



World Heritage Sites

Protected
Areas and
World
Heritage



TE WAHIPOUNAMU - SOUTH WEST NEW ZEALAND NEW ZEALAND

This vast composite park in south-west New Zealand is composed of 40 separate protected areas and covers 9.6% of the country. Its landscape has been shaped by tectonic uplift and successive glaciations into rocky coasts and fiords, towering cliffs, lakes and jagged mountain peaks. Two-thirds of the area is forested with southern beech and podocarp trees, some over 800 years old, and there is a wide diversity of habitats and endemic species. The kea, the only alpine parrot in the world, and the endangered flightless takahe, live in the park

COUNTRY

New Zealand

NAME

Te Wahipounamu - South West New Zealand

NATURAL WORLD HERITAGE SERIAL SITE

1990: Inscribed on the World Heritage List under Natural Criteria vii, viii, ix and x.

This incorporates Westland-Mount Cook National Park and Fiordland National Park, both previously inscribed in 1986 on the World Heritage List.

STATEMENT OF OUTSTANDING UNIVERSAL VALUE [pending]

IUCN MANAGEMENT CATEGORIES

Ia Nature Reserves/Scientific Areas/Special Areas:	total sites: 9
Ib Wilderness Areas:	total sites: 4
II National Parks:	total sites: 4
III Scenic Reserves/Ecological Reserves:	total sites: 17
IV Private Protected Land/ Wildlife Management Reserve	total sites: 3
Unassigned:	total sites: 4

BIOGEOGRAPHICAL PROVINCE

Neozealandia (7.01.02)

GEOGRAPHICAL LOCATION

In southwest South Island, extending 40-90 km inland from a 450 km length of the western coast between 166°26' to 170°40'E and 43°00' to 46°30'S. The sea-ward boundary is at the mean high water mark.

DATES AND HISTORY OF ESTABLISHMENT

1904: The Fiordland area reserved as a potential National Park (950,000 ha);

1953: Mount Cook gazetted a National Park under national parks legislation;

1955: Fiordland gazetted a National Park;

1960: Westland gazetted a National Park; 1983: the upper Karangarua Valley added;

1964: Mount Aspiring gazetted a National Park;

1986: Westland-Mount Cook and Fiordland National Parks inscribed on the World Heritage List;

1989: Mount Aspiring Park: 24,285 ha added; 1990: 41,630ha added (Red Hills & Olivine Range).

1997; Olivine Wilderness Area (83,000 ha) added to Mount Aspiring Park.

LAND TENURE

The Crown. The site comprises one contiguous unit, except for a number of small outliers, a few private enclaves and a small block at Martins Bay owned by the Royal Forest and Bird Protection Society. Most of the land was claimed by the Ngai Tahu Maori Trust Board, now compensated for 19th century dispossession, but the tribe is committed to maintaining the land's protected status. The whole Park is managed by the Department of Conservation. Much land not included within National Parks is managed as a *de facto* wilderness area, and protected as conservation land under the Conservation Act, or as reserves under the Reserves Act (DoC, pers. comm., 1995).

AREA

2,600,000 ha. The site is one unit, with a few small outliers, composed of 40 different protected areas:

Site	Gazettal	Date	Area (ha)	IUCN Category
National Park				
1.	Fiordland	1952	1,212,000	II
2.	Mount Aspiring	1964	355,543	II
3.	Aoraki/Mount Cook	1953	70,699	II
4.	Westland/Tai Poutini	1960	117,547	II
Nature Reserve				
5.	Waitangiroto	1957/1976/1986	1,230	la
6.	Wilderness	1964/1980	88	la
Scientific Reserve				
7.	Gorge Hill	Pending	2,188	III
8.	Ramparts	1972	4.5	la
9.	Te Anau	1973	0.02	la
Scenic Reserve				
10.	Jacobs River	1973	120	III
11.	Karangarua Bridge	1950/1977	24	III
12.	Lake Moeraki	1964	243	III
13.	Lake Paringa	1950	307	III
14.	Lake Rotokino	1930	255	III
15.	Mahitahi	1952/1981	22	III
16.	Okuru	1981	46	III
17.	Paringa Bridge	1950/1968	103	III
18.	Rohutu	1911/1974	492	III
19.	Saltwater Lagoon	1928/1981	1,300	III
20.	The Exile	1905	56	III
21.	Toarona Creek	1978	97	III
22.	Waitangitaona	1961	118	III
Private Protected Land				
23.	Chapman Reserve	1989	20	IV
Wildlife Management Reserve				
24.	Diamond Lake/Lake Reid	1970	283	?
25.	Lake Pratt	1978	25	IV
26.	Okarito Lagoon	1983	173	IV
27.	White Heron Lagoon	1984	172	?
Ecological Area				
28.	Diggers Ridge	1982	4,235	?

29.	Lillburn	1982	2,670	?	
30.	Saltwater Lagoon	1981/1984/1985	1,483	III	
31.	Oroko Swamp	1981	173	III	
32.	Waikoau	1983	329?		III
National Park Special Areas					
33.	Secretary Island	1973	8,890	la	
34.	Sinbad Gully Stream	1974	2,160	la	
35.	Solander Island	1973	120	la	
36.	Takahe Fiordland	1953	177,252	la	
37.	Slip Stream	1973	18,000	la	
National Park Wilderness Areas					
38.	Glaisnock	1974	124,800	lb	
39.	Pembroke	1974	18,000	lb	
Wilderness Area (Conservation Land)					
40.	Hooker/Landsborough	1990	41,000	lb	
41.	Olivine	1997	83,000	lb	

ALTITUDE

Sea-level to 3,764m (Mount Cook)

PHYSICAL FEATURES

The southwest coastal country of New Zealand is a wilderness of rugged snow-capped mountains, snowfields and glaciers, large inland and small alpine lakes and 14 deeply incised sea fiords. The World Heritage site covers the Fiordland massif (highpoint 2,746m) with on its north, Mt. Aspiring National Park (3,036m) and, detached beyond it, the contiguous Aoraki/Mt.Cook (3,764m) and Westland National Parks in the Southern Alps. The mountains result from tectonic uplift over the last five million years along the Alpine Fault. The basic shape of the land was set during the Pleistocene glaciations, but there has been substantial post-glacial change, most marked in south Westland and the Southern Alps. The uplifted mountains have been very deeply sculpted by glaciers, resulting in very high relief, especially in Westland and Mount Cook National Parks, which contain 28 of the 29 New Zealand peaks above 3,000m, with the latter park being mostly above the treeline.

Where the immense 27 km-long Tasman glacier on Mt. Cook flows east at only 0.65m a day, the fast-moving Fox and Franz Josef glaciers in Westland flow west at the rate of 4 metres a day, ending in lowland forests. Erosion in the mountains is very rapid, especially in the zone of high rainfall and fastest uplift west of the main divide where the land shows intense gullying, serrated ridges, rockfalls, major and minor, and a great variety of morainal forms. In Fiordland, a lower massif, post-glacial modification of the topography is much less than in the Southern Alps, the glacial landforms remain almost entirely intact and mountains are extremely steep. Full exposure to Southern Ocean swells has produced a dramatic coastline on the basement rocks, with irregular high sea cliffs, some as high as 2,000m, and many offshore rocks and stacks. On the south coast of Fiordland and adjacent Waitutu a flight of some 13 marine terraces records a detailed history of uplift over almost a million years; terraces formed by coastal erosion are now found up to 1,000m above sea level, and intertidal rock platforms extend into the sea from the low cliff foot. The fiord waters are excluded from the property.

South-west New Zealand straddles the colliding Indo-Australian and Eastern Pacific plates, both moving northwards along the Alpine Fault. It is one of only three major tectonic boundaries on land and is one of the most seismically active regions in the world. The rocks of Fiordland are generally crystalline, dominated by granite, diorite and metamorphic gneisses first uplifted about 350 million years ago. In the extreme south-west there are unmetamorphosed sedimentary rocks; in the north-east, the Fiordland block abuts a set of north-south trending mainly Permian volcanic and sedimentary rocks; the Dun Mountain ophiolite belt is the key unit, comprising a slice of oceanic crust and the underlying mantle. To the east, a Permian terrain of greywacke sandstone is more highly metamorphosed becoming the schist which forms the Southern Alps in Mount Aspiring Park. This band of schist narrows to the north-east, paralleling the Alpine Fault on its south-eastern side. On its eastern

edge in Mount Cook National Park the schist gradually changes to a different terrain formed of Permian-Triassic greywacke.

West of the Alpine Fault, the rocks of south Westland consist of a basement of Ordovician greywacke with some high temperature metamorphic rocks and granites, and minor areas of younger Cretaceous and Tertiary sedimentary rocks along the coast. Severely eroded by Pleistocene glaciers, these generally form blocks of rugged hill country or isolated hills standing above the post-glacial alluvium and lagoon-infilling sediments of the narrow coastal plain. Pleistocene moraines and outwash form extensive areas of subdued hill country and low plateaus. The valued New Zealand jade (*pounamu*) is found as boulders along the coast. Alluvial soils are found in the valleys and coastal plain, deposited by floods; elsewhere they are usually very shallow. In the mountains ultramafic soils with a high metal content, support unusual plant communities.

CLIMATE

The climate is oceanic and variable; altitude also makes a vital difference. The mountains form a barrier to the prevailing wet westerlies, and rain is often heavy and prolonged. East of the mountains the air descends as a typical föhn wind creating warm, often violent, north-west winds. From 3,000-5,000mm on the coastal lowlands, the annual rainfall increases inland, and with altitude exceeds 12,000mm on the western flank of the Southern Alps where much of it falls as snow. West of the mountains, rain is distributed uniformly through the year. East of the mountains, the annual rainfall is as low as 1,000mm. The ocean has a strong moderating influence on temperature, especially in the west and south. The result is a cool, temperate climate with small annual and diurnal ranges: from a near freezing average minimum in winter to the low or mid twenties degrees Celsius in mid summer. East of the divide, summer temperatures are slightly higher than in the west at equivalent altitudes, and winters are more severe.

VEGETATION

The region preserves ancient Gondwanan taxa, having in places remained ice-free and become refugia for such species such as the 14 podocarps and flightless birds. Both the flora and fauna of Fiordland are dominated by indigenous species; 700 higher plants are found only there, including 24 alpine species (Frimmel, 2001a). Its extreme diversity results from a number of pronounced environmental gradients: altitudinal from permanent high mountain ice to inter-montane basins or the sea coast; rainfall-temperature gradients from west to east, yielding a compressed transect from rainforest to grassland; the north-south gradient of three degrees of latitude; pronounced ecotones between open wetlands, grasslands, shrublands and forest communities; and distinct sequences of vegetation and soils developed on landforms of different ages. The west is covered by nearly 2,000,000 ha of temperate rain forest plus wetlands; the drier more continental east has more open forest, generally of mountain beech *Nothofagus solandri* var. *clifortioides*, shrubs and short tussock grasslands of *Chionochloa* species. The mountains hold 45,000 hectares of alpine communities.

The alpine flora, as a result of isolation in a geologically young habitat, is of very high species diversity and endemism, considerable adaptive radiation, polymorphism and variation, great variation in growth forms and has predominantly white flowers of simple bowl form, perhaps to attract specialised pollinators, which are scarce (Birks, 2003). The vegetation of tussock grass and herbs, species-rich cushion fields and, in the south, bogs, extends along the mountain summits from 200m to 1,000m above the tree line to permanent snow. The most striking plants are snow tussock grasses, up to 1m tall, which dominate the alpine grasslands, and mountain daisies *Celmisia* spp. of a wide variety of forms and species; also the dense cushion shrub *Raoulia* spp. ('vegetable sheep'), buttercups *Ranunculus* spp., including *R. lyallii*, the largest buttercup in the world, oxgloves *Ourisia*, lilies *Astelia*, and others.

South of the Paringa River in south Westland, the lower limit of the alpine vegetation is also marked by an abrupt tree line. The best-known vegetation chronosequences are those of plant succession after glacial retreat where the ages of outwash, terrace and higher piedmont surfaces are known. Raw gravels are colonised by mats of lichen *Rhacomitrium*; the youngest glacial moraines, some only 20 years old, have nitrogen-fixing shrubs, grasses and herbs growing on the weakly developed soil; on moraines, 150-year old forests flourish of *rata-kamahi* *Metrosideros-umbellata*-*Weinmannia racemosa* up to 20m high. The extreme is found on the higher glacial outwash surfaces some 25,000 years old, where the extremely leached infertile soils can only support a stunted heath and bog vegetation.

The cold-tolerant silver beech *Nothofagus menziesii* grows right down to the sea but usually forms the canopy at the very distinct tree line, which runs horizontally at about 1,000m. North of the Mahitahi River, beeches are absent for some 160 km, the so-called beech gap, caused by past glaciation; inland and further north the species is the red beech *N. fusca*. At warmer lower altitudes, the rain forest in the wetter, milder west is dominated by dense stands of tall podocarps such as *rimu Dacrydium cupressinum*, *miro Prumnopitys ferruginea*, and montane *totara Podocarpus cunninghamii*. 14 podocarp species occur in the southwest, 10 being forest trees, their distribution strongly controlled by landform, soil and climatic factors. The western coastal plain also contains the most extensive and least modified natural freshwater wetlands in New Zealand, including fertile swamps and infertile peat bogs. The most impressive landform chronosequence is the flights of marine terraces in southern Fiordland where terraces span a range of 600,000 years. The vegetation changes from tall mixed silver beech-podocarp-broadleaved forest on the lower terraces between 50m and 100m, through mountain beech-podocarp woodland between 300 and 400m, to mosaics of dwarf manuka *Leptospermum scoparium* - mountain beech-podocarp shrubland and cushion bog on the higher and older terraces above 600m. The drier east which has colder winters and warmer summers, has more open forest, generally of mountain beech, shrubs and short tussock grasslands dominated by red tussock grass *Chionochloa rubra*.

FAUNA

The southwest is the least modified region of mainland New Zealand and is the core habitat for many indigenous animals including a number of primitive taxa. The southwest coast has also the largest breeding aggregations of New Zealand fur seal *Arctocephalus forsteri*, except for the outlying Bounty Islands. This seal was hunted to almost extinction last century, but has recovered steadily, and now numbers more than 60,000 animals. The southwest is also home to the endemic Fiordland crested penguin *Eudyptes pachyrhynchus* (VU) with some 1,000 to 2,000 pairs breeding annually (DoC, pers. comm., 1995).

More than 100 species of birds have been recorded in the World Heritage area, more than half the breeding species of New Zealand, 28 of them threatened. It contains the largest and most significant populations of forest birds in the country, most being endemic. Restricted to two localities in the north of the Park, are the entire populations of the two rarest of the country's six species of kiwi: some 100 Okarito brown kiwi *Apteryx rowi* (EN: formerly *A. mantelli* 'Okarito') found in that area only, and 125 southern brown kiwi or Haast tokoeka *A. australis* 'Haast' (VU), living in the Haast area, both species being endemic to Westland (Robertson, 2006; IUCN, 2007). Endemic to Fiordland is the more abundant southern brown kiwi *Apteryx australis australis* (VU) with a stable sub-population on Stuart Island (of *A. australis lawryi*) and the widespread great spotted kiwi *Apteryx haastii* (VU). It is also the stronghold of both members of an endemic genus of parrots: kea *Nestor notabilis* (VU), the only alpine parrot in the world, which is restricted to the South Island mountain country; and its forest relative, the kaka *N. meridionalis* (EN), which is found mostly in the beech-podocarp forests of southern Westland and southeast Fiordland, particularly Waitutu. The flightless nocturnal kakapo *Strigops habroptila* (CR) is now extinct on the mainland. The country's largest populations of endemic yellow-crowned parakeet *Cyanoramphus auriceps* is found in the southwest's tall lowland beech and dense podocarp forests. A few Fiordland mountain valleys harbour the total wild population (220 in 2002) of the endangered takahe *Porphyrio hochstetteri* (EN), a large flightless rail believed extinct until rediscovered in 1948, which suffers competition for food from the red deer. The yellowhead *Mohoua ochrocephala* (EN) is thinly widespread but in decline due to predation. An endemic family of passerines, the Xenicidae, is represented by South Island wren *Xenicus gilviventris* (VU) and rifleman *Acanthisitta chloris*. Other birds found in the area with no close relatives beyond New Zealand include the torrent-living blue duck *Hymenolaimus malacorhynchus* (EN), wrybill *Anarhynchus frontalis* (VU) and western weka *Gallirallus australis* (VU). The area contains the largest populations of the three uncommon species, New Zealand fernbird *Bowdleria punctata*, New Zealand falcon *Falco novaeseelandiae* and Fiordland crested penguin (VU).

Okarito Lagoon is the largest estuarine lagoon on the west coast of South Island and an important habitat for wading birds, including Eurasian oystercatcher *Haematopus ostralegus*, pied stilt *Himantopus himantopus*, the migratory bar-tailed godwit *Limosa lapponica* and red knot *Calidris canutus*. Freshwater wetlands in the south-west support sizeable populations of several wetland birds, including grey duck *Anas superciliosa*, paradise shelduck *Tadorna variegata* and Australian shoveler *Anas rhynchos*, marsh and spotless crake *Porzilla pusilla* and *P. abuensis* and four species of cormorant, great, little, spotted and large pied *Phalacrocorax carbo*, *P. melanoleuca*, *P. punctatus* and

P. varius. Two species are largely confined to open water habitats of the area's numerous lakes: the nationally endangered great crested grebe *Podiceps cristatus australis* and the endemic New Zealand scaup *Aythya novaeseelandiae*. River bed invertebrates support a diverse birdlife including white heron *Egretta intermedia*, royal spoonbill *Platalea leucodia regia*, wrybill (VU), paradise shelduck, black-billed gull *Larus bulleri* (EN), black-fronted tern *Sterna albostrata* (EN) and double-banded dotterel *Charadrius bicinctus*. In the lower tussock grasslands, native birdlife is restricted to a few open country species such as New Zealand falcon, Australasian harrier *Circus approximans gouldii* and Australasian pipit *Anthus novaeseelandiae*.

A number of mammals have been introduced which have had severe impacts on the vegetation and ground-nesting birds. These include three species of rats *Rattus* spp., stoat *Mustela erminea*, brushtail possum *Trichosurus vulpecula*, wild boar *Sus scrofa*, fallow deer *Cervus dama*, wapiti (red deer) *Cervus elaphus*, Himalayan thar, *Hemitragus jemlahicus* (600 within the Parks), goat *Capra hircus* and northern chamois *Rupicapra rupicapra*. Very little is known about the lizard fauna. An endemic, the Fiordland skink *Origosoma acrinasum* is found, and the forest gecko *Haplodactylus granulatus* is probably a species distinctive to the southwest. Four species of Ross's carnivorous snail *Powelliphanta* spp. are known from the area, all from high altitude silver beech forest. The diversity of alpine and subalpine invertebrates is high, with 60 percent of New Zealand's known species present, including half of New Zealand's 1,500 moths, 35 of which are endemic to Fiordland. Eleven species of butterfly are also present, including the rare black Mountain ringlet *Percnodaimon pluto* which is found above 1,800m (Frimmel, 2001b). The 16 species of native freshwater fish, is an exceptionally large number relative to the rest of New Zealand. Several species rare or absent from settled regions are commonplace in the southwest, such as the giant kokopu *Galaxias argenteus* (VU). All but four of the fish species are endemic. The best-represented genera are *Galaxias* and *Gobiomorphus*.

CONSERVATION VALUE

The property is a landscape shaped by tectonic uplift and successive glaciations into a variety of dramatic mountain and coastal forms. Two-thirds are forested with southern beech and podocarps, some of the latter over 800 years old. The Park is also home to the world's only alpine parrot, the kea, and the endangered flightless takahe. The Park lies within a Conservation International-designated Conservation Hotspot, a WWF Marine Global 200 Eco-region, and a BirdLife-designated Endemic Bird Area.

CULTURAL HERITAGE

Te wahi pounamu means the waters of the green stone valued by the Maori for its beauty and hardness. The area is within the ancestral territories of the Ngai Tahu tribe, who in the 18th and 19th centuries, travelled to Fiordland to hunt seals and collect greenstone and were more numerous and settled in the area than was believed when they were bought out cheaply by early settlers in the early-mid 19th century. As a result, most of the land became the subject of a long disputed claim by the Ngai Tahu Maori Trust Board, only settled, with adequate compensation, in 1998, and safeguarding their right to mine *pounamu*. At this time the Maori names for Westland and Mt. Cook were added to the Park names. The first European to see the area was the Dutch navigator, Abel Tasman, in December 1642. Sealing by foreigners began in Fiordland in 1792 and by 1820 the seal populations had been reduced to non-commercial levels. Seals were given legal protection in 1875. Whalers established short-lived coastal stations during the 1800s. Gold was discovered in the early 1860s in south Westland and central Otago but within a few years most of the boom towns were abandoned.

LOCAL HUMAN POPULATION

This area is the least populated part of New Zealand. On the West Coast, land uses are grazing on short-term lease, whitebait fishing, small-scale mining and sphagnum moss harvesting. Extensive pastoralism is the main land use east of the World Heritage area. In Southland intensive and extensive grazing, exotic and indigenous forestry is practised adjacent to the World Heritage area. Sheep and cattle grazing is permitted under licence or on lease on a limited number of grassland on valley floors. Mineral exploration, prospecting and mining is permitted only with the consent of the Minister of Conservation though there are no significant mining activities within the World Heritage area (DoC, pers. comm., 1995) except for small-scale gold mining on the beaches and in some rivers of the West Coast. It is monitored by the Department of Conservation.

VISITORS AND VISITOR FACILITIES

Milford Sound, Mount Cook and the Franz Josef and Fox glaciers have been major visitor attractions from the earliest days of New Zealand tourism, and visitor numbers to the World Heritage site are high, especially since the publicity accruing from *The Lord of the Rings* film cycle, photographed there. A variety of small scale commercial recreation services operates throughout the World Heritage area under concessions from the Department of Conservation. This manages nine visitor centres and a large one at Haast opened in 1991, specifically planned to interpret the World Heritage area, especially the lowland rain forests of south Westland. Hiking the many trails, including three of New Zealand's multi-day 'Great Walks' is served by the many huts provided by the Department: over 50 in Fiordland and 17 on Mount Cook, several there primarily for mountaineers since the area has the finest mountaineering in the country. There is diving, sea kayaking in fiords, lake kayaking and river jet-skiing in Westland, heli-skiing and ski plane access to the back country snowfields and glaciers. Local towns provide a good range of accommodation and other facilities.

SCIENTIFIC RESEARCH AND FACILITIES

By the turn of the 19th century, discovery of the southwest was largely by mountaineer explorers. Some areas in the Mount Aspiring region were not explored on foot until the 1950s, and some of the more remote Fiordland valleys were still considered unexplored in the 1970s when accurate detailed topographic maps first became available for this remotest corner of the country. The nomination bibliography cites headings for film and videos, geology, soils and landforms, vegetation, wildlife, natural history, cultural history, resource use, recreation and tourism, park handbooks, investigation reports, management plans and overviews. An extensive program of on-going research is carried out in the area. Geology and vegetation are the most studied, also climate and glaciers and a project to monitor forest-pest interactions. Monitoring of many factors is routinely done by the Department of Conservation which has designed a biodiversity assessment sampling program.

MANAGEMENT

The Parks are protected under the Reserves Act of 1977, the Conservation Act of 1987 and the National Parks Act of 1980 and are managed by the Department of Conservation. This was formed in April 1987 when coordinated management of all government-owned natural lands became possible, opening the way for the creation of the comprehensive World Heritage Site in the southwest. The creation shortly afterwards of the Ngai Tahu Maori Trust Board led to the Ngai Tahu Settlement Claims Act, 1988. This granted compensation for past injustices and recognised Maori rights and tribal values, including certain sacred places, treasures such as rare species, and ownership of *pounamu*. Management is the responsibility of four Department Conservancies who have issued four Conservation Management Strategies, for Southland, West Coast, Otago and Canterbury, The whole area is covered by operative management plans produced for each National Park by the Department of Conservation but no overall management authority or administrative structure for the site is currently planned. The strategies are the central planning documents for the whole area, while the National Park plans are statutory planning documents that provide greater detail for the management of specific areas. All management plans are operative for a ten year period (DoC, pers. comm., 1995).

The principal aims of the World Heritage area are nature conservation, natural resource-based recreation, tourism and small-scale sustainable use of natural resources. With some variation in details of management, all areas are protected to maintain their intrinsic values for the future. Historic sites are open to the public depending on their sensitivity. 67% of the property (1,745,800 ha) has National Park status, but protection is also high in lands in other categories. Scenic reserves are managed for protection and preservation of natural features or landscapes of scenic beauty. Nature reserves are managed for their indigenous fauna and flora or rare natural features of scientific interest or importance. Ecological areas are set aside under the 1987 Conservation Act primarily for scientific and educational purposes, to protect representative ecosystems or rare plant and/or animal communities, soil types and geomorphological processes. Protected private land is managed as if it were a scenic reserve. Conservation areas held under the Conservation Act are held for the conservation of their historical and natural resources to maintain their intrinsic values and to provide for their appreciation and recreational enjoyment by the public, and safeguarding the options of future generations; some gazetted as stewardship areas and may receive greater protection in future.

National Parks policy aims for the extermination of introduced animals within the parks. In other protected areas their populations are kept at low levels to minimise their impact on the native flora and

fauna. Control methods include recreational and commercial hunting by helicopter and by foot. The Department of Conservation has initiated control programmes in fauna sanctuaries and is developing and implementing recovery plans for threatened species. Examples are the Waitangiroto Nature Reserve, established in 1957 to protect the white heron nesting area and the 2,783 ha Saltwater Ecological Area / Scenic Reserve which protects one of New Zealand's largest unmodified estuaries and the surrounding swamp forest (Frimmel, 2001). Monitoring is carried out on biodiversity, endangered bird species, pest numbers, the Dart glacier thickness, tree foliage, ecosystem plots to determine deer and thar impacts visitor numbers and aircraft overflights.

MANAGEMENT CONSTRAINTS

The greatest negative environmental impacts have been and are still caused by introduced browsing and predatory mammals, especially the possum and stoat which threatens the two locally endemic species of kiwi. Having evolved in isolation from such animals, native species have few defences against them and several have become extinct. Population increases of red deer in the 1940s and 1950s, threatened the integrity of the forest and alpine ecosystems by over-browsing. They are now controlled by hunting which removes about 12,000 animals a year. Other browsers, such as wapiti, fallow deer, goat, chamois and thar, have more restricted distributions but cause equally severe damage in places. Numbers of all these species fell sharply after the advent of commercial hunting from helicopters, with a corresponding recovery of the vegetation, particularly in open alpine areas. However, Australian brush-tailed possum has caused severe mortality in montane *rata/kamaha* forests in the north and are still extending their range into previously possum-free areas such as the Haast district. They are being controlled with poisoned bait. Introduced mustelids and rats have had a devastating impact on indigenous bird life. Rabbit populations affect some grasslands on the eastern side of the World Heritage area. Species have become extinct and most bird populations have been greatly reduced. Lately, infestation by Himalayan thar from outside the site has divided opinion between a successful government cull of half the population to protect the vegetation and the strategy of a long-term cull preferred by hunters (UNESCO, 2000).

Unlike the rest of the country, exotic weeds are not a major problem, being mainly confined to disturbed sites, with the exception of hawkweed *Hieracium* spp., which has invaded 80% of the inter-tussock vegetation. Others are gorse, marram grass which is widespread in south Westland and willow which is a potential threat to streams but at present is easily controlled. However, with a temperature rise of 3°C with climatic warming over the next century, some 200-300 (33-50%) of the 650 indigenous alpine species of the country may become endangered or even become extinct by 2100 as a result of forest encroachment, habitat fragmentation, alien species invasion and direct climatic effects. The coastal Waitutu forest, on the Park's southern boundary, and the west coast lowland forests were logged and threatened by logging in the 1990s on lands where native cutting rights were observed. After government intervention to save the forest under the Resource Management Act a voluntary moratorium on logging began in 1999, which provided a payment in exchange for forest protection, extended to 2005, to allow time for Maori owners under the 1906 South Island Landless Native Act to consider the options for the future of their forests.

International visitor numbers increased at over 10% a year in the early 1990s. Numbers of hikers on the three most popular tracks, Milford, Kepler and Routeburn also increased. These tracks are managed as 'Great Walks' and for two of them, Routeburn and Milford, it is now necessary to book. Two of the most popular visitor destinations, Mt Cook and Milford Sound, have also experienced considerable international growth and overcrowding can occur, aggravated by the sound of frequent overflights. Facilities at Milford were redeveloped to cope with the growth, but Mt Cook village was already under increasing pressure from visitor numbers in 1995 (DoC, pers. comm., 1995). A major underground hydro-electric power station is situated under the western extremity of Lake Manapouri: associated high voltage transmission lines and roads have considerable but localised impacts.

STAFF

In 1995 there were approximately 70 Department of Conservation Staff in field management and visitor servicing, located at eight field centres in and around the World Heritage Area (DoC, pers. comm., 1995).

BUDGET

Financial provision for management of the World Heritage area is made annually on assessment of the Department of Conservation's Corporate Plan, augmented by specific project costs. The annual cost of managing Fiordland was approximately NZ\$9 million in 2005, but the Park was estimated to add NZ\$228 million to the national economy (DOC, 2006).

LOCAL ADDRESSES

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