

Part Four: Biodiversity, Landscapes and Historic Management

4.1 PLANNING RATIONALE

National park status has been placed over Fiordland because of its impressive natural attributes. The preservation of these natural features and values requires some active management, principally to prevent, minimise or redress human-induced impacts, including those of introduced species. The aim of preserving historic sites also requires some active management. This part of the plan is concerned with the management, including maintenance, of the park's landscapes, ecosystems, habitats and species and historic sites.

Effective management of biodiversity, landscapes and historical and cultural heritage requires knowledge of the vast natural resources of Fiordland, their important and vulnerable elements, and changes that may be occurring. Information is obtained in three ways: inventory, monitoring and research (these three broad categories are explained in section 4.10). Having adequate information makes up one side of the management task; the other side consists of specific preservation projects deemed necessary to protect or restore natural ecosystems, habitats and species in Fiordland. Work within Fiordland National Park can be influenced by outside factors, such as national priorities for species preservation. Projects may focus on specific habitats or species, but the long-term purpose is natural ecosystems preservation.

Similarly, the preservation of historic sites requires both information bases and maintenance work.

The two sides of the preservation management task provide a framework for management policy. Firstly though, an "audit" of the resource and current management activities is presented. This audit identifies known and potential threats to the well-being of the park's natural environment and historic sites, and what response has been, or can be made by management. It sets the scene for policy direction.

4.2 ASSESSMENT OF VALUES AND PLACES

4.2.1 Landform

The geology of Fiordland National Park is distinctive in New Zealand, with the nature of the rock, landforms and process that have formed, and continue to form, the landscape of Fiordland National Park being recognised on both a national and international basis.

This area contains some of New Zealand's most rugged coastline and deepest fiords and lakes. The temperate rainforest and alpine plant communities are outstanding examples of these important ecosystems. The vegetation of Fiordland is notable both in national and international terms for its diversity and essentially pristine condition.

In the south-west of Fiordland, the densely forested uplifted marine terraces are unique in New Zealand and are internationally recognised. Some of these marine terraces are presently at an altitude of over 1000 metres above sea level with the benches spanning 50 kilometres. The oldest of these terraces are approximately 1 million years old.

Assessed at a landscape level, Fiordland National Park is in excellent condition, essentially still in its natural state except for the very small areas where development has occurred. The long Fiordland coastline is unique in New Zealand because the landscape has not been greatly modified by agriculture, fire, or other such human impacts.

The landform has been created by the uplift of hard plutonic rocks such as granite and diorite, which have been subsequently carved into their present shape by successive periods of heavy glaciation.

Most erosion since the last glaciation period has been by way of rock falls and slips. Effects are local and minor so that the glacial landforms are usually well preserved, other than where rivers have cut deep narrow gorges into the valley floors.

In general the soils of Fiordland are naturally low to very low in fertility and biological activity, and weak in structure. They are liable to periodic debris avalanches (normal geological erosion), scree, sheet and gully erosion.

Tree avalanches are another regular and distinctive landform feature; their effects include the filling of valley floors, the damming of rivers and formation of lakes. Much of the Fiordland forest clings to steep faces of hard rock covered only by a pad of peat and moss, providing rooting space which would be inadequate in a drier climate. Great scars are common where the forest has lost its precarious hold or where a landslide has carved a path through the vegetation.

Snow avalanches can occur throughout the alpine areas of Fiordland National Park mainly during the winter and spring. Major avalanche zones exist in the high Darran Mountains. Monitoring of snowfields for avalanche hazard is undertaken along State Highway 94, and to a lesser

extent on the Milford and Routeburn tracks. Artificial release of avalanches is carried out when necessary to avoid harm to visitors or facilities.

The shore of the outer Fiordland coast reflects the influence of ocean waves on hard-rock geology. There are rugged cliffs, but also boulder beaches and some sandy stretches. In the fiords, the impact of valley glaciation on the landscape has a dramatic effect on the shore. Precipitous rocky slopes plunge to depths below water as great as their height above. Slips on the mountain slopes deposit rock and tree detritus directly onto the foreshore and into the fiords.

Because of landscape form, river mouths are mainly located in fiord heads. Many have developed deltas, which are built up by river gravel and re-modelled by persistent wave action. Flooding can bring sudden changes to the delta pattern.

The larger lakes in Fiordland are also situated in old glacial valleys or troughs; their shorelines have evolved similarly to those of the fiords.

The water levels of Lakes Manapōuri, Monowai and Te Anau are controlled for the purposes of hydro-electric power generation. Operating guidelines for Lakes Manapōuri and Te Anau have been established under section 4A of the Manapōuri Te Anau Development Act 1963, with the aim of achieving optimum energy output from the Manapōuri generating station while preserving the natural shoreline features of both lakes. Monitoring of lake management and any impacts of controlled water levels upon lakeshore processes is undertaken by the Guardians of Lakes Manapōuri, Monowai and Te Anau.

Artificial replenishment of beaches on the lakeshore adjacent to Te Anau township has been carried out in recent years. The presence of man-made structures on the lake edge has the potential to interfere with the natural movement of littoral sediments along the lakeshore. Alteration of beaches has also occurred during periods of high lake levels.

Earthquakes and soil liquefaction, tsunamis, flooding, slumping, rockfalls, landslips and avalanches (with the potential for local tsunamis) are natural phenomena, the main management concern being their potential hazard to visitors and facilities in Fiordland National Park.

Karst is a distinctive terrain shaped by the action of water on soluble rock - usually marble or limestone. Features of karst landscapes include sinkholes, caves, blind valleys, bluffs, gorges, arches and fluted rock outcrops. Caves are vital features and provide the underground drainage characteristic of karst terrain.

Fiordland National Park contains only relatively small areas of karst. Notable are those on the Hunter Mountains, Murchison Mountains and on Mt Luxmore. A prominent line of bluffs lies on the eastern flank of the Murchison Mountains above Lake Te Anau. On the lower slopes, the Aurora/Te Anau cave consists of eight kilometres of passages. This

system extends over 270 metres vertically from its uppermost entrance to its resurgence near the lakeshore. Aurora cave is significant for its size, geomorphology, diversity of form, and subterranean ecosystem. The lowest portion (Te Ana-au) has been developed for tourist visits with minimal impact on the overall cave system.

Caves on Mt Luxmore are much smaller. Their alpine location is interesting in itself, and other important attributes are their speleothems (cave features such as stalactites and stalagmites).

Caves are sensitive environments - they require protection and careful management. The task facing park management is how to best accommodate recreational use and mitigate adverse impacts. Access to Aurora/Te Ana-au cave, apart from the tourist operation, is currently restricted by its location in the Takahē Specially Protected Area (see Map 8). Conversely the Mt Luxmore caves have been open to anyone wanting to explore them. Some damage has occurred. Although the scientific or aesthetic values of these caves are not of such significance to justify prohibiting access, some management controls appear to be necessary to avoid further damage to them and because of their cultural importance to Ngāi Tahu.

The Waitutu marine terraces are a special feature within Fiordland National Park. They comprise 13 terraces, with the oldest being over 900,000 years old. This sequence of terraces is arguably the best example of its kind in New Zealand.

4.2.2 Vegetation

Significant Features

The southern beeches and podocarps are very old elements of New Zealand flora. They have flourished and continue to dominate the forests of Fiordland. Silver beech and mountain beech are the most widespread species. Red beech is the largest in size but the least hardy of the beeches, being essentially a lowland species seldom found above 400 metres within Fiordland National Park. Near lakes and fiords, rimu stands out from the darker canopy of beech because of its weeping, tawny-green branchlets, and on alluvial flats fine specimens of rimu, miro, and totara are often prominent. These tall trees are often hosts for a variety of perching plants (epiphytes). Perhaps the most important tracts of podocarp forest are located at Martins Bay, in Back Valley near Lake Manapōuri and on the southern coast.

Three other tree species - southern rātā, kāmahī and broadleaf - are significant in Fiordland forests because of their adaptability to extreme climate and soil conditions. Wineberry, tutu, mountain ribbonwood and fuchsia quickly grow in open or exposed areas of forest (and along road margins). These species are usually the first to recolonise slip scars, along with various ferns. Valley sides can present several stages of plant succession.

Ferns are common on the forest floor. A rich variety of ferns including Blechnum ferns, shield ferns, spleenworts and filmy-ferns, along with the larger tree-ferns are all found.

Important in the subalpine zone are species of *Dracophyllum*, *Hebe*, *Olearia* and *Coprosma* species. Also found are three podocarps: snow tōtara, pink pine and mountain toatoa; most other subalpine plants are woody members of the daisy family and tussock grasses. Tussock grasses of the genus *Chionochloa* dominate the alpine zone. Common herbs include alpine daisies (*Celmisia*), native carrots, buttercups, speargrasses and many other species.

Coastal vegetation is influenced by a milder climate than most inland areas of Fiordland. Coastal forest contains a number of species not found elsewhere in Fiordland. These include: puka, pigeonwood, and two species of climbing rātā. Scrub and herbs fringe the windswept shores of open coastline.

Plant life also inhabits Fiordland's many lakes and their shorelines, although little is known overall, of the aquatic vegetation within Fiordland National Park.

Although the predominant flora can generally be found elsewhere in New Zealand, Fiordland's vast area supports a number of rare and regionally endemic species. For example, the tussock *Chionochloa spiralis* and shrub *Hebe arganthera* are endemic to Fiordland and both are rare species susceptible to deer browse. Other specialised flora can be found in association with limestone areas such as the Kepler Mountains and eastern Murchison Mountains. Floristic gradients across Fiordland are important features of Fiordland National Park vegetation.

The lakeshores of some Fiordland lakes form a special community containing up to 16 rare species of plants. These contain some local endemic species such as the buttercup *Ranunculus recens* var. *lacustris*, the cress *Iti lacustris*, and the dwarf daisy *Brachycome linearis*.

The lowland forests of Waitutu contain one of the largest tracts of unmilled lowland forest in New Zealand. One of the most significant features is the unmilled tracts of rimu-dominated forests which are of national importance.

Fiordland is thought to represent a national stronghold for the three species of beech mistletoe, the shore spurge (*Euphorbia glauca*), sand tussock (*Austrofestuca littoralis*) and tufted hair grass (*Deschampsia caespitosa*). Some of the most threatened species recorded from Fiordland include Cook's scurvy grass (*Lepidium oleraceum*) recorded from Solander Island, and the prostrate broom *Carmichaelia juncea*, which is thought to have become locally extinct.

4.2.3 Indigenous Fauna

Wildlife managers use a variety of terms to indicate the conservation status of a particular species in an area in relation to other species. The term threatened is usually used as a broad term to refer to any species in the endangered, vulnerable or rare categories. These terms are used below to illustrate the condition of the indigenous fauna biodiversity in Fiordland National Park (further definition of the terms can be found in the glossary).

Mammals

There are strong populations of New Zealand fur seals along the Fiordland coast and on Solander Island. They are now a reasonably secure species, despite having been decimated by sealers in the early 1800s.

There are three small, largely discrete, sub-populations of bottlenose dolphin that frequent the coast and fiords throughout the year. The northern-most group (comprising about 47 individuals) has a large habitat area and has been positively identified as far north as Jacksons Bay on the West Coast (they are known to enter Lake McKerrow / Whakatipu Waitai via the lower Hollyford River / Whakatipu Kā Tuka), and as far south as Charles Sound. The mid-group (about 45 individuals) is largely resident year-round in Doubtful Sound / Patea with only occasional sightings reported from offshore. The third group is located at Dusky/Breaksea (estimated at 60-70 individuals) and it is not confirmed whether this group is resident or moves further afield.

There is little detailed knowledge about the distribution and abundance of bats in Fiordland National Park. However, long-tailed bats have been recorded in various parts of Fiordland and short-tailed bats, previously unknown in Fiordland National Park, have recently been discovered in the Eglinton Valley, although no other populations are known.

Birds

Several species of oceanic birds inhabit the Solander Island group. Two of these, the sooty shearwater and mottled petrel also breed on the small islands of southern Fiordland. The mottled petrel colony at Lake Hauroko is the only known inland breeding site of this species in New Zealand. The status of these species is considered relatively secure. The Fiordland crested penguin is also found along the coast and on the Solander Islands. Nest sites are located in dense coastal scrub. Recent surveys have shown that the nesting success of mainland sites is about 50% while the success of sites on Breaksea Island is 88%. This research shows the value of offshore predator-free island refuges to indigenous wildlife. While penguin numbers appear to be stable it is unknown whether the 50% seasonal success will be high enough to sustain the mainland population long-term.

Gulls and ducks are found on waterways throughout Fiordland National Park. The nesting of black-backed gulls in the Te Anau area is creating adverse impacts because of the waste items and exotic seeds that these birds bring from the adjacent farmland. This species of gull is common in the region, and removing specific colonies may be appropriate, in order to better protect the wider ecology of the islands in Lake Te Anau.

There are many forest bird species: different landscapes support different types of birds and in Fiordland the climatic conditions of various sectors and vegetation diversity tends to determine the spread or location of forest birds. For example, yellow-crowned parakeets, robins and mōhua (yellowheads) prefer the drier forests in the east. South Island brown kiwi and weka live from sea level to alpine grassland, including most of the high rainfall areas. Despite the vast size of Fiordland the landscape contains very little lowland forest. There is limited habitat for some forest bird species such as mōhua (which rely predominantly on the beech forests of alluvial terraces, though at times are found elsewhere), and kākā.

Several species of birds have disappeared from Fiordland during European times. The South Island kōkako is now believed to be extinct and the little spotted kiwi is unknown on mainland South Island. Where recently there was a residual population of the critically endangered brown teal it is now believed to be extinct in Fiordland. The few remaining teal in Fiordland National Park are hybrids, possibly mixed with introduced mallard or indigenous grey duck. Kākāpō and takahē, also critically endangered, have declined to such an extent they are among the world's rarest birds. Until recently there have been no known kākāpō surviving in Fiordland. In mid-2002 kākāpō were released onto Chalky Island/Te Kakahu and may possibly be released onto other islands along the Fiordland coast throughout the life of this plan. The southern crested grebe is another endangered species present in Fiordland. The South Island saddleback (tieke) was also extinct in Fiordland, however it has recently been liberated on a number of islands from which mammalian pests have been eradicated.

Viable populations of threatened species include whio (blue duck), mōhua, yellow-crowned parakeet, South Island brown kiwi, South Island kākā, the southern sub-species of New Zealand falcon and South Island robin. There is growing concern about the declining status of some of these species particularly whio and mōhua. The Fiordland populations of all these species are considered to be of national importance. Fiordland is also one of the most important remaining strongholds of indigenous grey duck in New Zealand.

The drastic decline of some indigenous birds is attributed principally to rats and stoats which are found throughout Fiordland National Park (except on several islands). Ground birds are especially at risk from predation.

The remaining takahē population in Fiordland is almost entirely confined to the Murchison Mountains and is intensively managed. It is the only remaining wild population in the natural range of the species. A serious factor in the population decline has been the severe modification of vegetation by deer. Deer and takahē have similar food preferences, and as deer spread and colonised Fiordland (following the first liberations in 1901), the takahē habitat deteriorated leading to the rapid disappearance of the birds in several areas. Predation by stoats has been observed and may be another serious threat to the small population. Other adverse factors for survival of the takahē are egg failure and severe winter seasons.

A comprehensive national recovery plan for takahē in Fiordland National Park has been developed. The plan has two major components for the Fiordland population: one is the preservation, protection and enhancement of the takahē population and its habitat in the Murchison Mts through deer and stoat control and vegetation and takahē monitoring; the other is to enhance the wild population through the release of captive-bred and captive-reared chicks. These chicks are reared at Burwood Bush outside Fiordland National Park, mainly from eggs collected from the wild population but also from eggs laid by captive breeding pairs at Burwood.

An additional aspect of the programme has been to release captive-reared birds on predator-free offshore islands in other regions of New Zealand, where they have now established free-living, breeding populations. These serve as a “back-up” to ensure the survival of the species, should some unpredicted problem cause extinction of the Fiordland population.

Most other indigenous species preservation projects being undertaken in Fiordland National Park are either population monitoring studies or predator control projects designed to protect particular species. Control of stoats is undertaken in the Eglinton Valley (mōhua, kākā), Clinton Valley (whio, kiwi) and Iris Burn (mōhua). Eradication of stoats has also been achieved on Chalky Island / Te Kakahu and Anchor Island and is under way on Secretary and Coal Islands. The monitoring of populations has included: short tailed bats, mōhua and kākā in the Eglinton Valley; whio and kiwi in the Clinton and Arthur Valleys and Fiordland crested penguin at several sites along the coast. Possum control work is likely to benefit several species in the areas where it occurs, as possums are known to feed opportunistically on bird's eggs, and will feed on the plants eaten by threatened species such as kākā and kererū.

Invertebrates, Reptiles and Amphibians

Fiordland has an extraordinary variety of insects. Some 300 of the estimated 3000 insect, spider and other invertebrate species in Fiordland National Park could be endemic to Fiordland National Park or small areas within it. Many new species probably await discovery.

Significant invertebrates recorded include: large weevils which are mostly alpine and attached to the herbs *Aciphylla* and *Anisotome*, large land snails found at Borland and in the south-west, a large fly (*Exul singularis*) which occurs in the alpine zones of northern Fiordland, six indigenous species of butterfly, including the alpine black butterfly; and over 700 species of moth, about 100 of which are day-flying.

Very little of Fiordland National Park has been surveyed thoroughly for insects; and little is known overall about their conservation status. Rats, mice and stoats prey on some insects, therefore any predator control is likely to benefit insects and ecosystems generally.

There are many hundreds of native species of wasps in the park. *Vespula* species of wasps are introduced. These wasps are social wasps and tend to form large colonies and can behave aggressively towards people. They are seasonal and restricted to some habitats. There are two species known in Fiordland National Park. These are *Vespula germanica* and *Vespula vulgaris*.

There are five known indigenous lizard species in Fiordland National Park (two skinks and three geckos). All frog species present in Fiordland have been introduced to New Zealand.

Park Waters and Fish

The pristine natural quality of inland waters in Fiordland is compromised only on the eastern fringe where agricultural nutrients and weed seeds can enter the lakes by way of tributary rivers and streams.

In 1976 the Mararoa River was diverted to flow into Lake Manapōuri at the Mararoa weir as part of the Manapōuri hydro-electric power scheme. It is now a source of infestation for introduced plants such as gorse, broom and willow. There is a requirement to release silt-laden flood waters through the Mararoa weir (down the Waiiau River) to prevent them entering Lake Manapōuri, regardless of the lake level.

Various indigenous fish species inhabit the waterways of Fiordland National Park. Few populations of the fishes of the coastal rivers are large, perhaps because fish populations may be regularly reduced by massive or frequent flooding of these rivers. Whitebait are harvested from the lower Hollyford River / Whakatipu Kā Tuka. Lakes Manapōuri and Te Anau together with their tributaries provide the largest freshwater indigenous fish reserve in New Zealand.

Fiordland has not yet been adequately surveyed for freshwater fish (including shellfish).

The Mararoa weir together with reduced water flows in the lower Waiiau River acts as a barrier to migratory indigenous fish passage (long finned eels, lampreys, koaro and torrent fish). The recent modification to the weir undertaken by Meridian Energy Limited to allow fish passage appears to have alleviated the problem for trout and salmon,

however the current is too strong for young indigenous eels. Also because of the reverse flow of the Waiau River those few eels that are able to negotiate the weir continue up the Mararoa River rather than into the Waiau River to lakes Manapōuri and Te Anau. The natural instinct of the migrating fish is to swim against the current. The Te Anau control gates are another migratory obstacle. The Te Waiau Mahika Kai Trust is managing some of these problems with a programme that traps and transfers migratory eels within the system.

Introduced salmonids (trout and salmon) are well established on the eastern side of Fiordland National Park, although only rainbow trout and brown trout are abundant. Trout have been slow to colonise the western waters though they occur in the lower reaches of a few rivers and in several lakes. Chinook salmon occur in Lakes Te Anau and Manapōuri and are established in the Pyke River, and small populations of Atlantic salmon are found in the large eastern lakes.

The effect of introduced fish species on the indigenous fauna of Fiordland National Park is not well researched or understood. However, the introduced fish are predatory and may impact on some indigenous fish populations, and possibly on indigenous aquatic invertebrates, especially the larger active insects such as mayflies and stoneflies. It is therefore important to protect the unmodified habitat which remains by ensuring that there are no releases of introduced fish into waters where they are not found at present. The Department will seek to ensure that there are no further introductions of exotic fish species to Fiordland. This work is to prevent the loss, or decline in indigenous species, maintain indigenous character and avoid adverse effects on habitats and ecosystems. At the same time the recreation opportunities these species provide can continue to be recognised and provided for in areas where they are already present.

4.2.4 Historic Sites, Heritage and the Impacts of Humans

Fiordland National Park has been the scene for a broad range of human activities, all of which have left some mark on the landscape or are represented in the many varied activities undertaken in Fiordland National Park today.

Human history in Fiordland

The Māori history of Fiordland reaches back to the account of creation explaining the physical formation and shaping of the whole South Island. Many significant landscape features and place names remain from this and other traditional accounts. For centuries Fiordland was a regular seasonal home for southern Māori. Pounamu and takiwai, seafood, seals, birds and other natural resources (collectively known as mahinga kai) were gathered in Fiordland. Māori travelled the coast, but also reached the fiords and hinterland of Fiordland by travelling across the lakes and following traditional pathways over mountain passes (also see section 1.2.1).

These pathways, mahinga kai sites, occupation sites, and stone quarrying sites all bear Māori place names and signs of past use. In addition there are a number of rock art sites as well as burial sites dating back hundreds of years. Many of these places are recorded as archaeological sites of considerable significance. Others located in coastal areas have been recorded in a joint inventory with Ngāi Tahu called He Para A Tangaroa.

More recent history covers a spectrum of activities including early European exploration, sealing, whaling, prospecting, mining, timber milling, shipping, failed settlement, hunting, fishing, tourism, tramping and species protection.

Some of the more significant sites include: Astronomer Point in Dusky Sound, where James Cook's astronomer determined the latitude and longitude of New Zealand, Luncheon Cove in Dusky Sound, which was the site of the first European house in New Zealand, Richard Henry's house site, also in Dusky Sound, where some of the earliest conservation work in the country was undertaken and the Puysegur lighthouse at the entrance to Preservation Inlet (also see section 1.2.2).

Threats to historic sites include the natural processes of decay, corrosion, and weathering and also human impacts in the form of souvenir hunting, vandalism, graffiti, trampling or accidental disturbance. Active management of many sites is undertaken to arrest the natural processes of deterioration. The New Zealand Historic Places Trust has the role of granting archaeological authorities, and must be consulted as an interested party in the management of sites registered with the Trust.

Impact of Introduced Animals and Plants

Human activity has had a variety of effects on the natural values of Fiordland National Park. Many of the species protection programmes undertaken today are a result of the introduction of animals and plants by humans.

The New Zealand flora is palatable to browsing animals and vulnerable because it evolved in the absence of mammalian herbivores, although the presence of some browse-resistant plants suggests that browsing birds had a role in floral evolution. Much of Fiordland's vegetation has now been greatly modified by introduced mammals, especially deer, which multiplied quickly after the first liberations in 1901. Hardest hit by deer browsing have been the forest understorey plants and the large herbs of tussock grasslands. The impact of possums is dramatically increasing as their density and range increases. Pigs and goats have had a lesser but still significant impact.

A few areas, such as small islands in lakes or fiords and several small tracts near Milford Sound / Piopiotahi, have remained deer-free because of physical barriers and they retain the only unmodified vegetation in Fiordland.

Intensive helicopter hunting has previously had an impact on deer numbers in Fiordland. This method of control started in the late 1960s and continued until 2001. While herbs of higher open areas had reappeared during these control operations, forest interiors were slower to regenerate. Rising deer numbers are a serious threat to Fiordland National Park. Control efforts must be maintained because any prolonged reduction in hunting pressure will allow a resurgence of deer populations. Along with commercial aerial hunting, recreational hunting and Department control operations, capture pens provide a useful means of control, particularly for animals that dwell in the forest rather than in open areas. It is noted that since this early decade, there has been virtually no helicopter hunting in Fiordland National Park.

With limited knowledge of the vegetation health, a precautionary approach should be applied where introduced animals exist, to prevent them spreading or to reduce their spread into areas where they are not found at present.

Possoms were liberated in many locations throughout Fiordland around 1900. The impact of this species increases with the length of time since its liberation, its extending range as it continues to colonise new areas of Fiordland National Park, and its rising density in many areas. Species particularly susceptible to possum browse include mistletoe and southern rata. The Department of Conservation's control effort has followed two separate strategies. Firstly, effort has been concentrated on the worst affected areas where possum numbers are high, such as the Pembroke Wilderness Area in the north of Fiordland National Park. It is planned to extend this work into the Big Bay and Hollyford regions. The second approach has been to target some areas where possum density is low, such as the Waitutu, in an effort to slow colonisation and population build-up before significant damage can occur. Southland Regional Council, on behalf of the Area Health Board, has also undertaken significant control on the south-east edge of Fiordland National Park in the Monowai and Lill Burn areas.

Besides the direct threat to indigenous vegetation, possums infected with tuberculosis are a potential problem which could jeopardise wild animal recovery operations if the disease becomes widespread in the deer population. Similarly, the spread of diseased possums is a major concern to agricultural interests in Southland.

Chamois are present in small isolated pockets throughout most of Fiordland National Park. The Department of Conservation monitors these populations and passes information on to commercial operators, hunting guides and recreational hunting groups to enable them to target chamois.

Canada geese have become established in Fiordland National Park at locations with suitable habitat, with a relatively large population resident in the Eglinton Valley where they graze the river flats. They have adverse effects along the rivers and lakeshores by grazing native

vegetation, spreading the seeds of plant pests. The large amount of faeces they produce, they can have significant negative impacts on water quality and clarity. Fish and Game New Zealand (Southland Region) manages the Canada goose population according to the provisions of the South Island Canada Goose Management Plan that provides for control when the number of geese exceeds the target range. Canada geese also graze some alpine areas including within the Takahē Specially Protected Area. When the population exceeds predetermined population bands or when there are unacceptable impacts on national park values, control operations may be necessary in Fiordland National Park in the future.

There is no longer any stock grazing in Fiordland National Park with the final phasing out of sheep grazing in the Eglinton Valley in 1998.

Monitoring of vegetation and introduced mammal populations has been carried out in some areas of Fiordland National Park, often in association with control operations. While some of this information can be extrapolated to give an indication of the impacts on the remainder of Fiordland, the sheer size and remoteness of Fiordland National Park means we have little detailed knowledge about the vegetation health in most of it.

As New Zealand flora is susceptible to browsing mammals, its fauna is just as susceptible to introduced animals. Many habitats have been modified by the animals mentioned above. Mustelids, rodents and cats have also significantly affected fauna in Fiordland through predation. The recent near extinction of mohua (yellowhead) from the Eglinton Valley is evidence of this. Many of these animals were introduced into New Zealand in the early 1900s. Significant efforts are now being made to control such pests in specified areas of Fiordland National Park.

Numerous exotic plant species have spread, or have been introduced, into Fiordland as a result of human habitation. In the main, weeds are confined to fringe areas (including the coastline) and public use areas, though some have penetrated more deeply into Fiordland National Park. Various human activities can act as major transport vectors for weeds. An example of this is where weeds have invaded clearings near huts and tracks deep within Fiordland National Park. Some of the key weed threats in Fiordland as identified in the Southland Regional Pest Management Strategy (2002) include barberry, boxthorn, cotoneaster, German ivy, lagarosiphon, nodding thistle, old man's beard, ragwort and spartina. Californian and Scotch thistles are also considered a problem. They are not a major threat to natural ecosystems if adequate controls on their dispersal can be maintained. Wild, open riverbeds like the Eglinton are susceptible to infestation, for example lupin. Marram grass and gorse is being controlled along the entire Fiordland coast. The lakes are susceptible to the establishment and spread of aquatic weeds, particularly Lagarosiphon major.

Visitor access

A key component in the management of national parks is to encourage and provide for public access. It is important that Fiordland National Park values are available to be enjoyed by the public. The natural values of Fiordland National Park have a lot to offer in terms of recreation and tourism.

There are extensive track and hut networks within Fiordland National Park, with a variety of visitor services offered in various places such as Milford Sound / Piopiotahi, West Arm and Deep Cove. Most of these facilities provide an opportunity for people to enjoy the natural values of Fiordland National Park.

Many visitors are excellent ambassadors for conservation in Fiordland. Some commercial tourism operators and fishermen are actively involved in species protection programmes, both through sponsorship and through active involvement in species management.

Visitor access has also resulted in threats to natural values. Adverse effects from activities such as physical damage from trampling in alpine environments, weed dispersal, effects on water quality from inappropriate waste disposal, and effects on marine mammals from disturbance require careful management.

Man-made structures

Fiordland is essentially free of man-made structures. Most structures are either associated with recreation or biodiversity programmes, or are facilities like telecommunications sites. Generally, these activities have a limited effect on national park values. The Manapōuri Power Station is one facility which has significantly altered a freshwater ecosystem in Fiordland National Park and freshwater and marine environments adjoining Fiordland National Park. There are limited roading networks in the Fiordland National Park, though these can often act as vectors for plant and animal pests.

4.3 PRESERVATION OF INDIGENOUS SPECIES AND HABITATS

Rationale

The definition of animal in the National Parks Act 1980 includes any mammal, bird, reptile, amphibian, fish (including shellfish) or related organism, insect and crustacean. This section applies to all indigenous animals but does not include sports fish. Section 4.2 has indicated the extent of threatened (including endangered) animal and plant species present in Fiordland (see glossary for definitions of threatened and endangered). In most cases the Fiordland populations of threatened species are part of wider populations, as the species are found elsewhere in New Zealand. Conservation efforts are therefore usually planned and prioritised on a national basis via threatened species recovery plans. Conservation efforts vary depending on the different circumstances or requirements of the species. In some cases direct manipulation of the species is required to assist survival. In other cases restoration or manipulation of habitats may be a key factor.

Conservation efforts for endangered wildlife often require the provision and maintenance of safe habitats. Islands are currently the best manageable sites where removal of (or lack of) predators is also beneficial for flora and fauna and the ecosystem generally. Takahē preservation is focussed on the Murchison Mountains (Takahē Specially Protected Area). Selected habitats can also be enhanced if eradication or intensive control of introduced plants and animals is achievable.

Due to the vast size of Fiordland National Park it is not possible to directly manage all the indigenous species and habitats of Fiordland National Park. There are, however, some places and some species where particular attention is focussed. These biodiversity hotspots include a number of offshore islands (such as Te Kakahu (Chalky Island), Solander, Breaksea, Coal, Secretary and Resolution Islands); the Eglinton Valley; the Clinton and Arthur Valleys; and the Murchison Mts. The detail of how these places are managed is found in sections 4.3, 4.5, 4.6, 4.7 and 4.8.

Objectives

1. To maintain natural biodiversity by preventing, where possible, the further loss of indigenous species from areas where they are currently known to exist within Fiordland National Park and adjacent lands and waters.
2. To retain indigenous biodiversity in such condition in Fiordland National Park that all ecosystems are self-sustaining with minimal management input.
3. To restore ecological processes and biotic communities which maintain the indigenous biological diversity and ecological integrity of Fiordland.

4. To acknowledge the cultural, spiritual, historic and traditional association of Ngāi Tahu with taonga species and when managing indigenous plants and animals, have particular regard to the Department of Conservation's protocols with Ngāi Tahu for freshwater fisheries, cultural species and culling of species and to the areas where Deeds of Recognition apply (see section 2.2 and appendices).
5. To set priorities for threatened species management, having regard for national priorities, the requirements of species recovery plans and locally identified threats and priorities, and to keep these under review.
6. To facilitate appropriate management programmes for threatened or endangered indigenous species within Fiordland National Park.
7. To maintain and enhance threatened species populations and their habitats which are endemic to Fiordland National Park.
8. To ensure that the takahē population and habitat in the Murchison Mountains are preserved and protected and the population remains viable, with minimal management input.
9. To restore the diversity of indigenous species in island ecosystems to a range similar to that which existed before human disturbance occurred, and to ensure that species are self-sustaining with minimal management input.

Implementation

1. Advocate, through planning processes (such as plan and consent processes under the Resource Management Act 1991; plans prepared under the Local Government Act; the Biosecurity Act and other similar opportunities) the need for sound ecological management and preservation of national park values. Refer to sections 4.5, 4.6, 4.7, 4.8, 4.9, 4.12, 5.3, 5.5, 5.6, 5.7 and Part Six.
2. Undertake and participate in public awareness initiatives to promote the need for sound ecological management and the preservation of indigenous Fiordland National Park species and habitats and adjacent lands and waters.
3. Intensively manage various threatened species where the priority for that species has been assessed on distinctiveness, threatened status, threats faced, vulnerability, the ability to recover, the ability of management techniques to be successful, gains to

biodiversity and the nature of direction, given the appropriate species recovery plan.

4. May undertake management programmes for threatened species present within Fiordland National Park, provided the proposed methods have been subject to rigorous assessment to ensure their effectiveness and minimal impact on other park values.
5. Manage a range of threatened species and non-threatened indigenous species through non-intensive management techniques. Such techniques include legal protection of species, compliance and law enforcement, opportunistic survey of species distribution and habitats, fire control, habitat fencing, control of human visitor activity, and general habitat protection measures such as a general weed control and animal pest control programme.
6. Monitor the changing status of threats faced by non-intensively managed indigenous species, so that the need for any intensive management can be assessed.
7. Develop local species plans and/or detailed operational plans for species and habitat protection for the management of groups of indigenous species that are not covered by species recovery plans (e.g. the Southland Threatened Plant Recovery Plan). Such plans may be developed for taxonomic and/or ecological groups.
8. Action to promote indigenous species recovery should not be constrained by the absence of a recovery plan.
9. Give priority to operations for threatened species at locations where the greatest number of threatened species may benefit. Priority should also be given to operations that deal with a number of threats at one site.
10. Collection of distribution and population data for indigenous species where there is currently insufficient information will be an ongoing priority. This information will be used to determine more clearly their status and management requirements. The following applies:
 - a) For many of the species (threatened and non-threatened) this information is not available, so a major priority for Fiordland will be the collection of information through survey, monitoring, research, and use of databases; and
 - b) Encourage opportunistic surveys where a wide range of ecological information is collected through any field-work; and

- c) Actively encourage the participation of the public, other conservation agencies, universities and students to obtain information. Refer to section 4.10.
11. Undertake all management activity (including animal control, weed control, facilities development and maintenance, visitor management) in a manner compatible with, and wherever practical, integrated with ecosystem and species preservation.
 12. Consult with papatipu rūnanga and Te Rūnanga o Ngāi Tahu over projects and policies concerning taonga species as well as programmes to identify and protect wildlife and indigenous plants within areas where there is a Tōpuni or Deed of Recognition (see section 2.2 and appendices).
 13. Encourage the general public, public agencies and conservation interest groups to become involved in indigenous species and ecosystem preservation management activities. Information on species and ecosystem preservation will be made available where appropriate.
 14. The collection of native flora and fauna, soil and rock specimens is a privilege which will only be allowed by obtaining a permit and will be subject to stringent conditions. For the collection of flora and fauna, soil and rock specimens for customary use, please also see Section 6.10 – Ngāi Tahu Customary Use.
 15. The transfer of indigenous species not naturally occurring in Fiordland (either now or previously) is unlikely to be authorised, unless no other appropriate option exists. If no other appropriate option exists, an assessment of the risks of disease or other adverse impacts will be undertaken. This assessment will include consultation with papatipu rūnanga.
 16. Remove any indigenous plant or animal population (in whole or part) where this is necessary for species or subspecies survival and remove to locations where there is no threat to the survival of other species.
 17. Encourage the off-site propagation or breeding of endangered species if ecological restoration is feasible and other conditions are favourable. Such propagation or breeding programmes are to occur only in accordance with a restoration plan or species recovery plan.
 18. Allow the use of dogs where necessary for the management of indigenous species subject to national training and certification standards.

19. Maintain the Takahē Specially Protected Area (Murchison Mountains). Continued restrictions on access to this area are seen as one means of assisting the Takahē Recovery Programme. Refer to section 4.5 and section 5.3.4.
20. Undertake deer and stoat control in the Takahē Special Area (Murchison Mts) in accordance with the Takahē Recovery Programme.
21. Expand the Takahē Recovery Programme into other parts of Fiordland in the future if appropriate.
22. Investigate options for species re-introduction, including expanding current re-introductions of species such as kākāpō into Fiordland and implement where appropriate.

4.4 BIOSECURITY

Rationale

With Fiordland National Park becoming increasingly popular, the risk of visitors to the park bringing unwanted organisms into the area may increase. These organisms may be exotic diseases, fungi, invertebrates, algae, pest plants and pest animals. Some of these organisms may have a considerable impact on the indigenous biodiversity values of Fiordland National Park. With this, the Department of Conservation recognises that there is a need to monitor biosecurity risks and to take immediate action to eradicate any pest introduction which threatens the intrinsic values of Fiordland National Park. Fiordland National Park is a national priority area for this type of biosecurity monitoring. This especially relates to the large number of island habitats with high conservation values being managed for biodiversity purposes (see Section 4.8 Island Management).

It is also acknowledged that a risk of deliberate introductions of unwanted organisms, including wild animals such as tahr exists. It is an offence under Section 60 of the National Parks Act 1980 to take any animal or liberate any animal in Fiordland National Park, or plant any plant, sow or scatter the seed of any plant or introduce any substance known to be injurious to plant or animal life in Fiordland National Park. It is known that pest fish species have been released into other conservation land previously and the Department of Conservation will manage this threat to Fiordland National Park through education and monitoring programmes.

Biosecurity threats can also arise from the inadvertent introduction of pests, such as *Didymosphenia geminata* (Didymo), on fishing gear, waders and other recreational equipment. Air access, boat access and tramping and climbing within Fiordland National Park may allow for biosecurity threats to be transported around Fiordland National Park in a rapid manner. If any such threat becomes significant, the Department of Conservation will consider closing areas of Fiordland National Park to activities using equipment brought into, or transported within Fiordland National Park, or taking any other action as is deemed appropriate to manage or reduce biosecurity risks to Fiordland National Park. Such action will be undertaken in conjunction with recreational and commercial groups and organisations.

Objectives

1. To preserve the intrinsic natural values of Fiordland National Park.
2. To increase the awareness of biosecurity risks to Fiordland National Park.

Implementation

1. Monitor Fiordland National Park for biosecurity risks and take immediate action, where practical, to remove any new exotic organisms discovered.
2. Where any species are illegally introduced into Fiordland National Park, take steps where practical to eradicate them as soon as possible.
3. Develop and implement biosecurity education and monitoring programmes in cooperation with other management agencies and organisations.
4. The Department of Conservation will work alongside national and regional agencies responsible for biosecurity in order to identify biosecurity risks to Fiordland National Park and develop programmes to avoid such unwanted organisms becoming established within Fiordland National Park.

4.5 INTRODUCED ANIMALS

Rationale

The Department of Conservation's responsibilities for introduced animal control are derived from provisions in the Conservation Act 1987 and the National Parks Act 1980 and the Wild Animal Control Act 1977, which enables the Department of Conservation to control wild animals. The Wildlife Act 1953 also provides for the control of animal pests and allows for control to be applied to some protected or partially protected species where they are causing damage to land. As a land manager the Department of Conservation has obligations under the Biosecurity Act 1993 for the control of introduced animals. The Southland Regional Pest Management Strategy outlines some of the Department of Conservation's responsibilities under that Act.

The definition of animal in the National Parks Act 1980 includes any mammal, bird, reptile, amphibian, fish (including shellfish) or related organism, insect and crustacean. This section applies to all introduced animals except sports fish (for sports fish species see section 4.6).

Control of, deer, chamois, goats, pigs and possums is undertaken in terms of the Wild Animal Control Act 1977. That Act provides for wild animal control plans to be prepared. This management plan provides the policy direction for wild animal control in Fiordland National Park.

Current deer control in Fiordland National Park occurs in the Murchison Mountains (associated with the takahē recovery programme) and on various islands off the Fiordland coast (including Anchor and Secretary Islands).

The downturn in the feral venison industry during the 1990s has resulted in increasing deer numbers across Fiordland National Park, which has the potential of annually compounding if left unchecked. The scale of deer control undertaken by the Department of Conservation is dependent on the level of resourcing. Should resourcing for animal control remain the same and the industry stay static, then a priority-setting exercise will need to identify which areas are included in any future control programme.

Due to the widespread nature of possums in Fiordland National Park, prioritising key areas for action is necessary. Action is taken at sites to protect ecosystems of the highest priority.

The eradication of chamois is not considered feasible within the Fiordland National Park at this time. The numbers are low, with chamois reported over central and southern parts of Fiordland National Park. A monitoring and control programme is in place for several of the scattered populations that do exist. Control to keep chamois at the lowest practicable levels within their current range is desirable.

Other animals such as pigs and goats are found in various parts of Fiordland National Park. Goats are limited in range and all efforts will be made to eradicate this species.

Control of other introduced animals such as stoats and rats is undertaken in accordance with the National Parks Act 1980 which states, “the introduced plants and animals shall as far as possible be exterminated”. Stoat control over the entire Fiordland National Park is not practicable with known control methods. Trapping or other suitable methods of control will be undertaken when necessary in conjunction with species or habitat preservation activity. Research is focussing on increasing stoat control effectiveness while reducing per hectare effort. This will enable the control of stoats on large islands and mainland areas. A similar approach will be taken for other mustelids, wild cats, rats and mice.

Under the Wildlife Act 1953 and the Conservation Act 1987, Fish and Game New Zealand (Southland) also has a role in the management of game birds in Fiordland National Park. Canada geese are the only introduced game species present within Fiordland that have the potential to impact on national park values if numbers reach an unacceptable level. This threshold has been determined and control is provided for in a management plan for the species, prepared by Fish and Game New Zealand regional councils. Other gamebirds: mallard duck, grey duck, paradise shelduck and pūkeko exist in Fiordland National Park. Indigenous gamebirds may not be hunted in Fiordland National Park.

The General Policy for National Parks 2005 further defines the direction for the management of introduced animals. It reaffirms that eradication, where practicable, containment and reducing the range of established introduced animals should be a priority. Control of species considered widespread is to maintain the general welfare of national park indigenous species, habitats and ecosystems, or to maintain scenic and landform values as a priority where necessary. The eradication of new incursions and prevention of those animals not present is also a priority.

In some areas of Fiordland National Park, animal population sizes and levels of vegetation change have been monitored over time. However, not enough monitoring has been done at enough areas to determine trends across Fiordland National Park as a whole. Financial constraints and the sheer size, rugged terrain and remote nature of Fiordland make it impractical to monitor anything but a small selection of key sites, usually where indigenous species or animal control projects are being undertaken. Some monitoring has recently been carried out in the Pembroke, Eglinton and Waitutu areas in conjunction with possum control. Other monitoring has been carried out in the Murchison Mountains in conjunction with deer control operations associated with the takahē programme. Recent vegetation monitoring in the Murchison Mts has shown improvements in the tussock and forest condition as a

result of reduced deer numbers. Monitoring in the Pembroke area has been focussed on the success of recent possum control operations where an improvement in the condition of some tree species (tōtara, māhoe) was recorded.

Objectives

1. To preserve those areas of high natural biodiversity values in Fiordland National Park most at risk from introduced animals.
2. To reduce and control introduced animal numbers by all available means to a level that allows for the regeneration of browsed indigenous flora and the recovery of predated fauna. Initial emphasis will be placed on identified priority areas and species.
3. To monitor vegetation condition in key areas of Fiordland as well as monitoring the result of introduced animal management programmes.
4. To prevent the colonisation by introduced species of new areas within Fiordland National Park and to prevent the establishment of introduced animal species not already present within Fiordland National Park.
5. To support habitat management programmes with specific introduced animal control measures.
6. To identify those areas where eradication of pests is possible, practical and sustainable without re-invasion (or where re-invasion is manageable) and to undertake appropriate operations to eradicate pests.
7. To encourage integration and co-ordination between user groups, authorities, and agencies and to consider joint working programmes with those that have an interest in the management of introduced animals and / or their impacts, and to develop an awareness of the threats that introduced animals can pose to Fiordland National Park.

Implementation

1. Establish and regularly review introduced animal control priorities. Areas of Fiordland National Park will be ranked using nationally developed ranking systems. High ranking areas are likely to be those with unique ecosystems, threatened species, areas of high damage (or high susceptibility to damage), and areas not yet colonised by pest animals.
2. Seek funding for introduced animal control in areas of highest ranking. All animal control operations will be

carried out in accordance with national and conservancy priorities, plans and guidelines.

3. Review vegetation and introduced animal and monitoring programmes to ensure that trends in animal densities and impacts and the effects of control operations are known as far as possible. Adopt the most cost-effective, efficient and sustainable methods of monitoring to obtain representative data for the areas monitored.
4. Encourage community group initiatives for and participation in agreed animal control programmes. Support for any programmes will be dependent on a full assessment and will address the following matters (including, but not limited to):
 - a) Demonstrating the programme will assist in achieving the biodiversity and biosecurity objectives of this plan;
 - b) Demonstrating the programme will assist in conserving and/or restoring the ecosystems of indigenous species within Fiordland National Park;
 - c) Demonstrating the programme does not adversely affect the achievement of implementations 1 and 2 of this section; and
 - d) Demonstrating that the programme will be regularly reviewed to ensure the objectives of the programme are being achieved.
 - e) If over time it is considered that the programme is not meeting the objectives of this management plan then the programme will be reassessed and if appropriate, it will cease.
5. Liaise with, co-ordinate and inform local authorities, adjacent landowners, commercial and recreational hunters and the general public to achieve effective action against introduced animal problems wherever possible, and raise awareness of the effects that they have.
6. Aim for the eradication of goats within Fiordland National Park. Aim for zero densities in goat populations on lands administered by the Department of Conservation that are adjacent to Fiordland National Park, where invasion of Fiordland National Park may be a risk.
7. Priorities for possum control in Fiordland National Park are as follows:
 - a) Continue the current emphasis on possum control in the Pembroke/Kaipō/Martins Bay area, Eglinton Valley, Clinton/Arthur Valley, and Cleddau Valley areas, and

- sites in Waitutu Forest so as to protect the high natural values within those places;
- b) Within other areas of Fiordland National Park in the following circumstances:
 - i) To prevent significant damage to indigenous vegetation;
 - ii) To prevent the spread of possums;
 - iii) To protect the habitat of threatened species; and
 - iv) To avoid the spread of diseased bovine tuberculosis animals into Fiordland National Park.
 - c) Possum control should be undertaken in order of the priorities listed once a review (see Implementation 1) has taken place;
 - d) Operational plans should be prepared for each operation as needs arise;
 - e) Encouraging the control of possums on lands adjacent to Fiordland National Park; and
 - f) Maintaining liaison with and co-ordinating efforts with other animal pest control agencies.
8. Encourage commercial possum skin/fur recovery where this is consistent with the biodiversity and biosecurity objectives of this plan.
9. The general approach to deer control in Fiordland National Park is to encourage commercial recovery operations (Wild Animal Recovery Operations (WARO)). WARO operators are authorised through a concession. Where such operations are proposed in areas where joint community control programmes occur, the Department of Conservation will consult with interested parties and use the most appropriate tools for achieving the objectives of the plan. This may result in any WARO applications being declined and / or concessions being restricted or terminated.
10. Priorities for specific deer control measures include:
- a) Maintaining current deer free areas. The places of importance for this include:
 - i) Valleys around Milford Sound / Piopiotahi; and
 - ii) Deer-free islands (refer also to section 4.8);
 - b) Eradication from Secretary Island and other island where a pest free environment will enhance outcomes for indigenous ecosystems, habitats and species.

- c) Continued protection of habitat in the Murchison Mts: For the Murchison Mts the intent is to reduce the influence of browsing animals to the minimum possible level, so that takahē habitats can recover to a level which allows the takahē population to increase to an ecologically sustainable level. If the range for takahē is to expand then deer control in these places will be necessary. This could be outside the Murchison Mountains;
 - d) Avoiding colonisation by deer species presently not found in Fiordland National Park;
 - e) Identifying options for maximising integrated pest management of introduced animals; and
 - f) Protecting endemic species and/or ecosystems within Fiordland National Park. Such places will need to be either large or have defensible boundaries. An assessment is required to determine priority places.
11. Encourage recreational hunting by maintaining huts and tracks in appropriate areas, allowing aerial access to designated areas (consistent with the policy set out in section 5.5), and providing up-to-date information to hunters and hunting groups. To implement this, the Department of Conservation will work closely with hunting groups.
12. Authorise commercial aerial recovery of deer in defined areas, through the concessions process contained in Part IIB of the Conservation Act 1987 (see section 5.4 and 5.5).
13. Authorise the use of pens for the capture of animals if appropriate via the concessions process throughout Fiordland National Park, including Specially Protected Areas and Wilderness Areas. Restrictions or extra conditions may be applied for these areas, as well as areas with high public use.
14. Control, or where practicable, eradicate chamois from Fiordland National Park. Encourage commercial and recreational hunting of chamois.
15. Control and, where practicable, eradicate mustelids. Continue the current focus of stoat control and research in the Eglinton Valley, Murchison Mts, islands in Dusky Sound and Doubtful Sound / Patea and the Clinton/Arthur catchments. Priority places for future stoat control and research programmes include:
- a) Resolution Island;

- b) Other islands along the Fiordland coastline;
 - c) Further catchments around the Clinton/Arthur Rivers such as the Neale Burn; and the Worsley and Glaisnock catchments;
 - d) If necessary, the further expansion of control work in the Murchison Mountains; and
 - e) Grebe and Borland valleys.
16. Maintain rodent-free islands and control or, where practicable, eradicate rodents from Fiordland National Park. Currently there are no rodent control programmes in Fiordland National Park. Future places where control programmes may be considered include the Eglinton, Clinton, Arthur and Cleddau Valleys for the purpose of protecting bat and mohua populations.
17. Control the spread of pigs within Fiordland National Park and restrict pigs to their current range. If pigs are confirmed outside of their current range, eradication will be attempted. Control operations will be focussed in the following places:
- a) Southern coast of Fiordland National Park; and
 - b) The less steep areas in the south eastern part of Fiordland National Park.
18. Hunting of Canada geese in the Eglinton Valley may be undertaken by recreational hunters. Control may also be undertaken if these geese are having adverse impacts on national park values. Control may be required at sites in the Takahē Specially Protected Area in the Murchison Mountains from time to time. Other game bird hunting is unlikely to be authorised in Fiordland National Park unless expressly authorised for the purpose of the preservation of national park values.
19. Investigate the need to undertake cat control in areas where cats are having unacceptable effects on populations of threatened species.
20. Ensure that Himalayan thar (tahr) do not colonise Fiordland National Park and eradicate any animals that are seen.
21. Investigate the need to control lagomorphs (rabbit and hare) in areas where they are having unacceptable effects on sensitive environments or to control where there is an obligation to do so under the Southland Regional Pest Management Strategy.

22. Investigate the need to control hedgehogs in areas where they pose unacceptable effects on populations of threatened species.
23. Prevent the introduction of introduced animals into areas where they are not currently present, including pest species that are already present in Fiordland National Park. This shall not apply to legally authorised liberations of introduced animals, including those for control (e.g. Judas goats), weed biocontrol agents or for scientific purposes.
24. Where illegal or accidental introductions of new species occur, all possible steps will be taken to remove them.
25. Take action to prevent the illegal grazing of stock and other domestic animals in Fiordland National Park. Where Fiordland National Park adjoins freehold land, which is grazed, effective control of stock will be sought through discussions with landowners and appropriate fencing.
26. Keep up with and actively pursue new technology or information that leads to an increased capacity to control all introduced animals.
27. Should the technology become available, biological controls will be considered on a case-by-case basis. Biological control may provide an effective and efficient option for pest control management within Fiordland National Park. The release of bio-control agents in Fiordland National Park will be considered on a case-by-case basis in accordance with section 5A of the National Parks Act 1980 and should be authorised only to control species that cannot be effectively controlled in other ways. Technology that involves genetic modification may provide efficient and effective control options in the future. There is still much public debate over this issue and the management plan will give no guidance on this debate. Any application for such activities will be assessed on a case-by-case basis in accordance with national policy.
28. Undertake all management activity (including animal control, weed control, facilities development and maintenance, visitor management) in a manner compatible with, and wherever practicable integrated with, ecosystem management.
29. Use a range of statutory processes including mechanisms under the Biosecurity Act 1993, and the Resource Management Act 1991 to develop a regulatory framework to reduce the risk of pests spreading to areas where they are presently absent. This will enable a rapid response to invasions in or adjacent to Fiordland National Park.

30. Consult with papatipu rūnanga prior to undertaking animal control operations where the operations involve the use of toxins or if new bio-control agents are to be used (refer also to Part Two), and also with Te Rūnanga o Ngāi Tahu where the operation occurs within a Deed of Recognition area.