Rūnanga input into management 	Maintenance and enhancement of the natural and cultural values of Kaitorete Spit	Plains
Resource Management Act Advocacy	How can RMA processes be used to manage adverse impacts on native vegetation and wildlife	<ol style="list-style-type: none"> 1. Economic instruments 2. District and regional plan rules 3. Information provision 4. Riparian protection 5. Environmental compensation 	Avoiding, remedying or mitigating impacts on significant native vegetation and wildlife habitat	All places
Restoration	How to best enhance indigenous biodiversity in Canterbury	<ol style="list-style-type: none"> 1. Volunteer projects 2. Sponsorship 3. Research 4. Mining rehabilitation 	Community and Conservancy involvement in enhancing areas of natural value	All places
Ecological survey, Protected Natural Areas Programme, and protection implementation	How to best identify and protect indigenous biodiversity in the unit	<ol style="list-style-type: none"> 1. Tenure review 2. RMA advocacy 3. Covenants 4. Animal and plant pest control 5. Fencing 6. Purchase 7. Ecological survey 	Identification and protection of a range of ecosystems in the unit	All places (Note: Banks Peninsula PNA survey completed)
Mountain forests: Hurunui Mainland Habitat Islands	Manage major restoration programme for endangered species' habitats	<ol style="list-style-type: none"> 1. Pest and predator control 2. Weed control 3. Research 4. Sponsorship 5. Advocacy 	Establishment of sustainable populations of key species	Hurunui