



Auckland
Regional Council
TE RAUHITANGA TAIAO



Waitakere City Council
Te Taiao o Waitakere

PROTECTION OF THE WAITAKERE RANGES AREA



BACKGROUND PAPER
DECEMBER 2003

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1. INTRODUCTION

1.1 PURPOSE OF THIS REPORT

The Waitakere Ranges area is highly valued by many people and generally acknowledged as being one of the Auckland Region's most important landscapes with high biodiversity values. Since the 1890's when part of the Ranges were first vested as a recreation and conservation reserve a number of mechanisms and initiatives have protected these values. These have included:

- A large part of the forested and coastal area has progressively been brought into the Waitakere Ranges Regional Park by the Auckland Regional Council, often through gifts, bequests or contributions from landowners in the Ranges, voluntary organizations or other government bodies.
- A lobby group, the Waitakere Ranges Protection Society, was formed specifically to protect the Ranges.
- Numerous landowners and community groups have contributed time and resources to improve the ecological health and protect the values associated with the Ranges.
- The West Coast Plan, a strategic plan for the future management of the West Coast and Waitakere Ranges, was facilitated by Waitakere City Council and developed by a community consensus process.
- Successive regional and local councils have put in place policy and rules for the survival of valued landscape and natural features.
- Funding has gone into combating animal pests, weeds and other ecological threats.
- Information, educational material and assistance with environmental projects have been provided.
- Programmes have been initiated to involve residents in caring for their environment, for example, native tree planting days for schools, and Project Twin Streams in the Oratia, Opanuku and Swanson catchments.

Recently concern has been expressed by some local people, local MPs and lobby groups that the Ranges area continues to be under pressure and further action is needed to ensure more secure protection for future generations. The West Coast Plan also identified the need for further investigation of ways to improve the co-ordination and protection of the Ranges area. In addition, New Zealand's Parliamentary Commissioner for the Environment has questioned whether the many short-term actions on private land (especially subdivision and new housing) over a period of decades will threaten this highly valued area.

In response Waitakere City Council, in partnership with the Auckland Regional Council (ARC), iwi and local Members of Parliament, has initiated a project to investigate whether there is a need for further action. This report documents much of the material available to date in undertaking this investigation.

The investigation focuses on the following:

- The values that people associate with the Ranges area and the roles of the various parties involved in the management of the area.
- Current management regimes and the strengths and weaknesses of these.
- Possible responses and actions to improve long-term protection of the Ranges.

1.2 THE STUDY AREA

For the purposes of this study, the Waitakere Ranges Area has been defined as shown on the map on the next page.

Land Use

The Waitakere City District Plan separates the study area into different zones called 'Human Environments'. These zones identify different character areas, to which are attached rules governing land use activity. The Waitakere Ranges Area 'Human Environments' are outlined below and also shown in the map.

The Open Space Environment

Publicly owned park comprising 17,079 hectares of Regional parkland administered by the Auckland Regional Council, 404 hectares of Waitakere City Council parkland and 972 hectares of Department of Conservation land (managed by the Auckland Regional Council).

The Waitakere Ranges Environment

Generally quite large properties (average size 3.5ha), substantially bush covered and with high or outstanding landscape values. A number of significant natural features in private ownership are covered by the Waitakere Ranges Environment, including Lake Kawaupaka and a great part of the Waitakere Wetland. There are approximately 950 Waitakere Ranges Environment properties covering 3,450 ha.

The Bush Living Environment

Generally smaller bush covered properties (on average about 2,000m²), with something of a residential character. There are approximately 5,360 Bush Living Environment properties covering 1,069ha.

The Coastal Villages Environment

Settlements along the West Coast and the Manukau Harbour at Bethells/Te Henga, Piha, Karekare, Huia, Cornwallis and Parau. These areas are located within the coastal landscapes of the Ranges, and are generally a mix of bush covered and cleared areas. There are approximately 1,391 properties covering 222ha.

The Foothills Environment

Generally quite large properties (average size is 2.5 ha) lying along the eastern foothills of the Ranges. characterised by a mix of pasture, orchard and bush remnants. There are approximately 1,540 properties covering 4,277 ha. The eastern foothills and their management as an integral part of the protection of the Ranges area are seen by many as crucial. The Foothills Environment forms a significant part of the Ranges as viewed from the urban area of Greater Auckland, and their role in protecting the bush area of the Ranges from many of the adverse impacts of residential style development has been recognised over many decades.

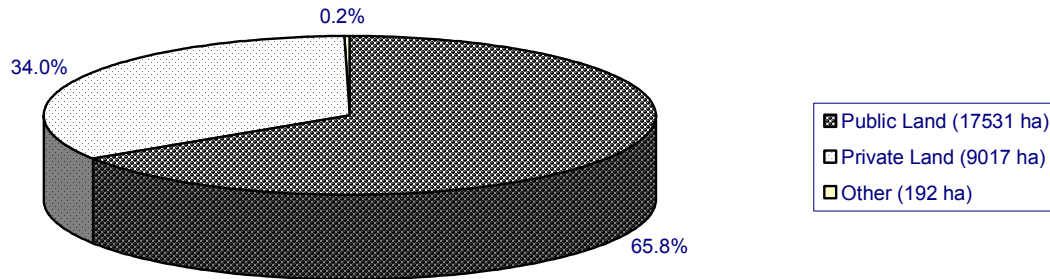
Rural Village Environment

Waitakere Township is the only rural village to be included in the Waitakere Ranges Management Area. It is located in the Dilworth sub-catchment of the upper Kumeu River water catchment, on the border between Waitakere City and Rodney District Council. The average site size is 4,000 square metres.

In addition, part of the Waitakere Wetland and its immediate catchment is within Rodney District. This area is within the 'Landscape Protection Rural' zone in the Proposed Rodney District Plan. This proposed zone limits the creation of additional sites and makes no provision for extensive urban settlement or permanent activities that would draw large numbers of people to a site or introduce significant urban elements to the zone. Subdivision is possible where permanent legal and physical protection of stands of native bush (at least 2 hectares continuous native bush), scrub or wetland is carried out.

Land Ownership

The following figure shows the proportion of land owned by the three main types of owners in the Waitakere Ranges area (public land, private land and 'other'). The 'other' category includes significant conservation holdings of which Royal Forest & Bird Society owns 120ha of the Waitakere Wetland (the Matuku Reserve in Rodney District), the University of Auckland owns 16ha in the Ranges, and the Auckland Acclimatisation Society owns 14ha. These properties are managed mostly for conservation and scientific purposes. Another approximately 42 ha is under Queen Elizabeth 11 Conservation Covenant.



2. VALUES OF THE RANGES AREA

The Ranges Area has been recognised as a valued resource and a key landmark by the people of Waitakere City and the wider Auckland Region for many decades. It provides a dramatic backdrop to the Auckland Region and is central to the identity of Waitakere City.

The Waitemata City Council (pre Local body amalgamation in 1989) first introduced planning rules to protect native vegetation on private land in the Ranges Area in the 1970s. Successive plans for the area (for example, Strategic and District Plans, structure plans for areas within the Foothills Environment and the West Coast Plan) have involved numerous consultative processes. These have found that the Waitakere Ranges are highly valued by iwi, residents and visitors to and from Waitakere City for the following:

- Landscape, beauty, aesthetic value
- Recreational opportunities
- Native forests and wildlife
- Inspirational, artistic and spiritual values
- Associations and sites of significance to Tangata Whenua
- European heritage sites
- Clean water
- Importance to the tourism, recreation and filming industries
- Attractiveness as a living environment

Some of these values are supported in a range of studies that provide some quantification or assessment of these values. The key information from these studies is summarised below.

2.1 LANDSCAPE

In the Auckland region the natural environment has been extensively modified with only 12% of the land cover remaining in native forest. The extensive indigenous vegetation of the Waitakere Ranges and associated foothills is one of only two large continuous tracts of indigenous vegetation remaining in the mainland Auckland region, conferring very high landscape values.

2.2 NATIVE FORESTS AND WILDLIFE

New Zealand's natural environment is unique. It has evolved in isolation over 55 million years and isolation coupled with the absence of any land mammals except native bats, has resulted in a high proportion of endemic species – that is species found nowhere else in the world. Around 80% of New Zealand's species are endemic and within that total, 100% of reptiles are endemic.

The indigenous biodiversity is therefore special to New Zealand as is the "balance" in which it exists and prospers. Isolation and lack of land mammals has meant New Zealand's flora and fauna have evolved to fill the ecological niches occupied by land mammals elsewhere in the world.

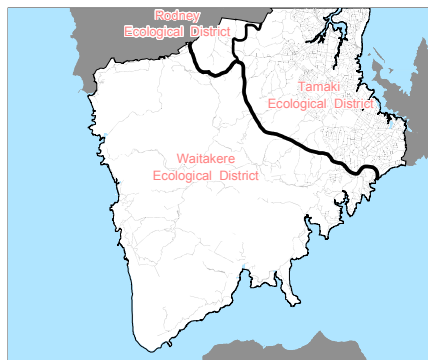
The very recent introduction of humans, exotic plants and mammals, especially predatory mammals, has posed, and continues to pose, the largest threat to the survival of New Zealand's indigenous biodiversity. The native species have very limited defences or none at all against these dominant new influences.

While New Zealand has suffered a high level of biodiversity loss through extinctions it is one of the few places that has retained living prehistoric plants and animals, such as the Kahikatea and Kauri Snail.

Extensive information on the biodiversity of public and private land within the Ranges area is contained within the Waitakere Protected Natural Area (PNA) report, the Tamaki Ecological District PNA report (north-western portion), the Auckland Regional Policy Statement, and the Regional Parks Management Plan.

The Waitakere PNA report involved a comprehensive survey of the significant natural resources of the Waitakere Ecological District, using a methodology designed to ensure that unique and representative areas in New Zealand are adequately protected. An ecological survey of the portion of the Tamaki Ecological District that lies within Waitakere City's boundaries was carried out in 1998, detailing significant indigenous vegetation and habitats of indigenous fauna. The boundary between the two ecological districts runs through the eastern foothills of the Ranges area, with the Tamaki district including some parts of Titirangi and the upper parts of Swanson and Oratia together with the lowlands of the city. A small part of the Rodney Ecological District lies in the northern part of the Waitakere Ranges area. A map showing the boundary between the Ecological Districts is shown below.

Ecological District Boundaries – Waitakere City



A more detailed explanation is attached at Appendix 1.

The surveys found that:

- Both ecological districts contain distinctive plant communities, landforms and fauna.
- The Tamaki Ecological District has lost a great proportion of its native vegetation, so that all indigenous vegetation is considered significant.
- The Waitakere Ecological District contains Sites of Special Wildlife Interest (SSWI) of outstanding significance. These are sites that provide important habitat for wildlife and were identified nationwide by the former New Zealand Wildlife Service.
- The Waitakere Ecological District is of particular significance due to the rich diversity of forest types and vegetation communities, intact sequences of vegetation from the coast up to the inland hills, wild nature of its coastal ecosystems, and associations of wetland and dune lake systems.



Anawhata provides an outstanding example of the intact sequences of vegetation types present in the Ranges.

- The Waitakere Ecological District contains more than a quarter of New Zealand's flowering plant species and two-thirds of all native fern species. Specifically the area is home to:
 - 542 species of native plant (111 species of these being native ferns)
 - 21 species of rare and endangered plants and 43 species of regionally threatened plants
 - 50 species of native bird (14 of these being rare or endangered)
 - 3 species of kauri snail (large land snails)
 - 11 species of native freshwater fish
 - 5 species of native reptile (2 skinks and 3 geckos)
 - 1 native frog species
 - 1 native mammal (long-tailed bat)
- A large part of the Waitakere Ecological district is protected within the Waitakere Ranges Regional Parkland, which originated in 1940 when a large proportion of the regional community decided to protect 8,500 hectares as part of the centennial celebration of the arrival of European settlers.

2.3 CLEAN WATER

The Waitakere Ranges receives more rain than anywhere else in the Auckland Region, some of which is captured in the five water supply dams located in the Auckland Regional Council parkland and operated by Watercare Services Ltd. All of the dams occur in entirely forested catchments and consequently have excellent water quality. Recent surveys of streams in the foothills and bush living areas of the Waitakere Ranges has found that most have 'good' water quality. The Cascades Stream is considered to be of such high quality that it is used as an unmodified reference site against which all monitored streams in the Auckland Region are compared.

2.4 CULTURAL HERITAGE

The Waitakere Ranges area has long been home to human activity and there are many aspects of cultural heritage significance remaining. Many areas along the Manukau and Tasman coasts contain middens and pa related to Maori occupation, and both Te Kawerau a Maki and Ngati Whatua have identified to Waitakere City Council the location of a range of key waahi tapu. A number of *Po* have been located throughout the Ranges at Cornwallis, Lion Rock, Karekare, the Cascade Kauri Park, Arataki and Whatipu to commemorate Te Kawerau a Maki association with the area. These have been established by a three-way partnership between Te Kawerau a Maki, the Auckland Regional Council and the Friends of Arataki.

Section 3 below sets out the iwis' cultural associations with the Waitakere Ranges in more detail.

European history in the Ranges area is marked by archaeological sites and features such as:

<ul style="list-style-type: none">▪ Plaque and monument at Puponga Peninsula commemorating early settlers in 1841▪ Destruction Gully navigation beacon▪ Orpheus graves at Cornwallis▪ Remnants of several stringer dams▪ Remnants of sawmills such as Mander and Bradley's mill on the Upper Nihotupu Stream, the Huia mill on the Huia Stream, Niagara Mill at Karamatura and Foote's Mill in the Pararaha Valley▪ Bush railway line at Piha▪ Timber tramway remains at Karekare/Whatipu beaches▪ Remnants of the kauri timber loading wharf at Whatipu▪ Tramway timber tunnel, Pararaha	<ul style="list-style-type: none">▪ Pitsaw pit on Piha Road▪ A plaque on Lion Rock commemorating employees of the state sawmill at Piha who died in World War 1▪ Water flume on Karekare Falls▪ Cemeteries such as those at Spraggs Bush and Swanson▪ The road ford at Little Huia▪ Various heritage buildings such as Lopdell House in Titirangi and the Huia and Whatipu Lodges▪ The Huia Nihotupu and Waitakere Filter Stations▪ A number of heritage dwellings including Rose Hellaby House, the original Atkinson house in Titirangi, and Endt cottage in Oratia▪ A number of early churches
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2.5 RECREATIONAL OPPORTUNITIES / TOURISM

The Waitakere Ranges area, and in particular the Auckland Regional Council parkland and the West Coast beaches, are popular destinations for visitors, in the summer months in particular. Using a number of data sources, Massey University estimated in 1998 that the Waitakere Ranges Regional Parkland receives approximately 2.6 million visits annually. Many of these visits were found to be from people living in the wider Auckland Region. In a recent regional phone survey undertaken by the Waitakere City Council in August 2003, 60% of respondents indicating that they had visited the Waitakere Ranges area in the past 12 months. The following figures generated from other surveys within the last 10 years provide further evidence of the popularity of the Ranges;

- During the summer of 1994/95 the Northern Lifeguard Association estimated that 265,000 people visited Te Henga/Bethells Beach, Piha and Karekare.
- Waitakere City Council vehicle counts undertaken during peak visitor periods over summer estimate approximately 10,000 visitors visit Piha Beach on the busiest days (Boxing Day, New Years day and the days in-between, and Anniversary Day).
- Vehicle counts undertaken by the Auckland Regional Council estimate around 180,000 visits annually to Arataki Visitor Centre, 72,000 to Cascades/Kauri Park, 59,000 visits to Cornwallis and 53,000 visits to Whatipu.

The pursuit of recreation in the Ranges has also resulted in over 100 operators with commercial interests in Waitakere Ranges Regional Parkland, that are known to the Auckland Regional Council. They offer a range of services and include coach hire (9 companies), sightseeing, tour groups (10 operators), surfing companies (3 operators), language school trips (5 schools), bush walking/environmental groups (17 operators), personal training groups (11 operators), and adventure sports such as canyoning (2 operators).

2.6 ATTRACTIVENESS AS A LIVING ENVIRONMENT

Over 1,000,000 people live in the Auckland Region on the doorstep of the Waitakere Ranges area, with over 17,600 people in 4,836 families actually living within the Ranges area (2001 figures for the area identified in Section 1.2). The Ranges are becoming more popular as a place to reside with a 5.9% increase in the usually resident population of the area over the inter-censal period 1996-2001. Dwellings over the same time increased from 5,724 to 6,237. The Waitakere Ranges area is one of the unique places in New Zealand where tension exists between protection of the unique natural and landscape values and urban development pressures.

3. GUARDIANSHIP OF THE RANGES

A large number of individuals, groups and statutory bodies are involved in the care and management of the Ranges for a variety of purposes. Below is a short summary of the roles and responsibilities of some of the key groups. More detail is given in section 4 regarding specific responsibilities. The most relevant pieces of legislation, policy, and regulatory and non-regulatory plans are listed in Appendix 2.

3.1 TANGATA WHENUA

Both Te Kawerau a Maki and Ngati Whatua claim mana whenua status in the Waitakere Ranges. Their statements outlining some of their views in relation to the Ranges are as follows:

Te Kawerau a Maki

The tangata whenua of the Waitakere district are the people of Te Kawerau a Maki. Although they are no longer in permanent occupation of their ancestral domain, they are regarded as still holding mana whenua or traditional ownership of the land.

Te Kawerau a Maki people have been a distinct tribal entity since the early 1600s, when their ancestor Maki and his people conquered and settled the district. Through prior ancestral links, and subsequent intermarriage with those they conquered, they have genealogical links that extend back to all the preceding tribal groups that occupied the Waitakere area.

The Maori place names of the Waitakere Ranges and their environs reflect the area's thousand-year history of human occupation. These names not only describe the topography of the land, its natural resources and their usage, but they also commemorate specific ancestors, events and traditions. To those familiar with them and their historical associations, these names are landmarks that act as a constant reminder of the past. They act as tohu or symbols providing proof of traditional ownership to the Kawerau a Maki people today, just as they did to their ancestors before them. Landmarks and their names are central to the identity of all Maori tribal groups. This is certainly the case with Kawerau a Maki people, who continue to use the more famous place names in whaikorero or traditional speechmaking to establish their identity and to express their emotional ties with their ancestral home. This identity is expressed in the following pepeha:

*Ko Puketotara te maunga
Ko Waitakere te awa
Ko Te Au o Te Whenua te tangata
Ko Te Kawerau a Maki te iwi*

*Puketotara is the mountain
Waitakere is the river
Te Au o Te Whenua is the person
Te Kawerau a Maki is the tribe*

The following key concerns in relation to protection of the Waitakere Ranges for Te Kawerau a Maki are of direct relevance to this project:

Water

The mauri (lifeforce) of all natural waters should be protected, and the food producing capacity and life supporting capacity of natural waterways should be protected and enhanced. The iwi wants waterways to be managed to a level that ensures their use as a food source and supports active restoration programmes, including stream edge planting. Above all, the iwi requires that the spiritual and cultural concepts should be recognised as key issues in water management.

Land and Landscape

Te Kawerau a Maki is concerned with the promotion of sustainable land management and the protection of its productive capacity ensuring that the cultural meaning, amenity and aesthetic values of the landscape are protected. In terms of landscape, a particular concern is the protection of important sites and places associated with ancestors. The iwi also has a pre-eminent concern, that a land-base and marae complex for Te Kawerau a Maki is re-established.

Flora and Fauna

Te Kawerau a Maki's key concerns in relation to native plants and wildlife in the Waitakere Ranges are having access to flora and fauna for cultural harvest and craft; protecting and enhancing indigenous flora and fauna and their ecosystems; and eradicating exotic plants and animals that are damaging, destroying or competing with native species or their ecosystems.

Heritage Sites

Te Kawerau a Maki wishes to ensure recognition of and provision for, cultural and spiritual values in decision making and to have opportunities to manage, enhance and monitor heritage concerns relating to waahi tapu. There are many parts of the Waitakere Ranges, coastal areas and foothills where significant sites (waahi tapu) occur and these areas have a special significance in the iwi's relationship with their ancestral lands and other taonga.

Coastal Marine Areas

Te Kawerau a Maki's concerns in this area are to ensure protection of heritage sites, water quality, the quality and availability of kaimoana (seafood), and to manage any development and use of coastal space to avoid adverse effects on water quality and coastal character.



In 1993 Te Kawerau a Maki placed a rahui (or ban) on shellfish gathering at Karekare in strong support of local residents seeking a legal ban. See Case Study below.



CASE STUDY

Karekare Shellfish Rahui

Visitors to Karekare beach are still observing a longstanding ban on the taking of shellfish from the area. The ban was initiated by local residents and is still monitored by them. However, the key to the success of this ban has been the strong support by Te Kawerau a Maki as *tangata whenua* of this area. The residents were concerned that some visitors to the area were damaging and removing the shellfish and marine life that grows on the beach's rocky shoreline. They spoke of people arriving in cars and stripping the rocks with heavy wires, leaving the rocks in a damaged state from which they could take years to recover.

Karekare residents approached their local community board, which resolved to ask the Council to impose a ban on the collection of shellfish from Karekare beach. A search of the legal situation regarding shellfish showed that Council has in fact no power whatsoever to impose such a ban. The taking of shellfish is regulated by the Ministry of Fisheries, damage to rocky shores is the responsibility of the Department of Conservation and the Auckland Regional Council, and there was also a legal obligation to recognise the *kaitiaki* of the area who have a specific guardianship role – in this case Te Kawerau a Maki.

With all these groups working in isolation from each other, the Council saw a role for itself as a mediator and facilitator of the whole process. Each of the groups involved was in favour of a ban. But there were many issues to be resolved first.

The Te Kawerau a Maki *iwi* were as concerned as the local residents about damage to the beach's marine life. They were saddened, however, after a history of *iwi* having their actions as *kaitiaki* in, for example, banning the taking of shellfish from an area, ignored by the Ministry of Fisheries and flouted by the public. The opportunity to have their own actions as *kaitiaki* backed up by legal force and policed by local people empowered to impose fines on people breaking the ban was greeted enthusiastically.

The Minister of Fisheries officially imposed a ban on the taking of shellfish from Karekare on 11 May 1993. Waitakere City Council had provided signs clearly stating the ban and had printed a leaflet explaining it in several languages. That morning, at dawn, the ancient protocols were enacted by the people of Te Kawerau a Maki and a *rahui* (or ban) was imposed on shellfish gathering at Karekare. About 150 people attended the ceremony, and the magic of the occasion was clear to every one.

The ban has now been in force for ten years. During that time the shellfish of the beach have recovered significantly. During the first year of the *rahui*, a number of people were observed breaking it. All of them responded positively to an explanation about why they should return the shellfish they had collected to the sea. Nobody has been officially charged or fined, and in recent years nobody has been observed infringing the *rahui*. Visitors to the area now seem to know about and understand the *rahui*, and many of them make a point of visiting the rocks to observe the fascinating marine life that is reappearing there.



Ngati Whatua

Through ancestral links, Ngati Whatua exercise manawhenua (customary authority) and kaitiakitanga (guardianship) within the Waitakere district.

A general concern of Ngati Whatua is that resource management systems are enshrined in statute and customarily carried out by government at all levels, and this tends to run counter to holistic views of the environment and, most importantly, does not easily recognise and provide for the spiritual as well as physical dimension of resource management. Similarly, the approach taken under the legislation is fundamentally different from a system of resource management based on duty and obligation to protect the environment, which is enshrined in kaitiakitanga. Without such an integrated approach, Government cannot easily provide for their responsibilities under the Resource Management Act.

Specific concerns of Ngati Whatua in relation to the Waitakere Ranges are:

- Removal of ngahere (bush) in an unsustainable manner, and related increased potential for land instability and erosion of exposed soil.
- Ngati Whatua opposes the planting of exotic species in all Council and Crown reserves in the Waitakere Ranges, except where it is to provide fruit trees. Ngati Whatua supports Council initiatives to educate the public regarding the impact of their plantings on private land.
- Activities in and around the Waitakere Ranges area that magnify the adverse effects from, for example, recreational and commercial uses (such as dam structures and visitor impacts).
- The effects of stormwater structures and discharges, septic tanks, landfills, noxious plants and pests, and construction of buildings in sensitive areas need to be understood. Ngati Whatua encourages a precautionary approach.
- Ngati Whatua desires the retention and enhancement of natural native forests, riparian vegetation and biodiversity.
- Water quality and the mauri of sites.
- Waahi tapu and significant sites.
- Heritage protection and promotion.
- Access to resources for cultural purposes

Ngati Whatua have identified those areas in the City that it sees as particularly significant in terms of cultural heritage, and waahi tapu which it would wish to see acknowledged as areas that have special significance in the iwi's relationship with their ancestral lands and taonga. This includes many areas in the Waitakere Ranges, coastal areas and foothills and the iwi requires protection (and recognition where appropriate) of waahi tapu found within these areas.

3.2 AUCKLAND REGIONAL COUNCIL

The Auckland Regional Council has a very significant role in the care of the Ranges being both a substantial landowner (60% of the Ranges area) and with statutory responsibilities that cover a number of aspects of managing the Ranges (refer Appendix 2).

Regional Parkland

The establishment of the Auckland Centennial Memorial Parkland in 1941 came about through the efforts of many people over many years. Since the late 1800's land has been acquired and gifted to serve the Auckland region for the purpose of recreation and the conservation of native flora and fauna. Some of the notable donations of land are as follows:

- 770ha at Cornwallis (McLaughlin family)
- 308ha at Kaitarakahi (Spragg family)
- 270ha (Mr Earle Vaile)
- 71ha and house (Sir William Goodfellow)
- 42ha (Sir Algerhorn Thomas)
- 32ha (DE Godley)

This has culminated in the creation of the approximately 17,000ha of regional parkland in the Waitakere Ranges area today. Much of the regional parkland covers the elevated and forested areas of the Ranges but also includes the Whatipu Sands Scientific Reserve, (accreted land on the northern head of the Manukau Harbour).



*Whatipu Sands
Scientific Reserve*

Part of the parkland around the Waitakere River, Nihotupu and Huia Streams (6,600ha) is leased to Watercare Services Limited for water supply purposes, and the Waitakere Ranges Protection Society owns 17hectares beside Big Muddy Creek and leases it to the ARC for regional park purposes.

Grazing land for cattle or sheep covers 110 hectares of the parkland - 40ha to the west near Anawhata Beach, 30ha in the south at Huia and 40ha in the north at Pae O Te Rangi. Farming operations are, however, regarded as secondary to the primary park purpose of managing open space settings for recreation and the protection of natural heritage.

Auckland Regional Parks Management Plan 2003

The Regional Parks Management Plan in fulfilment of the Local Government Act 1974 and the Reserves Act 1977 sets out how the ARC intends to manage most parks that form part of the Auckland Regional parks network, over the next five years. The plan guides the long-term management of these parks and sets the context for their future use and conservation of natural and cultural resources found within them. The management focus and actions relating to the Waitakere Ranges Regional Parkland are outlined in section 4.5 of this report.

Auckland Regional Policy Statement

The Auckland Regional Policy Statement (ARPS) is a requirement under the Resource Management Act 1991 to achieve integrated management of the natural and physical resources of the Region. It provides an overview of the region's resource management issues and includes objectives, policies and methods to guide management.

In this document, a number of natural areas and values in the Waitakere Ranges area are listed in Appendix B as having special significance, including:

- The andescitic pillow lava flows at Maori Bay (national importance)
- Te Henga – Wainamu area swamp lands, lakes, dunes and native forest (national importance)
- Bull kelp along the west coast between Te Henga and Piha is rare in the region (regional importance)
- The Waitakere Ranges (national and international importance)
- Whatipu Beach (national importance)
- The Huia area (regional importance)
- Kaipatiki Escarpment (regional importance)

Auckland Regional Pest Management Strategy

The Auckland Regional Pest Management Strategy 2002 has been prepared under the Biosecurity Act 1993 and sets out how the ARC will manage plant and animal pests in the region. A number of the Landcare groups listed in Appendix 3 are supported to help achieve the aims of the Pest Management Strategy.

3.3 WAITAKERE CITY COUNCIL

Waitakere City Council plays a key role in the Ranges both as a landowner and regulator of land activity through the District Plan and other relevant policies and plans. There should not be any inconsistency with Regional policy and plans.

Green Network

The Green Network is a key strategic platform of Waitakere City, set out in the Long Term Council Community Plan 2003 developed under the Local Government Act 2000. The heart of the Green Network is the Waitakere Ranges, and 'green links' are envisaged from the bushed areas of the Ranges down through the foothills and urban area to the Waitemata harbour. The key issue for the Council is ensuring permanent protection for the Ranges, in the face of increasing pressures from the rapidly growing urban area and from weeds and pests. The Green Network strategy seeks to protect and enhance native plants, wildlife and ecosystems (of both land and water), and the high quality landscapes of the city on both public and private land, to encourage community involvement and to provide friendly green areas

Reserve Management Plans

Waitakere City has 177 reserves in the Ranges area representing some 404ha (35% of all Waitakere City reserves). Many of these reserves have management plans prepared under the Reserves Act 1977 to guide their management.

Waitakere City District Plan 2003

The Waitakere City District Plan 2003, prepared under the Resource Management Act 1991 (RMA), sets out objectives, policies and rules for achieving the sustainable management of natural and physical resources within the City including heritage. As well as the map of 'Human Environments' previously mentioned, the important natural resources of the city are mapped, and managed under the five 'Natural Areas' identified on the District Plan Natural Area maps. These five areas collectively make up the core of the Green Network, and include:

- Protected Natural Area. Includes the areas that contain outstanding native vegetation and/or outstanding natural features, and provides a high level of protection to these resources.
- Coastal Natural Area. Those areas of largely unmodified coastal character, needing a high level of protection.
- Riparian Margins/Coastal Edges Natural Area. These are the margins of streams, lakes and wetlands, and of the coast, and, particularly when vegetated, have a significant role to play in maintenance and enhancement of water quality. They also contribute to the protection of ecological and landscape values, preservation of natural character, and the avoidance and mitigation of natural hazards.
- Managed Natural Area. Includes all areas of significant and outstanding native fauna habitat, and those areas of native vegetation that have been identified as significant.
- Restoration Natural Area. Includes areas with between 20% and 50% native vegetation cover that are over 300m² in area. The management approach signals the need to provide protection for natural regeneration, but it is recognised that settlement may occur.

The District Plan sets out specific rules to manage effects of activities on these natural areas, including rules relating to earthworks activities, vegetation alteration (pruning, clearance and work within the drip line of vegetation), construction of impermeable surfaces, establishment of environmentally damaging plants, and grazing of animals. The District Plan rules relating to subdivision and development of land also control impacts on natural areas.

West Coast Plan 2001

In addition to its statutory responsibilities Waitakere City Council has facilitated a range of non-statutory plans as part of the commitment it made in 1993 to become an Eco-city. Of particular relevance to the Ranges Project is the West Coast Plan 2001, which was briefly described in the introduction and was written through a community consensus process. The West Coast Plan covered only part of the study area for the Waitakere Ranges Project. The coastal / bush living communities from Parau to Green Bay and the eastern foothills were not part of this exercise.

Weed Management Strategy 2000

The Waitakere City Weed Management Strategy sets out the City's approach to management of 'environmental weeds' in the City. These are plants that can significantly affect the health of native plant and animal communities and the long-term survival of many native species. The strategy recognises that environmental weeds permanently alter ecological communities, and failure to manage weed threats will inevitably lead to loss of biodiversity and the progressive degradation of native ecological communities. The goal of the strategy is 'protection of the quality, resilience, biodiversity and ecological integrity of Waitakere City's natural habitat from the impact of environmental weeds'.

3.4 THE COMMUNITY

With a usually resident population of 17,658 living in the Waitakere Ranges area (including the foothills), people are a key component of the Ranges. Of the dwellings in the Ranges, 83% are owned rather than rented, compared with 69% in Waitakere City as a whole. A higher proportion than in the region as a whole are in full or part time employment, and the population of the Waitakere Ranges area has a median personal annual income of \$26,251, and median family income of \$65,000, higher than the medians in both Waitakere City and the Auckland Region. The most common family type is a couple with children, and 96% of the population is of New Zealand European descent. A relatively high proportion of households (52%) have internet access.

There is a history in Waitakere of a strong involvement and interest by the community in issues relating to the environment of the City. Involvement is at different levels and through a variety of organisations and programmes that are related to and influence the Waitakere Ranges.

There are currently a range of community groups and individuals involved in activities and initiatives within the Waitakere Ranges. These community relationships with the Ranges are predominantly based around the following drivers:

- Community partnerships with the Auckland Regional Council and Waitakere City Council
- Private organisations/trusts
- Individual contributions/activities

Generally community groups are involved in a range of different activities and initiatives, with some being more focussed on particular elements. The types of activities being undertaken by the community can be categorised as follows:

- Land acquisition and protection
- Restoration and/or revegetation
- Pest/weed control
- Education
- Resident and Ratepayer activities
- Fundraising
- Political lobbying
- Protection initiatives
- Volunteerism
- Community engagement

Examples of the range of different groups initiated through these drivers and an outline of the work being undertaken is provided in Appendix 3.

3.5 WATERCARE SERVICES LIMITED

Watercare Services Limited (Watercare) is a Local Authority Trading Enterprise (LATE) formed in 1992 from the water and drainage operations of the Auckland Regional Council. Ownership passed from the Auckland Regional Services Trust to Auckland's six territorial local authorities in 1998. Shareholding allocation is based on the number of retail water connections of each council. Waitakere City Council has an allocated 16.7% shareholding.

The company supplies around 84,600 cubic metres of water daily to Auckland from five water supply dams situated in the Ranges. This amounts to 26% of Auckland's water supply. The dams are located within 6,757 hectares of water catchment land, 6,448 hectares leased from the Auckland Regional Council and the remainder (309 hectares) owned by Watercare.

3.6 THE DEPARTMENT OF CONSERVATION

Under the Conservation Act 1987, the Department of Conservation (DoC) is primarily responsible for the conservation of heritage resources located on the DoC estate. Its main management tool for this purpose is the Auckland Conservation Management Strategy 1995 –2005. It owns 972 hectares of land in the Ranges (listed at Appendix 4), and delegates management of the 820 hectares of reserve land at Whatipu to the Auckland Regional Council. In addition, the Department owns Goldies Bush, located in Rodney District.

The department participates in the various resource management statutory processes, including submitting on regional plans/changes, district plan/changes, structure plans and individual resource consent applications, advocating for conservation on private land and the appropriate management of natural and historic resources generally.

DoC submits on and/or gives final approval to reserve management plans prepared in accordance with the Reserves Act 1997, including the Regional Parks Management Plan. In addition, when considered warranted, the Department makes submissions on annual plan projects (for example, goat control).

3.7 RODNEY DISTRICT COUNCIL

The Rodney District Council has the same statutory responsibilities as Waitakere City Council. Its approach to managing the part of Rodney District that falls within the Waitakere Ranges area is contained within its Proposed District Plan. The Plan identifies the Te Henga-Waitakere River-Bethells Road area as a Highly Valued Landscape with reference made to the regional significance of the landscapes listed. A Landscape Protection Rural Zone applies to the privately owned land in this area with limits on subdivision, controls on siting of buildings and restrictions on removal of native vegetation, earthworks and modification of wetlands.

4. CURRENT MANAGEMENT AND STATE OF THE RANGES

This section investigates the current management of the Ranges, describing the methods that are being used and identifying whether the specific values of the Ranges described in section 2 are being sufficiently protected, by analysing existing information on their current state. This section is organised according to these values under the following headings:

- Landscape
- Native vegetation and wildlife
- Clean water
- Cultural heritage
- Recreational opportunities and tourism
- Attractiveness as a living environment

4.1 LANDSCAPE

4.1.1 Management Approach

a) Identification of Landscape Values

As a matter of national importance the Resource Management Act 1991 requires local authorities to recognise and provide for the protection of outstanding natural features and landscapes from inappropriate subdivision, use and development. During the preparation of the Auckland Regional Plan: Coastal, the Auckland Regional Policy Statement and the Waitakere City District Plan, landscape studies were commissioned to identify outstanding landscapes.

The main criteria for identifying outstanding landscapes were:

- A considerable portion of the area is intact in terms of natural character.
- The area displays high levels of aesthetic value through its coherence, vividness and diversity.
- A strong sense of native/endemic heritage with the presence of extensive or continuous indigenous vegetation.
- The presence of significant natural features such as open beaches, closed bays, large rivers or lakes.
- The presence of varied and often convoluted landforms.
- The size of the viewing audience and the viewing frequency.

Application of these criteria resulted in the following areas being identified as outstanding landscapes and were incorporated into the relevant statutory documents:

- The coastal landscape between Bethells/Te Henga and the Manukau Heads;
- The coastal and estuarine areas between Whatipu and Green Bay;
- The bush landscape including the Waitakere Ranges and the fingers of bush in the upper areas of the eastern foothills catchments.

The lower eastern foothills with their mixture of pasture and bush were not identified as an outstanding landscape in any of the studies.

b) Managing Effects on Landscape

There are three main activities that affect the quality of landscapes. These are:

- i) Vegetation clearance.
- ii) Earthworks that visibly alter land topography.
- iii) Introduction of visible built structures including buildings, roads, jetties and utility infrastructure.

Many of these activities result from land development following subdivision. Therefore a broad approach for managing effects on landscape is to limit subdivision.

Managing Subdivision

Managing subdivision is the method used by the Auckland Regional Council through the Auckland Regional Policy Statement (ARPS), which identifies a Metropolitan Urban Limit (MUL) within which urban development is required to be contained. Policies 2.5.2 (3) (iv) in the APRS states that '*expansion of rural and coastal settlements outside the limits of existing urban zones and settlements is not permitted*'. The MUL excludes most of the Waitakere Ranges from the urban area, with the exception of the Titirangi / Laingholm area. The APRS also includes two specific policies on outstanding landscapes that require subdivision, use and development to be avoided if they affect the character, aesthetic value and integrity of the landscape as a whole.

The Waitakere City Council manages effects on landscape through the District Plan by limiting both subdivision in the Ranges in accordance with the APRS policy on the MUL and also by regulating vegetation clearance, earthworks and structures.

The subdivision provisions of the Waitakere City District Plan regulate the number and location of new houses based on the five residential "Human Environments" in the Waitakere Ranges area as described in Section 1.2.

- Waitakere Ranges Environment
- Coastal Villages Environment
- Bush Living Environment
- Foothills Environment
- Waitakere Township Rural Village Environment

In the Waitakere Ranges, Coastal Villages, Bush Living and Rural Village Environment, the subdivision standards are primarily based on:

- A minimum lot size,
- Restrictions based on the natural values identified on a property which are shown on the Natural Area maps of the District Plan.

In the Foothills Environment, there are two types of provisions:

- A standard 4ha minimum property size
- Structure Plans
- The subdivision provisions are summarised in the table below:

HUMAN ENVIRONMENT	MINIMUM PROPERTY SIZE AVAILABLE FROM SUBDIVISION
Waitakere Ranges	4ha provided it will not lead to development in highly sensitive natural areas
Bush Living Environment	4,000m ² – 4ha, depending primarily on the extent of native bush, and also providing it will not lead to development in highly sensitive natural areas
Coastal Villages Environment	4,000m ² providing it will not lead to bush clearance
Foothills Environment	4ha OR through structure plans
Waitakere Township Rural Village Environment	Unsewered sites - 4,000 m ² average, 3,000 m ² minimum, 5,000 m ² maximum provided natural features are protected

Note:

This is a short summary only, containing generalisations about complex rules. The relevant District Plan rules and criteria should be consulted in relation to any subdivision potential.

Structure Plans

Structure Plans are intended to be a tool for identifying and implementing appropriate and sensitive subdivision patterns, over a large enough area to make the identification of environmental and other constraints possible (a catchment). It is a useful method for addressing cumulative effects of subdivision. In Waitakere, there is one operative Structure Plan, in the Oratia Valley Foothills Environment. Two other structure plans have been proposed – one in the Birdwood area, and one in Swanson, although these are not yet operative.

The Waitakere City Council is currently undertaking a review of the use of structure plans in the Foothills Human Environment, and this review is expected to give guidance as to an appropriate subdivision regime for this area. The review is expected to be completed in December 2003 and will be taken into account as part of the Waitakere Ranges Project.

Vacant land

There are many vacant sites in the Ranges area, often from historical subdivision, and these, too, can be developed at any time.

Managing Development

It is the activities associated with developing land following subdivision, that lead to the effects on landscape values described earlier. These activities are mainly vegetation clearance, building of structures and earthworks.

The approach in the Waitakere City District Plan to managing the effects of these activities is described below.

Vegetation Clearance

In the Waitakere Ranges, Bush Living and Coastal Villages Environments, establishment of new houses often requires the clearance of significant areas of bush as many lots are completely covered in bush. For example, of the 670 currently vacant (unbuilt) sites in the Waitakere Ranges area, it is estimated that 67% are bush covered.

**Number of Vacant Properties and Percentage
of Properties Covered with Bush**

Human Environment	Number of vacant properties	Vacant properties covered in bush
Waitakere Ranges	119	94 (78%)
Bush Living Environment	312	252 (80%)
Coastal Villages	153	92 (60%)
Foothills Environment (excluding the Oratia Structure Plan Area)	86	11 (13%)

Source: Waitakere City Council

Any bush clearance associated with the establishment of dwellings has the potential to contribute cumulatively to the fragmentation of vegetation, decreasing the intactness of the natural character of the landscape and breaking up the continuity of indigenous vegetation. These have been identified as key qualities of the outstanding landscape value conferred on the Waitakere Ranges.

The District Plan has provisions that direct that as much native vegetation as possible is to be retained when establishing new development and minimises removal of bush through:

- Directing development towards existing cleared areas on a property.
- Requirements that clearance is carried out in a way that avoids or minimises adverse effects.
- Emphasis is placed on refining applications both before and after they are formally lodged with the Council, in order to ensure they are as appropriate as possible.

Built Structures

The District Plan provides for one dwelling on each site, together with, in certain circumstances, a 'minor household unit' or secondary dwelling (not more than 65 m² gross floor area). In the Coastal Villages and Bush Living Environments properties must be at least 1500m² in area for this to apply. The provisions for minor household units are intended to provide a social function by allowing greater flexibility in household organisation, for example, by providing an associated but independent dwelling for elderly relatives.

Experience has established that once a minor household unit has been established, there can be pressure to allow it to be subdivided off from the main dwelling. Recently an environment Court decision overturned a Council refusal to allow such a subdivision, on the basis that the effect had already been established. The Council considers that the pressure to subdivide off minor household units is a real issue in the Waitakere Ranges area.

Recently the provisions have been tightened in the Bush Living, Waitakere Ranges and Foothills Environments of the District Plan. (These changes came about as a result of appeals to the District Plan that did not relate to Coastal Villages.) Minor household units are now non-complying in all of the Bush Living and Waitakere Ranges Environment area outside the Metropolitan Urban Limit. Another change is a reduction in the permitted separation distance between a minor household unit and the main dwelling, from 20 metres to 6 metres in the Foothills Environment. These new provisions are designed to lessen the potential adverse effects from minor household units.

Visibility of Built Structures

The main approach to reducing the effects on landscape through the visibility of built structures is to direct development away from prominent ridges. This has involved the identification of ridges that are sensitive to development, 'sensitive ridgelines', which are shown on the Natural Area maps in the District Plan. Collectively they cover 555ha of land. The sensitive ridge provisions generally direct new development away from the top of these ridges, with development that intrudes into the skyline when viewed from a public place, or which is visible from a public place, being subject to strict resource consents. Conditions can be placed on resource consents relating to the height and design of buildings on sensitive ridges.

The degree to which a built structure is visible within a landscape is a factor of the reflectivity of the structure as well as its location. When the District Plan was first proposed in 1995, it included provisions to encourage new building in the Waitakere Ranges, Bush Living and Coastal Villages Environments to be finished with darker colours. These restrictions were based on reflectivity values, and required that paints with low reflectivity, and hence less potential for high visual prominence, be used when painting new development. There was major opposition to these provisions from some people, and the restrictions were removed through the submissions process. There is still scope for the placing of restrictions on colour as a resource consent condition, but these are rarely used, as there is a perception that such restrictions go beyond what most Waitakere residents would find reasonable.

The District Plan also places restrictions on the maximum height and coverage of buildings in the Coastal Villages Environment, to protect natural landscape and neighbourhood character. The maximum height standard is 6 metres as a Permitted Activity in all coastal villages except Te Henga, where the height is subject to a resource consent and strict criteria relating to physical domination, privacy and views of the adjoining sites. Resource consent conditions can include limiting the height, altering the design or requiring planting or screening. The Permitted Activity standard for maximum building coverage is no more than 15% of the net site area or 300 m², whichever is the lesser, provided that no single building may exceed a building coverage of 200 m².

The visual impact of power and communication infrastructure has long been controversial in the visually sensitive environment of the Waitakere Ranges area. Power poles and lines, telecommunication towers and the like can interrupt a scenic view and detract from the natural character of the landscape, for example, the pole on the main road lookout over Piha, and the communications mast standing on the Scenic Drive ridgeline at Waiatarua. Many of the roads in the Ranges and Coastal Villages are reticulated with overhead lines (although much of the Piha Road and the Scenic Drive currently remains clear of such infrastructure).

Programmes to underground infrastructure are costly, and a piece of work is needed to set priorities for undergrounding, taking into account the possible threats to vegetation of trenching and thrusting techniques, and the (possibly equal) need to clear vegetation away from overhead lines.

Generally, the District Plan seeks to manage new infrastructure that provides services such as water, wastewater, stormwater, power and communications in the Waitakere Ranges area, so that it is placed to avoid adverse effects on natural features, amenity values, neighbourhood character, and views. District Plan rules effectively require a resource consent for most new power or communication infrastructure other than that intended to be installed underground, and this mechanism allows discussions to take place with applicants over environmentally sensitive installation, and public consultation to take place where appropriate.

Built Structure Encroachments on Parkland

There are currently a large number of encroachments of private structures onto Waitakere City Council owned land. The vast majority of these encroachments are known to occur on esplanade reserves and include numerous illegal jetties and other coastal structures. Waitakere City Council has recently developed an Encroachment Policy that provides a framework to address the encroachment issue, a valuable tool in providing a consistent approach to dealing with encroachments as the Council is made aware of them. However, no work has been undertaken proactively identifying all of the encroachments and no programme exists to deal with them.

The Auckland Regional Council has identified all illegal coastal structures in the City, and almost all of these structures are illegal encroachments. In addition there are paths, retaining walls, buildings, and fences, which cumulatively have a significant adverse effect on both the protection of natural and landscape values and public access to the coast. In many instances these encroachments are very substantial (swimming pools, large wharves) and often involve multiple illegalities. These include situations such as several landowners being affected (for example, Waitakere City Council and the Department of Conservation or Waitakere City Council and adjacent private landowners), and multiple illegalities (for example, encroachments with no building consents).

Without a proactive programme to deal with encroachments, then the adverse effects on natural and landscape values and public access will continue to be felt, and the perception that encroaching on Council land is "OK:" because no action is taken to remove them will be reinforced. In addition the issue of safety of such structures is significant, since they are often poorly made and not maintained.

The Auckland Regional Council is currently re-investigating a programme to resolve all matters of non-compliance in the Coastal Marine Area. This programme will result in structures being consented and removed from the Coastal Marine Area as appropriate. There are also numerous encroachments onto the Waitakere Ranges Regional Parkland which the ARC deals with on a case by case basis.

Earthworks

Earthworks may lead to loss of and damage to the structure and form of landforms. To avoid this adverse effect, any earthworks that take place on a sensitive ridge or headland/cliff/scarp as identified on the District Plan Natural Area maps require a resource consent under the District Plan. Assessment criteria include 'The extent to which earthworks adversely affect the significance or landscape value or natural character of natural landscape elements, or other natural features'.

Community Development and Education

The Parliamentary Commissioner for the Environment in a recent report '*Superb to Suburb*' points out that, in managing special landscape areas, the rules need to be complemented by other methods such as community education, guidelines, and strategies.

The Council makes available some educational material designed to help people in the Ranges area design and build sympathetically with the environment. These are entitled:

- Living in the Waitakere Ranges
- Building in the Waitakere Ranges

4.1.2 Current State of the Landscape of the Ranges Area

Since the preparation of the Waitakere City District Plan, two recent re-evaluations have been undertaken of the landscape values within the City. The first of these, a study undertaken by LA4 landscape architects in 2001 to look at the boundary of the MUL from a landscape perspective, identified that some landscape changes had occurred over time.

Generally the report concluded that on a region-wide basis, most of the landscape quality and sensitivity ascribed by the original regional landscape assessment in 1984 continue to be valid. However it did identify that some rural landscapes in the foothills of the Waitakere Ranges have been degraded by inappropriate development of rural industry, glasshouses, and some lifestyle housing.

The study identified specific changes to the landscape ratings as follows:

- *Woodlands/Laingholm area*
The indigenous native forest has matured significantly and the units' landscape quality and sensitivity are now higher.
- *Birdwood area, the Babich area, and the area south of Swanson*
Sporadic subdivision and development have diminished landscape quality, so that past ratings should be reduced.
- *Oratia catchment*
The study noted that significant changes had already occurred in the Oratia catchment due to tree removal (particularly exotic and orchard trees), which has changed the landscape character. The report identified that the rural character in the area west of Parrs Cross Road in particular had been diminished, and that the landscape is at potential threat from future urban development.
- *General*
The report identified a need to ensure that ongoing incremental changes as a result of the Oratia and Birdwood Structure Plans do not result in cumulative adverse effects that erode the rural character and landscape values of these parts of the Waitakere Foothills.

The second more recent study was commissioned by the Auckland Regional Council in 2003 and has confirmed some of the findings of the 2001 Waitakere City study in relation to the Waitakere Foothills, as well as looking at the wider landscape of the Waitakere Ranges and the Region. This study reviewed the 1984 Regional Landscape Assessment and takes account of refined approaches to determine the quality and sensitivity of the landscape.

Among the key changes to landscape character in the Waitakere Ranges identified through this process is removal from the Outstanding Landscape category of Little Huia, stretches of Karekare Road and Lone Kauri Track, and the area surrounding Piha Road in the Piha Valley.

The study was based on public perceptions of what factors determine an outstanding landscape. A prime factor driving these changes in the Ranges area is the level of development – the greater the level of development, the less significant the landscape quality. Nowhere in the Ranges area has this been more evident than at Piha. Analysis elsewhere in this report suggests that much of this development has not been a result of new subdivision, but rather redevelopment of existing sites, or development of vacant sites from subdivision that occurred many years ago, and the associated bush clearance.

Much of the development of this area has occurred since the notification of the Waitakere City District Plan, and may indicate a need to investigate whether provisions relating to effect of buildings on landscape need to be strengthened, and if so, how.

An analysis of subdivision and development in the Ranges since the District Plan was first introduced in 1995 is contained in the following case study.



CASE STUDY

Subdivision and Development in the Ranges since 1995

Subdivision

Between 1995 (when the current District Plan was first introduced) and 2003 (to date), there were:

- 145 subdivisions in the four residential Human Environments in the Ranges.
- 55 of these were either boundary adjustments (where the boundary between two properties is moved, without creating any new properties) or to create Right of Ways.
- The remaining 90 subdivisions created an additional 283 properties.

The breakdown of these subdivisions by Human Environment is presented in the table below:

Human Environment	Number of additional properties 1995-2003
Waitakere Ranges Environment	26
Bush Living Environment	42
Coastal Villages Environment	16
Foothills Environment	112
Oratia Structure Plan (Foothills)	87
Total new properties from subdivision 1995-2003	283

It is immediately apparent from these figures that the greatest pressure for subdivision in the Waitakere Ranges over the last eight years has been in the Foothills Environment with 70% of all new properties resulting from subdivision located there. Relatively few new properties have been created in the other three residential Human Environments in the Ranges.

Development

Vegetation Clearance

An analysis of Council resource consents showed that where vegetation clearance has been required to establish new houses this, on average, resulted in the loss of about 215m² of bush on each site. This relatively small average area of new clearance indicates that these provisions are being implemented so as to minimise vegetation clearance and associated adverse effects.

Visibility

New houses are frequently obvious, and this is particularly true in the Foothills Environment, where many new houses have been established in existing cleared areas that are not screened by bush. In the Oratia Structure Plan area, all new houses have been established in existing cleared areas, and there are extensive re-vegetation and screening requirements. Most of the re-vegetation that has taken place here is still immature, and as yet has not contributed much of an improvement in the landscape values, as it should over time.

Analysis of resource consents granted for development on sensitive ridges where there is extensive vegetation cover, indicates that approximately 6% of consents for new development are visible from a public place or intruding into the skyline. In all of these circumstances, the consent planner was satisfied that existing or new screening would adequately mitigate the effects.



4.2 NATIVE VEGETATION AND WILDLIFE

4.2.1 Management Approach

Identification of Significant Native Vegetation and Wildlife

As a matter of national importance the Resource Management Act 1991 (RMA) requires local authorities to recognise and provide for the protection of significant indigenous vegetation and significant indigenous fauna from inappropriate subdivision use and development.

As discussed in section 2.3, and in Appendix 1, areas of significant and outstanding vegetation and wildlife habitat for the Waitakere Ranges area were identified in the Waitakere and Tamaki Ecological District Protected Natural Area (PNA) reports. This information was used during the preparation of the Auckland Regional Policy Statement (ARPS) and the Waitakere City District Plan to fulfil the RMA requirements.

The ARPS identifies the whole of the area of the Waitakere Ranges that is covered in indigenous vegetation as a natural heritage resource of regional, national and international importance (Appendix B of the ARPS). The Waitakere District Plan has used the areas identified in the PNA reports as a component of the Natural Areas notations. Areas of significant and outstanding native wildlife habitat and significant vegetation are the main component of the District Plan's Managed Natural Area, while areas of outstanding vegetation are one of the main components of the Protected Natural Area.

Managing Effects on Native Vegetation and Wildlife

There is a range of activities that affect native vegetation and wildlife. Activities that lead to direct removal of vegetation include vegetation clearance and earthworks, usually associated with the development of land in the Ranges area, and quarrying. The Waitakere Quarry, owned by Waitakere City Council, is located in the northern Waitakere bushland on Te Henga Road. Within the Quarry Special Area is a range of continuous high quality ridge, slope and gully forests of higher quality than much of the adjacent Regional Park.

Vegetation clearance can impact on the amount of food available to birds and other native wildlife. It can also affect the remaining vegetation and wildlife habitat by fragmenting the area of vegetation, isolating wildlife and reducing their habitat. Fragmentation usually increases the length of bush edges, allowing more light and wind into the bush area, and creating conditions that allow weeds to establish.

The introduction of weeds and pests into the Ranges, affect the quality and quantity of native vegetation and wildlife.

Works associated with roads, footpaths, carparks and driveways can damage native vegetation and waterways by impacting on root systems of mature trees, especially surface feeders such as Kauri, and by changing drainage patterns, introducing pollutants and increasing instability. Badly designed stream crossings can block fish passage. Care needs to be taken with stormwater, earthworks and disposal of fill, and with suitable restoration of slip faces, which can easily become sources of weed infestation for the surrounding bushland. Roads themselves tend to be 'weed corridors, and trials of appropriate native vegetation for road berm areas in the Ranges are being carried out. Once this information is available, berm weed removal and planting programmes will be needed.

Road kill is a threat to some native species, and Council has installed a 'frog tunnel' under the Scenic Drive near a known location of Hochstetters Frogs, to try and reduce this threat. The physical and visual impact of roads and footpaths (where necessary) in the Ranges area can be reduced, and the area's character reinforced by good design.

With increasing population and visitors in the Ranges, safety issues are arising, and the City will need to consider developing passing lanes and pull-off bays on some roads. Development of design guides for roading works in the environmentally sensitive areas of the Ranges and west coast is needed.

Managing Vegetation Clearance

Vegetation clearance is managed mostly through the Waitakere District Plan as described in Section 4.1.1. To evaluate the effects of resource consents for vegetation clearance on native vegetation and wildlife, the Waitakere City Council employs specialist ecological staff and arborists. Resource Consent applications for clearance of native trees/vegetation are free to the applicant.

The District Plan contains a Quarry Management Plan that indicates an area, identified as the least significant vegetation, to be used for quarrying purposes to the end of the Management Plan life in 2020. The remainder high quality vegetation is marked as buffer area to be protected, with a Council resolution in 1993 to initiate the process of putting in place a reserve status over this area. Implementation was deferred to enable evaluation of rock reserves in the area.

Managing Weeds

Environmental weeds are a particular threat to the health and long-term survival of native vegetation and wildlife.

New Zealand has approximately 2,200 native plant species and more than 20,000 exotic species, most of which are found in gardens. However, not all exotic species are weeds. Of the 20,000 exotic species in New Zealand approximately 10%, or 2,000, have *naturalised*, that is, a plant species, brought to New Zealand by humans, which can reproduce, by seed or vegetative means, in the wild. On average, twelve new exotic plant species naturalises in New Zealand per year.

Of the 2,000 naturalised plant species, approximately 10%, or 200, are invasive weeds. 'Invasive' plant species override native systems and usually become abundant and widespread. 'Environmental weeds' are not only invasive they also threaten the health, integrity and survival of our native ecosystems. Approximately 25% of all weeds result from agricultural or accidental introductions, but the large majority, 75% of weeds, are originally cultivated plants that have since gone wild.

In Auckland there are an estimated 674 naturalised plant species (up to the end of 1998 - E.K. Cameron (pers. comm. Kerry Bodmin)), with four new plant species naturalising per year in Auckland. The Auckland Regional Council has monitored a steady increase in both the number and density of plant and animal pests within the Auckland Region, as well as the cumulative adverse effects they have on the environment.

Many plants that have become 'environmental weeds' have attractive flowers or berries, such as agapanthus, bamboo, flowering cherry, Kahili ginger and cotoneaster. Although these naturalised plants are spread into indigenous vegetation from gardens with the help of birds and animals, wind, water or other natural means, the major dispersal mechanism is people. People spread weeds through poor weed hygiene; illegally dumped garden waste, the movement of machinery, recreational gear, clothing and in topsoil.

Over time a naturalised plant species may become invasive if suitable environmental conditions and lack of browsers exists. In the warm, moist climate of the Ranges, they can often out-compete native plants, either smothering the vegetation or creating such a thick ground cover that native regeneration is dramatically reduced until eventually the canopy is also replaced by weeds. In the long term, this leads to a permanent change in the structure and composition of our native plant communities and their ability to support native fauna. For example, native bush has a self-sustaining life span that operates in cycles of tens of thousands of years, however, a carpet of *Tradescantia* on the forest floor prevents regeneration – new plants growing from seeds - and reduces the bush lifespan to only hundreds of years.

Further information about weed management is contained in Appendix 5

Auckland Regional Council

The ARC in conjunction with landowners, has legal responsibility for weed control in the region under the Biosecurity Act 1993. Its approach to meeting its legal responsibilities is contained in the Auckland Regional Pest Management Strategy 2002 (ARPMS). The ARC has budgeted a total of \$932,000 for biosecurity management in the Waitakere Ranges for the 2003/2004 financial year.

Of the 674 naturalised plant species in Auckland the Regional Council lists 115 of these as plant pests, and many of these are environmental weeds. The pest plants identified in the strategy are grouped into different categories, each with different levels of control required. These are:

- **Total Control Pest Plants** (25 species), ARC carries out all control.
- **Containment Pest Plants** (16), landowners/ occupiers are required to carry out control.
- **Surveillance Pest Plants** (80), plants banned from sale, distribution and display.

In addition to the regulatory control it carries out, the ARC manages weeds through operational activities that include:

An annual programme of 'ecological weed control' (weeds that impact on the indigenous ecology) in the Waitakere Ranges Regional Parkland, utilising both staff and contractors. Most of this control work is site-led, with weed-led work centring mainly on low incidence infestations. About \$330,000 (including contractors and parks/biosecurity staff time) has been budgeted by the ARC for ecological weed control in the 2003/2004 financial year.

- The ARC's Western biosecurity officer also deals with complaints and enquiries in Waitakere City and undertakes control of a range of low incidence and Total Control Pest Plants. These include moth plant and mignonette vine. The budget for the 2003/2004 financial year is \$65,000.
- The ARC Call Centre helps deal with enquiries from people within the Waitakere Ranges area.
- The ARC supports a number of community initiatives in the Waitakere Ranges area, such as Bethells Beachcare, Ark in the Park and Karekare Landcare Groups.
- The ARC contributes \$10,000 to the annual War on Weeds campaign, run by Keep Waitakere Beautiful and the Waitakere City Council.

- The ARC contributes \$10,000 per year to a joint ARC/Rodney District Council/ Waitakere City Council project - the Waitakere Wetland and River Weed Control Programme. The results of the programme to date have been very encouraging, with large areas of willows now controlled, and incidence and abundance of ecological weeds such as Mexican waterlily, parrot's feather and reed sweet grass being significantly reduced.

Waitakere City Council

Until recently weed control undertaken on Waitakere City Council land focused primarily on agricultural weeds such as ragwort and gorse. The recognition of environmental weeds as a serious threat by the Council saw the development of provisions in the District Plan in 1995, allocation of resources targeting invasive plants on Council land from 1998 / 1999, the development of a weed management strategy by July 2000, and involvement in, or support of, various weed control programmes.

District Plan

The City's District Plan contains an appendix listing 'Environmentally Damaging Plants' in Waitakere City, and rules provide that these plants should not be established within the Green Network. On the other hand, the 'Removable Vegetation Appendix' lists those species (such as Acacia, Bamboo and Willow) that are considered weedy, and where the Plan generally expedites removal (except for situations such as large areas and areas close to waterways, where some control is retained to ensure that impacts such as sedimentation can be managed). Resource consents for vegetation removal are free to the applicant.

Weed Strategy

Council's "Invasive and Environmental Weeds of Waitakere" builds on the Regional Council's plant pest list to include over 200 plant pests, including known invasive plants not listed by the Regional Council, plants that are particular to Waitakere City and plants that are contentious due to commercial interests. Waitakere City Council has a Weed Management Strategy (2000) consistent with the ARPMS, which sets out the Council's long-term goals and objectives and provides a framework to guide the Council in identifying, prioritising and managing weed impacts on both public and private land.

Management of Weeds on Public Land

On public land (parks and roadsides) there are two broad types of weed management carried out by WCC. The first is legal weed control of 'containment pest plants' on land that the Council owns, as required by the ARPMS. In the 2002/03 financial year \$58,000 was spent on legal weed control on the 179 Waitakere City Council parks located in the Ranges (about 30% of the total budget for legal weed control on Waitakere City Parks).

The other is ecological weed management in parks of which \$62,600 was spent in 2002/03. There are 71 reserves in the "Five year weed management priority plan", of which 59 are in the ranges. All of the 71 reserves are regarded as having high ecological significance. This year 16 new reserves in the Ranges area (149 hectares in Waiatarua and Titirangi) will receive comprehensive weed control, and up to 30 reserves in the area will receive follow up weed control, after recently having comprehensive weed control. This is not considered enough to achieve the Council's vision of weed-free parks by 2020, with only an estimated 10% of parks in the city currently receiving comprehensive weed control.

More promising progress is being made on roadsides, where techniques are being investigated that reduce habitats for weeds and maximise the habitat and regenerative capacity of native vegetation. It is through these means that the target of weed-free roadsides by the year 2014 is likely to be achieved.

Management of weeds in the Waitakere Quarry

The quarry, and especially the exposed rock faces, is a perfect environment for the invasion and proliferation of invasive weeds. There is the danger that the quarry can become a weed infestation source for the northern Waitakere Ranges, through natural dispersion methods (such as birds and wind), or through being trucked out of the quarry with the metal or carried down the stream corridor.

Pampas grass and wattle are the most common weeds in the quarry. Council is making some progress with the issue, spending around \$55,000 on revegetation and \$7,500 on contract supervision in the year 2001-02. Weeds on the walls of the old quarry require removal by the more expensive means of abseiling or helicopter, and cannot at this stage be accommodated within existing budgets. In order to better combat weed infestation, Waitakere City Council has adopted a policy of rolling revegetation of areas no longer required for quarry operations. Some of this area has been successfully revegetated, mainly in Manuka. An innovative method of revegetation is currently being trialled, with the removal of entire areas of forest required for new quarrying, together with the soil and forest floor leaf litter, to areas of the quarry in need of reinstatement. The aim is that more of the ecosystem, including soil microbes, insects and other forest floor species will be saved and a complex forest ecosystem more quickly and readily established.

Strides have been taken in recent years to ensure ongoing responsible quarry management, and the initiation of the reserve designation process for the buffer area in the quarry management plan is a very positive step. Good ongoing management with adequate resourcing, especially to combat weeds and sediment pollution are required.

Management of Weeds on Private Land

On private land, WCC manages weeds through both regulatory and non-regulatory methods. The regulatory method used is the rules in the District Plan that require environmentally damaging plants to be removed when subdivision occurs in the Ranges, and that environmentally damaging plants (as listed) not be established.

An incentives programme, the 'Green Network Community Assistance Programme' was initiated by Waitakere City Council to provide assistance to private land occupiers seeking to remove weeds from their land. The current forms of assistance include weed bins, free ginger disposal, telephone advice, weedkiller for large scale ginger control, contractor assistance, native plants, assistance with management plans, fencing subsidy, rates relief and covenants.

In the last financial year:

- \$30,000 was budgeted for assistance with environmental weed control on private land with most being taken up by landowners in the Ranges.
- An additional \$8,000 was specifically targeted at removing and disposing of ginger.
- \$15,000 was used for supplying free eco-sourced native plants using plant vouchers.

- \$5,000 was spent on assisting landowners in the development of appropriate management plans.
- An additional \$15,000 was budgeted for the production and dissemination of educational material.

The results of market research into the effectiveness of the Green Network Community Assistance Programme are outlined at Appendix 6.

In addition, Ecowater has initiated Project Twin Streams, a major catchment-based project to integrate water management along the Swanson, Opanuku and Oratia Streams. This project includes weed removal and riparian vegetation restoration in the eastern foothills of the Ranges area.

The use of agrichemicals to control weeds and pests is a concern to the Council, and a programme is underway looking at the reduction of toxicity, quantity and/or effects of the use of agrichemicals by Council representatives.

Keep Waitakere Beautiful

Keep Waitakere Beautiful (KWB) coordinates the distribution of weed bins for the disposal of environmental weeds removed from public land by members of the public. (This includes parts of the Regional Parkland as well as Waitakere City Council reserves.) In the last financial year, 91 bins were distributed in the Waitakere Ranges area at a cost of \$17,635.

Community Groups / Private Landowners

There are a large number of community groups and private landowners undertaking weed control work on both public and private land. Some get assistance from the ARC and/or WCC but many others carry out this work with no assistance. Appendix 3 lists some of the community groups carrying out weed control.

Managing Animal Pests

A large number of introduced animal species have established in New Zealand; 35 mammals, 40 bird species, 20 freshwater fish, 3 frogs, 1 reptile – a skink, 31 marine invertebrates and more than 2000 terrestrial invertebrates – insects, spiders, slugs, worms and snails. Over the last five years there has been a steady increase in the number of new insect and bird pest species.

Possoms are considered one of the major threats to native vegetation and wildlife in the Waitakere Ranges area. Many of the plants preferred by possums (e.g. pohutakawa, rata and kohekohe) are key components of several vegetation community types in the Ranges. Possums also eat eggs and chicks of native birds.

There is a wide range of other animal pests in the Ranges including rats, mustelids (i.e. stoats, weasels and ferrets), pigs, magpies, mynahs, 'banjo frog', exotic fish species, painted apple moth and rabbits that destroy duneland vegetation. Both feral and domestic cats predate native wildlife; not only birds but also species such as frogs, geckos, wetas and other insects. The impacts of pests include browsing or grazing, that can significantly alter the composition of indigenous plant communities areas; direct competition with native bird species for territory, food or roost sites and predation of native fauna.

A number of pest species are now establishing within the coastal environment. This includes shellfish species such as Pacific oysters, which have spread through the inner Manukau Harbour and are now adversely affecting public access, and foreign seaweed species such as Undaria. Like land based pests, these species out compete and smother native coastal species, and also tend to create altered environmental conditions.

Auckland Regional Council

Pests are primarily the responsibility of the landowner. As owner, the Auckland Regional Council has responsibility for pest control in the parkland. Under the Biosecurity Act 1993 the ARC has responsibility for pest management in the Region, and has set out its management approach in the Auckland Regional Pest Management Strategy 2002. Of the many introduced animal species that have established in New Zealand, the Auckland Regional Council lists twenty-one of these as animal pests that cannot be exhibited, bred, sold or offered for sale.

The release, liberation or conveyance of any of the feral animals listed below is also prohibited under section 11 of the Wild Animal Control Act 1977.

- Deer (including wapiti and moose)
- Chamois
- Thar
- Wallaby (all species)
- Possums
- Goats
- Pigs

The ARC carries out animal pest control programmes in the region in a prioritised manner, with a focus on areas of significant environmental or conservation value, with the Waitakere Ranges being one of the top priorities.

A lot of the control work is targeted at preventing ecological damage by possums. The ARC undertook a large possum control programme, known as 'Operation Forest Save', throughout the entire Waitakere Ranges during 1998. This covered over 28,000 hectares, including 12,700 hectares that were privately owned.

The ARC uses the 'Residual Trap Catch' method to monitor possum populations in the Ranges. This consists of monitoring traplines and calculating the percentage of each 100 traps that have caught a possum. Operation Forest Save has been very successful, and annual control programmes now maintain possum numbers at between 1 and 3% Residual Trap Catch (RTC) throughout the Ranges parkland, and buffering private land. The programme has now moved to a four-year rotational programme of follow up trapping with some ad hoc trapping undertaken in response to public reports of large increases in possum numbers.

Community Groups / Private Landowners

There are a large number of community groups and private landowners that undertake pest control work on both public and private land. Some get assistance from the ARC and WCC but many others carry out work with no assistance. Appendix 3 lists many of the community groups undertaking pest control.

Waitakere City Council

In the last two years WCC has undertaken limited possum control in Council-owned parks and reserves to either complement the control work being carried out by the Regional Council, or to control possums in parks where restoration programme are being undertaken. Possum control using Timms traps has been carried out in the lower portion of the Waitakere Quarry, the lower Opanuku and Swanson.

At present no control work on mustelids is carried out by Waitakere City Council. The Waitakere City Council District Plan does, however, prohibit the farming of mustilids, rodents, wallabies and possums in Waitakere City.

There are two other animal pests that the Council controls on parks and reserves - rats, and wasps. Rat control is carried out on a response basis to calls logged through the Call Centre. Bait is used to control rats on Council land or rats that have invaded private land from Council owned land. Wasp and wild bee control on Council land is carried out on a similar response basis.

The Council currently has no programme offering assistance, apart from advice, to private landowners wishing to undertake pest control.

4.2.2 Current State

To assess the current state of native vegetation and wildlife in the Ranges requires baseline information from some previous time period and data from a comprehensive monitoring programme that can be compared with the baseline to pick up trends.

There are good inventories of indigenous plants and animals from the PNA and other studies. These are only useful when trying to determine whether a species is still present in the Ranges, and are not useful for detecting whether species are increasing or declining in number. There are no comprehensive monitoring programmes covering all of the Waitakere Ranges study area, but there have been a number of surveys undertaken that provide some assessment on the state of certain species or the effectiveness of management actions aimed at protecting native vegetation and wildlife. A summary of these surveys follows.

Birds

The best information on the state of any group of species in the Waitakere Ranges is for birds.

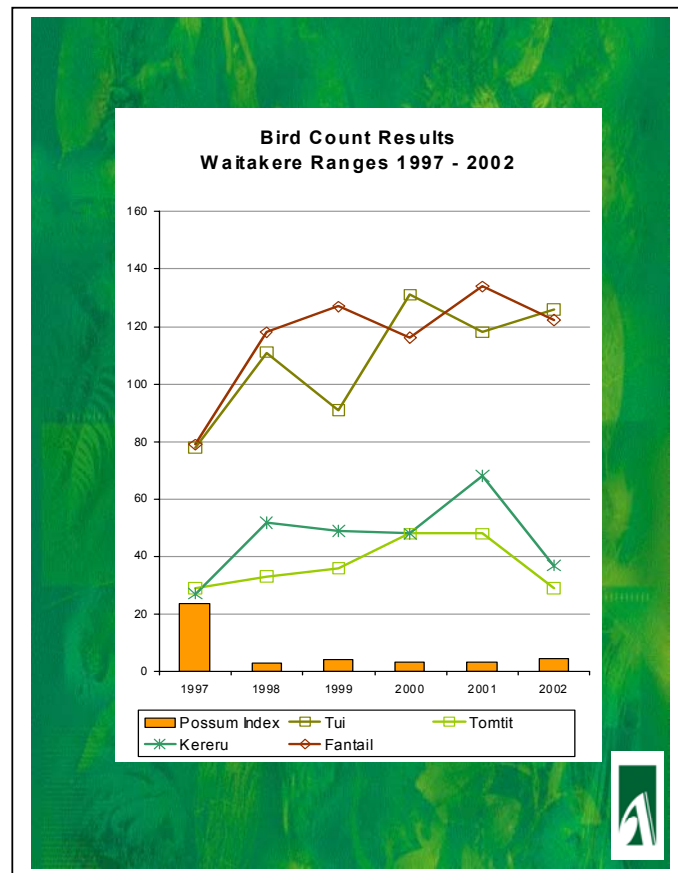
Since European settlement there have been many local extinctions of native birds in the ranges. These losses include:

- | | |
|----------------------|--------------|
| ▪ Brown kiwi | ▪ Whitehead |
| ▪ Brown teal | ▪ Rifleman |
| ▪ New Zealand falcon | ▪ Stichbird |
| ▪ Weka | ▪ Bellbird |
| ▪ Kaka | ▪ Piopio |
| ▪ Kakariki | ▪ Saddleback |
| ▪ Robin | ▪ Kokako |

Attempts have been made to reintroduce bird species into the Ranges but these have been unsuccessful partly due to the lack of predator control. Improved predator control and research could make it possible in the future to reintroduce species into 'mainland island' restoration projects in parts of the Waitakere Ranges, for example, Ark in the Park. This may result in the reintroduction of species such as robin, whitehead, bellbird and kokako.

Waitakere City Council monitors birds in the forest remnants of the foothills in the Tamaki Ecological District, complementing the ARC's monitoring programme in the Waitakere Ecological District. Five-minute bird count sites in the foothills at Tram Valley Road (Waitakere) and Swanson measure presence or absence of species, and found tui, kingfisher, kereru, fantail, warbler and silvereve present at both sites over the surveys in 1998, 1999 and 2001. Tui numbers were considered low at all sites, and the 2001 survey indicated a further decrease. A decrease was also noted in kereru at the Swanson site.

The news is better in the Waitakere Ecological District, where the Auckland Regional Council has undertaken five-minute bird counts annually in early summer, on a range of different forest types on nine widely spaced tracks in the Ranges (15 counts per track). The counts have been done since 1997 prior to Operation Forest Save, with 135 counts conducted each year. The results of this forest bird monitoring programme (tui, fantail, tomtit and kereru) are graphed below, together with the index of possum numbers over the years 1997 to 2002. The increase in forest birds can be largely attributable to Operation Forest Save.



Source: Auckland Regional Council

With forest bird numbers starting to recover in the Ranges parkland area, it seems these bird numbers may be more at risk in the fragmented bush remnants of the foothills. Comment from the contractor carrying out the Waitakere City counts in these areas indicates that the quality of the habitat at the counting site has declined in a number of cases. If the decreasing trend in numbers is confirmed, closer monitoring and management will be required to find and address the reasons.

Invertebrates

Recently a survey of ground invertebrate populations was carried out within Ark in the Park sites and Matuku Reserve, the latter having had intensive possum and rat baiting programmes carried out. The aims and results of the survey are presented in the case study below.



CASE STUDY

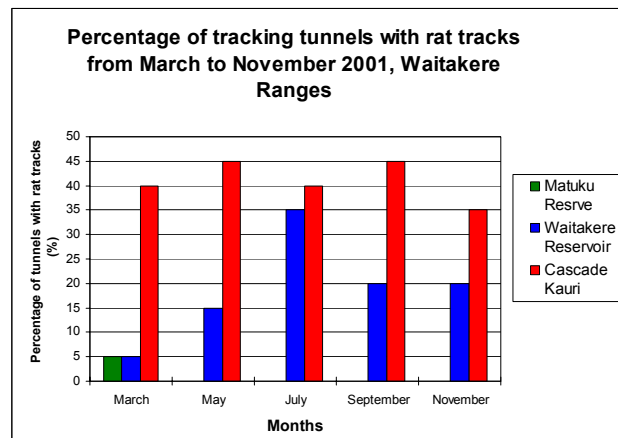
Waitakere Ranges Ground Invertebrate Research 2001

In 2001, Brent Booker a Royal Society of NZ Teacher Fellow carried out research on ground invertebrates in the Waitakere Ranges. The aims of the study were:

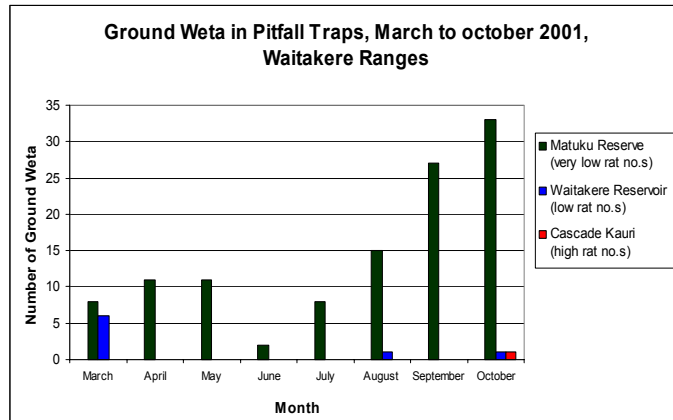
- To survey ground invertebrate populations within the proposed Ark in the Park site in the Waitakere Ranges to provide baseline data
- To compare ground invertebrate populations within Ark in the Park sites with a nearby site (Matuku Reserve) that has had an intensive possum and rat baiting programme over the last two and a half years
- To investigate whether rodent numbers affect ground invertebrate populations

Results

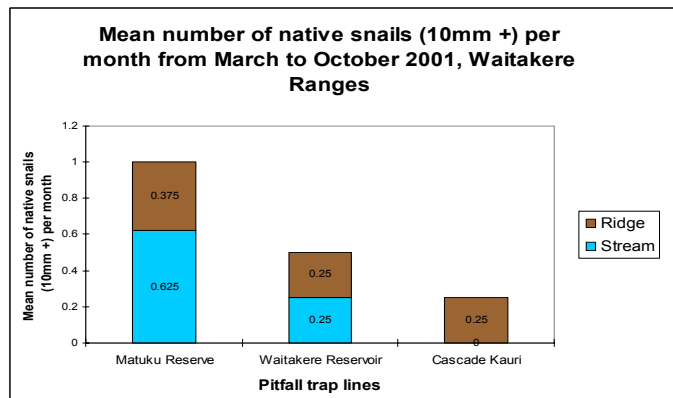
Rats were most common at Cascade Kauri sites, followed by Waitakere Reservoir, with Matuku Reserve (north of the Waitakere Wetland) having very low numbers. At Matuku Reserve only one rat print (at the Kokopu stream site), was recorded in the tunnels over the whole year. Rat numbers were much higher at stream compared to ridge sites.



Ground weta numbers are significantly higher at Matuku Reserve where the rat numbers are the lowest. From March - October only one ground weta was recorded in the Cascade Kauri pitfall traps. This indicates that rat numbers negatively impact on ground weta populations in the Ranges.



Larger native snails (10mm +) are most abundant at Matuku Reserve. Larger snails at Matuku Reserve show higher numbers at stream sites than ridge sites. The two other sites had much lower snail numbers, especially at stream sites. Rat numbers were highest at stream sites when compared with ridge sites in all sample areas. The Cascade Kauri site, where rat numbers are the highest, had no larger snails in the stream site pitfall traps. This stream site had rat prints in 50% to 80% of the tracking tunnels monitored, throughout the whole year. This data would indicate that rats are negatively impacting on larger native snail populations in the Waitakere Ranges.



Native Vegetation

Forest health monitoring in the Waitakere Ranges has been undertaken every 2 - 4 years since 1995 by the Auckland Regional Council. Monitoring focuses on assessing abundance and diversity and recruitment of species vulnerable to possum damage, including monitoring of rata trees, a favourite food for possums. Monitoring transects are placed in representative forest types within the Waitakere Ranges Regional Parkland. Monitoring has been undertaken prior to and since Operation Forest Save. To date little improvement of forest health has been recorded. While possum indices have been below 5% for most of the Waitakere Ranges since Operation Forest Save in 1998/99 forests could take at least 5 years to recover from high pest numbers. The lack of any significant change in forest health indicated by this monitoring may also reflect the relatively good health of the parts of the Waitakere Ranges that have been assessed.

More promisingly vegetation photo-points have been monitored during this time and they indicate that the possum control programme is having a beneficial effect. This is reflected in an increase in the percentage of pohutukawa with no possum browse and with improving canopy density.

Weeds

Residential gardens surrounding the Waitakere Ranges were jointly surveyed for key environmental weeds in 1994 by Waitakere City Council and the Auckland Regional Council and again in 1998 by Waitakere City. In the four years there was a spread of most environmental weeds with an average increase of 5% in all localities. Although this survey is not conclusive, there is a definite indication that the weediness of these areas increased between the 1995 and 1998 surveys.

An increase in the variety of key environmental weeds was also observed in various locations as summarised below:

Location	1994	1998	Dominant weed species
Anawhata	7	31	agapanthus, montbretia and hydrangea
Laingholm	59	81	agapanthus, montbretia and tradescantia
Piha	25	66	agapanthus, cape Ivy
Karekare	29	40	agapanthus, kikuyu and montbretia
Cornwallis	33	40	agapanthus, hydrangea and cotoneaster
Titirangi	37	56	kahili ginger, tradescantia and montbretia
Waiatarua	41	55	hydrangea, agapanthus and montbretia

Animal Pests

Possum indices (Residual Trap Catch, or possums caught per 100 traps) have been monitored by the ARC to assess the effectiveness of trapping programmes initiated with Operation Forest Save. As described earlier possum indices have been below 5% for most of the Waitakere Ranges area covered by the programme since Operation Forest Save was initiated.

4.3 CLEAN WATER

The Waitakere Ranges area has an extensive and rugged western coastline as well as the shoreline and estuaries of the Manukau Harbour. It contains numerous streams, several wetlands, including the Waitakere Wetland, the largest in the Auckland Region, and Lakes Wainamu and Kawaupaka. In addition, more than 6,800 hectares of the Ranges are in water supply catchments, with five water supply dams and reservoirs (located on the Waitakere River, the Huia Stream and three on the Nihotupu Stream) supplying water to a significant portion of the region.

Most of the Waitakere Ranges area is serviced by on-site water supply and wastewater disposal systems, mainly rainwater collection tanks and septic tanks for treating sewage. The reticulated sewerage system (which collects wastewater and pipes it to the Treatment Plant at Mangere) was extended into Titirangi and Laingholm in the 1980s, in order to address concerns about the health of waterways in the area.

4.3.1 Management Approach

Under the Resource Management Act 1991 the Auckland Regional Council has overall responsibility for the control of the use of land for the purpose of the maintenance and enhancement of the quality of water and the maintenance of the quantity of water in water bodies and coastal water. Waitakere City Council has responsibility for the control of any actual and potential effects of the use, development or protection of land on natural and physical resources in the City.

The Treaty of Waitangi and the Resource Management Act require the unique role and distinct cultural beliefs and traditions of Maori to be taken into account. Te Kawerau a Maki and Ngati Whatua have set out their resource management goals relating to water.

Te Kawerau a Maki

The Te Kawerau a Maki Trust desires that:

- The Mauri of all natural waterways is protected
- The food producing capacity of natural waterways is protected and enhanced
- The life supporting capacity of natural waterways is protected and enhanced

Te Kawerau a Maki advocates water conservation and efficient use of water, opposes the direct disposal of any wastes into waterways and requires that wastes pass through the soils before discharge. The iwi supports active restoration programmes, including stream edge planting. Above all the iwi requires that spiritual and cultural concepts should be recognised as key issues in water management.

Ngati Whatua

Water represents the tears of Ranginui, the life blood of Papatuanuku and is the domain of Tangaroa. Water must be managed holistically and nurtured as a living entity.

Particular matters of concern to Ngati Whatua are sewage, stormwater and industrial discharge to waterways, leachate from landfills, sedimentation and erosion, dumping of animal carcasses near waterways, the mixing of waters from different sources, which is spiritually offensive, noxious weeds in waterways and the need to reintroduce and retain natural wetlands. In order to protect the Mauri of waterways, Ngati Whatua wish to see all wastes derived from land returned to the land rather than directly to the waterways.

Central, Regional and Local government Policy and Plans

Significant Central, regional and local policies and plans that influence the approach to water management in the Waitakere Ranges area include:

- National Coastal Policy Statement 1994
- Sustainable Development for New Zealand Programme of Action 2003
- Auckland Regional Policy Statement 1999
- Auckland Regional Plan: Coastal 1995
- Auckland Regional Council Low Impact Design Manual 2000
- Proposed Auckland Regional Plan: Air, Land and Water 2001
- Waitakere City Long Term Council Community Plan 2003
- Waitakere City District Plan 2003
- Water Cycle Strategy 1996
- Waitakere City Stormwater Management Strategy 2000
- Waitakere Wastewater Plan 2000
- Waitakere City Non-Regulatory Incentives Strategy 1999
- Waitakere City State of the City Report updated 2002
- Stormwater Catchment Management Plans
- Eco Water Solutions Business Plan
- Asset Management Plans

Descriptions of these policies and plans are attached at Appendix 7.

Managing Effects of Activities on Water Quality

The legislative and strategic context at both national and regional levels, the iwi perspective and the Council's own strategic direction all point to the need for a holistic, integrated approach to managing water within the context of total water cycle management.

Waitakere City now looks to achieve this broader approach to water management in the City. This means that management of the City's water supply, sewage disposal and stormwater aims for socially, culturally and economically acceptable solutions that produce attractive landscape sustained by healthy and biologically diverse streams, wetland systems, estuaries and harbours. It is increasingly recognised that managing waterways to protect and restore ecosystems supporting native wildlife is just as important as using them to supply water, receive treated effluent and transport stormwater away.

Water is a resource that is sensitive to the impacts of activities on land or water. Water quality of streams and harbours is affected by the input of contaminants such as sediment, heavy metals, excess nutrients and pesticides. Many of these contaminants are carried by stormwater, particularly from roads that carry significant traffic loads. Malfunctioning wastewater systems, the presence of animals in the catchment (domestic and feral) and fertilizer application can bring about increases of nutrients in waterways.

Waitakere City requires maintenance of all on-site wastewater treatment systems in the Ranges area, charging residents outside the Inner Drainage Area (the area serviced by a reticulated sewerage system) for emptying and checking all private wastewater systems on a three-yearly cycle.

Changes in hydrology can also affect water quality and are brought about by water abstraction, damming of waterways and changes in the catchment land cover, particularly when bush and trees are removed or impervious surfaces cover more than 10% of the catchment. The building of more impermeable surfaces without proper assessment of the effects or regard to their avoidance or mitigation results in an increase in flooding, erosion and land stability. This is a particular issue in the Ranges, where much of the land is 'stability sensitive'. Development in the Ranges area can impact on the hydrology and pollutant levels downstream in the urban areas and in the harbours and estuaries.

These factors - stormwater contamination together with erosion, land instability and flooding - are strongly influenced, for better or worse, by development densities and the style of new development. Incorporating into the design of new developments in the Ranges area, features such as adequate on-site stormwater treatment and riparian margin management, to remedy or mitigate the adverse effects of stormwater, is crucial to the future health of the City's waterways and environmental sustainability. District and Regional plan provisions and the resource consent process are the major methods by which these management features are achieved, for example, new development in structure plan areas is required to demonstrate 'hydrological neutrality' where the post-development level of stormwater runoff from the site mimics pre-development levels.

Earthworks for new road works or building platforms and site development, if not properly managed, can have a significant impact on water quality, with up to 25% of silt running off the land ending up in streams, smothering aquatic life and carrying contaminants to the coastal receiving environment. In an attempt to minimise the loss of soil from earthworks into waterways, the Waitakere City District Plan lists as a 'Prohibited Activity' in the city, *'any area of unvegetated open ground that is not grassed or vegetated with an appropriate ground cover of vegetation within 3 months of the completion of earthworks activity resulting in that unvegetated open ground'*.

As described earlier in this report, the District Plan controls bush clearance in the Ranges area and prescribes development densities. Impermeable surfaces are managed through the District Plan while management of earthworks is a shared responsibility between the Regional and City Councils. The Auckland Regional Council issues consents and monitors earthworks over 1 hectare in area, while those less than 1 hectare are managed by the City Council. Margins alongside all waterways are required to be kept free of development, and the restoration of margins with native planting is encouraged through the non-regulatory incentive and assistance programmes run by both Waitakere City and the Auckland Regional Council.

Quarrying activities at the Waitakere Quarry can impact on the Waitipu Stream, that flows through the quarry, and thence to the Waitakere River and the nationally significant Waitakere wetland. There have, in the past, been problems with sediment from the quarry entering the stream. The management of the quarry has been tightened up in recent years, with regular monitoring and a Community Consultative Committee in operation since 1991. As a result, one sediment pond has been shut down and another repaired.

4.3.2 Current State

A number of surveys on water resources have been carried out in the Ranges area and provide some information on the current state of streams, lakes, wetlands and coastal lagoons. A summary of the surveys is presented below.

Streams

There are a range of key indicators that can be used to determine the water quality of streams. A large number of surveys have been carried out in the Ranges area, using a number of different methods measuring a range of different stream health indicators; for example, the Macroinvertebrate Community Index (MCI), the ARC Habitat Protocol, the EPT method (Ephemeroptera-Pleoptera-Trichoptera) and SHMAK (Stream health Monitoring and Assessment Kit). The results are summarised in the table below.

STREAM HEALTH AT SURVEY LOCATIONS IN THE WAITAKERE RANGES AREA	
LOCATION	STREAM HEALTH
Laingholm & Titirangi	In general stream health is 'good' however some of the streams surveyed around Laingholm and Titirangi had poor ecological health. This usually corresponded with an increase in rural or urbanised land use for example Waituna Stream which had a 50% urbanised catchment and low numbers of sensitive macro-invertebrate species.
Piha Stream	A recent survey of the Piha Stream revealed a marked change in ecological health as the stream reached the residential development along Glen Esk Road. This corresponded with a sharp rise in water temperature probably due to a decline in the amount of riparian vegetation.
Waitakere River	Ecological health along the Waitakere River is generally good except just below the Waitakere dam where flows have been dramatically reduced. In very dry summers, aquatic habitat can become poor and potentially hypoxic (i.e. very low levels of dissolved oxygen) downstream of Falls Rd with dead fish recorded that appeared to have died from a lack of oxygen and very low numbers of sensitive macro-invertebrates.
Cascades Stream	The Cascades Stream is monitored as an unmodified reference site against which all streams monitored by the ARC are compared. The Cascade Stream has excellent water quality and has changed little in the last eight years.
Opanuku Stream	The Opanuku Stream at Candia Road has been monitored by the ARC for the last eight years. Opanuku Stream has high faecal coliform and presumptive coliform counts (15x that found in Cascades Stream) which correlate with surrounding mixed land use. Water quality has changed little in the last eight years.

In addition to the water quality surveys, sediment surveys have been carried out at 13 sites to determine whether run-off from development is causing heavy metal pollution (particularly of copper, zinc and lead). If heavy metals reach certain concentration levels then adverse effects on aquatic organisms can occur. The 13 sites were all located in the more developed areas of the ranges including bush living areas and the upper Opanuku and Oratia catchments.

Only one site, the rural section of the Upper Oratia, had copper concentrations that exceeded the probable effects guideline and this occurred on only one occasion. This was sampled again on another occasion and this time the guidelines were not exceeded. These results suggest that the level of development that has occurred in the Ranges is not leading to heavy metal pollution of streams.

Another good indicator of the health of streams is the presence of native fish communities. There are two fish communities that indicate high diversity. In shady streams this indicator community is the 'shortfin eel/longfin eel/banded kokopu/redfin bully' fish community and in the open streams it is the 'shortfin eel/longfin eel/common bully /inanga/redfin bully' fish community.

A number of fish surveys have been carried out in the Ranges. The Waitakere River contained the fish community indicating high diversity in open, low gradient streams as well as the Crans Bully, which is a more uncommon species in the Auckland Region. In the Cascades and Opanuku Streams some of these species that make up the indicator fish communities were present but not all. A list of species recorded in these 3 streams is presented in the following table. In most other surveyed streams (usually in bush living areas) up to five native fish species were commonly present.

FISH SPECIES RECORDED IN THREE STREAMS IN THE WAITAKERE RANGES AREA		
WAITAKERE RIVER	OPANUKU STREAM	CASCADES STREAM
Shortfin eel	Shortfin eel	Shortfin eel
Common bully	Common bully	Common bully
Inanga	Inanga	
Redfin bully	Redfin bully	
Crans bully	Crans bully	
Longfin eel		Longfin eel
Banded kokopu		Banded kokopu
Kaoro		
Inanga		

Variations in stream flows impact on stream health. Reduction in stream flows in the Waitakere Ranges area is caused primarily by abstraction of water in the five water supply dams. Collectively, 84,600 m³ of water is abstracted each day from the dams (26% of the Auckland Region's water supply), and this significantly reduces flows downstream of the dams.

Watercare Services Limited has applied to the Auckland Regional Council for replacement resource consents to authorize the water supply operations. It is likely that the consideration of these applications will involve assessment of alternative operating regimes, including residual flow requirements downstream of each dam. Only eight other consents have been granted for water abstraction from streams in the Waitakere Ranges area, all from the Waitakere River catchment. Together, these amount to 721m³ per day.

Water quality measured by the Auckland Regional Council at the Cascades Stream is the best of any long term baseline monitoring site in the Auckland Region, and this is likely to be representative of similar streams throughout the Ranges parkland area, except for those impacted by land use changes or activities such as water supply dams.

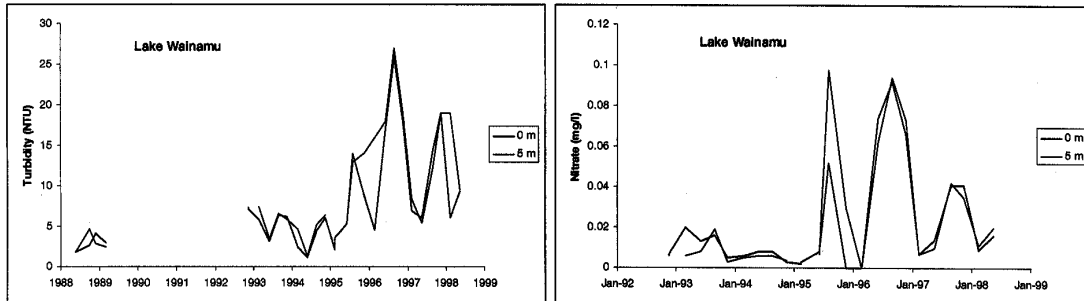
Groundwater

The groundwater resource in the Waitakere Ranges is expected to be poor to moderate. The area is underlain with Manukau Breccia. This is a mixture of different rock types, and yields from these rocks is expected to be variable, but generally low, although no specific groundwater resource assessment has been undertaken for the area. There is enough groundwater in places to supply water for domestic use or small - scale development, and only three consents have been granted by the Auckland Regional Council to take ground water in the Waitakere Ranges area. There is not expected to be any significant future demand for water in the area.

Lakes

The only lake that is monitored regularly in the Ranges is Lake Wainamu. Since the mid-1990s it has been declining in water quality. Lake Wainamu is a very popular swimming spot that had reasonably clear water up until 1995 when it suddenly became more turbid and nitrate levels increased dramatically (see figures below).

The exact cause is not known. However it is likely that coarse fish (e.g. perch) present in the lake diminished the beds of aquatic plants that help keep the water clear by preventing re-suspension of sediments on the bottom of the lake. In the absence of aquatic plants, algae (phytoplankton) were able to increase substantially in the water column and are the reason the lake now appears so turbid.



Coastal Lagoons

Waitakere City Council monitors water quality in the lagoons at Karekare, Bethells Beach and Piha to see whether they are suitable for swimming. A median of 35 enterococci (a bacteria used as an indicator of water quality) per 100ml of water is the maximum level of bacteria that is considered safe for swimming. In the 1997-98 summer all three lagoons were well over this level two-thirds of the time they were sampled.

4.4 CULTURAL HERITAGE

The Waitakere Ranges has long been home to human activity and there are many aspects of cultural heritage significance remaining within the Ranges. Cultural heritage resources are the products and remnants of people and communities and are valued for many different perspectives. For example, a place or area can be valued for its historic, archaeological, architectural, technological, aesthetic, scientific, spiritual, social or traditional significance.

4.4.1 Management Approach

Identification of Cultural Heritage

The New Zealand Historic Places Trust is the national body charged with promoting the identification, protection, preservation, and conservation of the historical and cultural heritage of New Zealand. They have specific responsibilities regarding archaeological sites, and produce and maintain a national register of historic places and areas, waahi tapu and waahi tapu areas.

In identifying significant cultural heritage resources, the ARC and the WCC have taken guidance from section 23 of the Historic Places Act 1993 and the New Zealand Historic Places Trust (NZHPT). The Historic Places Act lists values and criteria which assist with the identification of significant cultural heritage resources and sets a minimum standard. The NZHPT may assign Category I or Category II status to any historic place. Category I status applies to "Places of special or outstanding historical or cultural heritage significance or value". Category II status applies to "Places of historical or cultural heritage significance or value".

Archaeological Sites

All archaeological sites are accorded protection under sections 9 and 10 of the HP Act 1993 whether or not they are registered. There are over 1,000 recorded archaeological sites within Waitakere City's boundaries. Most sites within the Waitakere Ranges area are found within the ARC Parkland or Watercare Services Catchment area, or on Waitakere City Council coastal reserves. For example there are over 46 archaeological sites recorded to date within the Waitakere City reserves on the Manukau foreshore alone. These sites range from coastal middens and pa relating to Maori occupation through to the remnants of the historic timber and farming industries.

Heritage Structures

The Cultural Heritage Inventory (CHI) is a database of cultural heritage information, which is being developed by the ARC with the support and involvement of all the territorial authorities in the Region. It currently includes 2117 records within Waitakere City. Waitakere City Council has specifically identified 94 of these sites located in the Waitakere Ranges as of sufficient significance for specific listing and protection within the Waitakere City District Plan. These include items such as buildings, plaques, bridges and fords, and are located on both publicly owned and private land in the Waitakere Ranges. It is recognised that this is not an exhaustive list. About 50 of these heritage structures or objects are listed in the Waitakere City District Plan, and afforded a level of protection. These include a number of Category I listings of buildings such as Albion Vale in Oratia and Lopdell House in Titirangi.

Category II listings include the Huia Lodge, Little Huia Ford, Oratia Cemetery, Oratia Folk Museum, Nihotupu Filter Station, Little Muddy Creek Brick Bridge and the plaque at Watchman Hill in Karekare.

In addition a number of residential dwellings and other buildings and objects are listed as Category II and Category III items in the Waitakere City District Plan.

Heritage Trees

A number of trees and groves of trees have been identified as having significant heritage value within Waitakere City. This includes 35 listings for trees and vegetation within the Waitakere Ranges. These vegetation sites were identified in the pre-1995 District Scheme developed by the former Waitemata City. At the time of preparation of the Waitakere City District Plan the vegetation was checked to ensure it was still in existence.

Waahi Tapu

Waahi tapu sites may include:

- urupa (burial places)
- Pa sites
- Battle sites
- A place where tupapaku (corpses) rested – (tapu trees, caves etc)
- A place of refuge
- A place where a vision occurred
- A place where a ritual was performed
- A mountain from which territory was claimed
- Where a famous song or chant was first recited
- A place where a waka was landed.

Both Te Kawerau a Maki and Ngati Whatua have provided information to Waitakere City Council on the location of a range of key waahi tapu. In addition an inventory of waahi tapu on Waitakere City Council owned land has been undertaken in conjunction with Iwi. Further work needs to be undertaken by Iwi and Council to identify, locate and assess the state of existing and additional sites.

Managing Effects on Cultural Heritage

As a matter of national importance the Resource Management Act 1991 requires Councils to recognise and provide for the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu and other taonga. The recent amendments to the Resource Management Act have also made the protection of cultural heritage a matter of national importance (previously heritage values of sites, buildings, places or areas only needed to be had 'regard to').

Auckland Regional Council

The Auckland Regional Policy statement sets out the Regional approach for dealing with cultural heritage resources. It includes:

- Assessment criteria for establishment of the significance of heritage resources
- A requirement that Districts provide for:
 - the preservation and protection of heritage resources relating to the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu and other taonga
 - Preservation or protection of cultural heritage values from the adverse effects of subdivision of land and use and development of resources or, as a last resort, mitigation of the adverse effects
- Provision for use of other methods in conjunction with District Plan regulation, including development and maintenance of a cultural heritage inventory, advocacy and heritage education programmes, and possible use of assistance programmes for preservation or protection.

Most listed archaeological sites within the Waitakere Ranges are found within the Auckland Regional Council Parkland, or on Waitakere City Council coastal reserves. Conservation Plans have been developed for all heritage buildings on Auckland Regional Council parkland, including Keddle House (Anawhata), Rose Hellaby House (Waiatarua), Gibbons Homestead (Whatipu) and Hinge House (Huia).

The Auckland Regional Council has developed a series of "Our Heritage" posters and cards as part of an education and advocacy project to increase community awareness of the Auckland Region's unique heritage, both natural and cultural, and to highlight the importance of the region's significant heritage landscapes. These are also available as E-cards.

Waitakere City

Before the Waitakere City District Plan was notified in 1995, the Council undertook a public campaign to identify all items of cultural heritage significance in the city. These were added to the inventory containing the already identified items in the Transitional District Schemes of the three former boroughs of New Lynn, Glen Eden and Henderson, and Waitemata City. These inventory items were assessed against the criteria in the Auckland Regional Policy Statement and either selected for scheduling in the District Plan as Category 1, 11 or 111 items, or for 'inventory only' (included in a Council-held list for information).

District Plan rules relate to alterations and additions to, or demolition of scheduled heritage structures, objects, sites or places, destruction, trimming, felling or modification of heritage trees, and alteration of archaeological sites or waahi tapu.

A register of waahi tapu on Waitakere City Council owned land is being developed, but this is not yet complete the City Council has purchased some significant heritage buildings for restoration, such as the McCahon House in Otitori Bay Road

The Department of Conservation

The Department of Conservation (DoC) is primarily responsible for the conservation of cultural heritage resources located on the DoC estate under the Conservation Act 1987. The DoC Conservation Management Strategy (CMS) provides a strategy for the integrated management of all areas administered by DoC in the Auckland Conservancy. The department also has a conservation advocacy role that relates to all land regardless of ownership.

Queen Elizabeth II National Trust

In addition to the statutory agencies, there are independent organisations, such as the Queen Elizabeth II National Trust, which provide a mechanism by which private landowners can protect heritage resources on their land in perpetuity.

4.4.2 Current State

Archaeological Sites

No comprehensive evaluation of the state of individual sites and their management has been undertaken in recent times. During the management planning process for the Manukau Harbour Foreshore Reserves Management Plan an evaluation of the archaeological sites within the foreshore reserves was undertaken. This indicated that erosion was a significant factor in the deterioration of coastal sites, particularly midden. Some sites, such as the Arapito Foreshore Reserve pa and Warner Park headland pa, have significant remains, currently overgrown with regenerating bush.

Most cultural heritage sites recorded within the Waitakere Ranges Regional Parkland were a result of survey work by Hayward and Diamond in 1977-1978. Most of these sites have not been revisited since they were originally recorded and their current state and condition is unknown.

Recognising the high visitor use of the Waitakere Ranges and the cultural heritage values contained within it, a GIS map has been produced by the ARC of the historic roads, tracks, trails and tramlines and other historic sites within the Ranges area. This information has been combined with the Waitakere City Cultural Heritage Inventory information and regional parks data on high trail use by park visitors, to identify historic places and areas that are potentially most at threat from disturbance and modification.

Some re-survey work has carried out by Simpson (1995) and Donaghey (2000) of Maori archaeological sites in the Ranges area. The Donaghey work, outlined below, serves to highlight the need to revisit and upgrade the current information on all archaeological sites.

Donaghey (2000) reported that of the 66 sites in the Cornwallis – Parau – Laingholm area that were originally recorded by Hayward and Diamond:

- 98% had suffered and continued to suffer from various degrees of damage
- 80% are in a continuing state of destruction
- Approximately 4% no longer existed
- 15% could not be relocated for various reasons
- Five new sites were recorded (May 2000)

Damage to these sites appears to be most prevalent along the coast as a result of erosion, except at Whatipu where there is accretion of sand. The author has also noted that within the stream valleys of the Waitakere Ranges, significant damage has resulted to the kauri timber dams and associated sites from flood damage, with general decay and fossicking other contributing factors.

Heritage Structures

While Conservation Plans have been developed for heritage structures on Auckland Regional Council parkland, on Waitakere City land, currently none of these specifically listed buildings and objects have Conservation Plans prepared for them. While they were all broadly evaluated in terms of condition at the time of the District Plan preparation in the mid 1990s, no ongoing monitoring of their condition or protection has been undertaken.

4.5 RECREATION, TOURISM AND BUSINESS ACTIVITIES

4.5.1 Management Approach

The beaches and parkland areas are the popular destinations for most tourists and recreation visitors to the Waitakere Ranges area, and the focus for a number of businesses such as the filming industry.

Most of the publicly owned land in the Ranges is regional park, owned and managed by the Auckland Regional Council, with small areas owned by Waitakere City Council, the Department of Conservation and the Queen Elizabeth 11 Trust. Management of visitor impacts on these parkland areas is guided by the open space management strategies and Reserve Management Plans developed by the ARC and the Waitakere City Council.

Resident communities and the environment can also be impacted by visitor numbers (recreation and tourism) and industry requirements (for example, filming). Councils cannot directly limit access to West Coast beaches and parkland, or place limits on visitor numbers in general, but may be able to influence the impact of visitors in other ways. These strategies are generally set out in Visitor Management Plans.

Regional Parkland

The Auckland Centennial Memorial Park Act 1941 established a Board (which has since been absorbed into the Auckland Regional Council by the former Auckland Regional Authority Act 1963) to hold and control lands for the purposes of a scenic park, to be known as the Auckland Centennial Memorial Park, and to prescribe its powers and functions.

Various parts of the Regional parkland are held and administered under either or both the Reserves Act 1977 and the Local Government Act 1974. The Regional parkland was formally protected in perpetuity under the Local Government Act 1974 and was managed under the Regional Parks Management Plan prepared under Section 619 of that Act.

The Local Government Act was amended in December 2002. The amended Act rescinded the Auckland Centennial Memorial Park Act, removed the requirement for a management plan and creates two classes of regional parkland; those that are managed under the Local Government Act and would qualify for protection in perpetuity, and those that would remain under the Reserves Act with a lesser level of protection. This is particularly problematic in the Waitakere Ranges where various parts of the parkland would be administered under the different Acts, but for all practical purposes are managed as an integral whole.

The Auckland Regional Council intends to retain and periodically update the management plan and is in the process of investigating the most appropriate course of action to protect the parkland.

Waitakere Ranges Regional Parkland Management

Over the next five years the management of the Waitakere Ranges Regional Park will focus primarily on maintaining and enhancing the natural resources and features of the Ranges whilst providing an appropriate range of recreational activities.

Management will be directed at:

- Retaining predominately bush settings with limited areas of open countryside in appropriate locations such as behind beaches, at viewing points and in some high country areas
- Implementing an integrated plant and animal control programme to maintain viable habitats for native flora and fauna
- Conserving historic buildings, structures and places
- Providing visitor and school curriculum-based education services
- Providing varying levels of infrastructure according to the character of the different areas. The level will vary from very low in the remote wilderness areas such as Whatipu, Anawhata, Lake Wainamu and Pae O te Rangi to medium in areas such as the Piha Valley, Cascade-Kauri, Karekare and Huia. Higher levels will be provided in areas such as Cornwallis and Arataki

Specific Management Actions:

- The Auckland Regional Council will consider undertaking ecological enhancement of specific locations in partnership with community and interest groups where the strategy proposed is consistent with the objectives and policies in this Plan.
- Mountain biking, which is currently prohibited in the Waitakere Ranges, will be reviewed in consultation with affected stakeholders and the community.
- Revegetation will focus on amenity planting and localised and coastal forest enhancement.
- All existing track entrances will be maintained with an appropriate level of safe parking and facilities.

Waitakere City Council will be encouraged to:

- Remove all unnecessary road designations from the Waitakere Ranges
- Retain all roads in remote areas as gravel roads.
- The management of some areas of parkland will be transferred to Waitakere City Council where it better serves local needs.

Waitakere City Parks

The Waitakere City Parks Strategy 1999 contains ten objectives relating to:

- Increasing the use and enjoyment of parks
- Extending and improving the city's natural ecosystems
- Increasing the opportunities for people to enjoy nature on parks
- Managing parks sustainably as part of the wider landscape
- Improving the use, range and quality of sports facilities within the city
- Protecting heritage values within parks and increasing the awareness of the heritage of the city and local areas
- Providing quality local and neighbourhood parks that are within walking distance throughout the city
- Working in partnership with iwi (and where relevant, the wider Maori community) on the management of waahi tapu and sites of significance
- Involving communities in the design and management of parks
- Improving the management and administration of parks

Management Plans for Waitakere City reserves, such as the Manukau Foreshore Reserves Management Plan, have been developed in close consultation with the local communities and iwi.

Visitor Study

The Auckland Regional Council is currently undertaking a visitor management study for the Waitakere Ranges Regional Parkland, in consultation with Waitakere City Council.

The purpose of the study is to make sure the type and level of use of the parkland is sustainable and balanced against other values of the Ranges. The values will be used to determine the type and level of management required to protect them.

The study will examine the current level and type of use occurring, emerging recreational trends, where these might occur and the threats these might represent to existing values. The study will investigate the level of commercial recreation activity in the Ranges parkland and issues such as the demand for mountain biking, which is currently prohibited in the parkland.

The Regional Council would like to know more about what people do when visiting the Ranges parkland and what they value about the Ranges area. To assist in this the ARC will undertake survey work over the Christmas holiday period.

In February 2004 the ARC will be holding a series of focus groups to help refine understanding of what people value about the area.

4.5.2 Visitor Impacts

The popularity of the Waitakere Ranges for recreation and tourism has resulted in large numbers of visitors to the Waitakere Ranges and West Coast. This inevitably has some impact on the quality of the recreational and tourism experience, and also affects local residents and the natural environment.

The West Coast area is frequently used in promotional material aimed at attracting tourists to Auckland or to New Zealand. For example one of the poster images for the New Zealand Tourism Board's "Pure New Zealand" global marketing campaign is of the Piano at Karekare Beach. The West Coast beaches are also profiled in a video shown on Air New Zealand on some inbound flights to Auckland.

Extensive work has been done on determining the types of visitor impacts on the West Coast and these are also applicable to the wider Waitakere Ranges. These impacts are outlined below:

Environmental

- Dune erosion – particularly at Piha, Bethells/Te Henga and Karekare from both pedestrian and vehicular access.
- Impact on wildlife – particularly coastal bird life affected by dogs and disturbance of habitats such as sea caves.
- Decline in aquatic resources such as shellfish, fish and seaweed.
- Spread of weeds such as *Sellaginella* along walking tracks
- Damage to streambeds through vehicle and pedestrian use
- Introduction of *Giardia* to some waterways in the Waitakere Ranges
- Pollution of air and waterways from vehicle emissions and contaminants
- Increased risk of fire
- Disturbance of bush environment and damage to vegetation – particularly from visitors deviating from formed tracks or interfering in the environment (e.g collecting plants). This is a particular concern in relation to species such as kauri, where popular walking areas have had to have root protection mechanisms put in place.
- Physical damage to waahi tapu and other iwi heritage sites
- Noise reducing the peace and tranquillity of the Waitakere Ranges – particularly from visitor related activities such as jet skiing, scenic helicopter trips and partying at night time.
- Loss of visual amenity and character as a result of providing visitor facilities such as car parks, signs, rubbish bins, toilets and surf towers.

Economic

- Litter and rubbish generation, particularly over the summer months results in significant costs to both Waitakere City Council and the Auckland Regional Council for clean up and removal. Illegal dumping is also an issue in some parts of the Waitakere Ranges.
- Increased traffic on roads and the associated costs of maintenance and renewal.
- Pressure for more infrastructure such as toilets and carparks and the costs of development and maintenance of these.
- Provision of some jobs through the visitor facilities such as local shops, camping grounds, local lodges and B&Bs.

Social

- Spiritual loss to iwi from visitor intrusion into waahi tapu or other heritage sites.
- Loss of iwi profile and limited ability of iwi to utilise resources to build an economic base.
- Illegal parking in busy areas blocking emergency access ways, private land and turning areas.
- Behaviour of visitors – in some areas (e.g Piha, Mt Atkinson, Pukematakeo) are significant problems that arise particularly as a result of the influence of alcohol. Arson and petty theft also increase during the peak visitor periods.
- Road safety – particularly speed, alcohol, the behaviour of drivers on the narrow winding roads. This particularly impacts on pedestrians, as there is a limited footpath network within the Waitakere Ranges.
- Lack of community control of visitor numbers and impacts.
- Fragmented sense of community and sense of place due to transient nature of visitor population.

- Displacement of locals over summer.
- Trespassing on private land.
- Visitor disappointment because of crowding of most heavily visited areas, e.g West Coast beaches, Titirangi, Cascade/Kauri Park.
- Visitors involved in accidents due to poor awareness of dangerous activities (e.g West Coast beach swimming and fishing).

The appropriate provision of infrastructure in high visitor areas can be a complex issue. This is because providing infrastructure can assist in mitigating some environmental or social impacts - while exacerbating other impacts. At the same time not providing (or under-providing) infrastructure can have the same effect. Infrastructure itself should not damage the environment.

For example "under provision" of car parking may help limit visitor numbers but it can also encourage people to park illegally, which can be a nuisance to residents. On the other hand extending car parking facilities to cope with peak summer demand may encourage more visitors and is also likely to have a negative impact on the amenity of the area. Providing more signs with visitor information can encourage people to behave appropriately but may also reduce visual amenity.

4.6 ATTRACTIVENESS AS A LIVING ENVIRONMENT

The attractiveness of the Waitakere Ranges as a living environment is evident in the 5.9% increase in the usually resident population of the area between 1996-2001. It is also reflected in the increasing value of properties within the Waitakere Ranges with coastal settlements such as Piha experiencing some of the highest growth in median house prices in Waitakere City in recent years.

The attractiveness of the Ranges as a living environment is one of the reasons for provision of regulatory controls to manage subdivision and development in the Ranges. The management approaches and the current state of the living environment have been discussed in the previous sections.

4.7 HAZARDS

Hazards with the potential to most affect the natural resources and landscape of the Ranges and coastal settlements include instability and erosion, sea level rise and fire.

Much of the area of the Ranges has been identified as being 'stability sensitive' and has been marked on Council's hazard maps as such. When an application for building consent is received in such an area, design by a registered engineer is required. This land is also very susceptible to changes in drainage patterns such as may be caused by roading works or building, and in much of the area, advice has been that such risk should be avoided.

Coastal erosion is a real issue, particularly around the Manukau harbour coastline, and sea level rise as a result of climate change may effect low-lying coastal areas such as French Bay and Laingholm.

Fire from natural or human causes is a risk in the bushed areas of the Ranges, with areas of gorse, exotics that are extremely flammable such as gums and indigenous 'nursery crops' such as Manuka and Kanuka being the greatest fire risk. To reduce the risk, Council sets fire seasons that require a permit for lighting of any fires in the open air between December 1st and April 30th, and provides for authorisation of a total fire ban during periods of severe drought.

5. KEY PRESSURES AND MANAGEMENT WEAKNESSES

From the information presented in section 4 it is evident that almost all of the features of the Ranges that people value are under in pressure in some way and that while some management actions are having positive results there are weaknesses in the current system that need to be addressed to ensure the long term protection of the values of the Ranges. A summary of the values and the key pressures are listed below.

VALUE	PRESSURE
Landscape	Subdivision, vacant lots that make development possible Development that is unsympathetic to the environment - vegetation clearance - weeds and animal pests - earthworks - visible built structures
Native vegetation and wildlife	Subdivision and development - vegetation clearance - earthworks Weeds Animal pests Visitor impacts
Clean water	Subdivision and development - vegetation clearance - earthworks - impermeable surfaces - lack of adequate infrastructure Visitor impacts
Cultural heritage	Subdivision and development - vegetation clearance - earthworks Visitor impacts
Recreational opportunities / tourism	Subdivision and development that affect the quality of recreational experiences Visitor impacts Lack of adequate infrastructure
Attractive living environment	Inappropriate subdivision and development Visitor impacts

A description of the key pressures and the weaknesses in managing these pressures are described below.

5.1 SUBDIVISION AND DEVELOPMENT

The Waitakere Ranges and foothills are under pressure for subdivision and development, particularly in areas such as Titirangi, Laingholm and the eastern foothills. This pressure is increasing as:

- Population increases.
- Coastal and rural lifestyle opportunities are seen as desirable.
- The difficulties associated with consolidating development within the urban area are realised.
- The increasing value of these properties making them more attractive to develop.
- Technology advances that allow the more technically difficult sites to be developed.

5.1.1 Future Subdivision and Development

To gain an understanding of the extent of the potential for future development in the Ranges, an analysis was undertaken to determine how many more lots could be created under the current District Plan rules, how many sites in the Ranges are currently vacant and how many of these would need to be cleared for a building platform to be constructed. A summary of the results is presented in the table below, along with a comparison of the equivalent provisions of the old (pre 1995) Transitional District Plan.

Human Environment	Additional potential properties under current District Plan	Additional properties under Transitional District Plan pre-1995	Number of vacant properties	Vacant properties covered in bush
Waitakere Ranges	40*	1750 approx*	119	94 (78%)
Bush Living Environment	175**	-	312	252 (80%)
Coastal Villages	30	70 approx	153	92 (60%)
Foothills Environment (excluding the Oratia Structure Plan Area)	155	360 approx	86	11 (13%)
Oratia Structure Plan Area	220 (87 already approved)	350 approx		
PROPOSED – the Swanson Structure Plan and the Birdwood Structure Plan	187			
TOTAL	807	2530	670	449

* This was the development potential in the areas that are now identified as Waitakere Ranges Environment AND the Bush Living Environment.

**These figures include an estimation of the potential for additional properties from subdivision within the Titirangi/Laingholm area – 10 in the Waitakere Ranges Environment and 140 in the Bush Living Environment – where the subdivision provisions are under appeal.

These results highlight that the greatest level of increased development from subdivision is likely to be in the Foothills and Bush Living Environment. This potential for new development created by vacant properties is greater in some areas than others, for example there are up to 115 vacant properties at Piha and approximately 100 each in Titirangi and Oratia. Many of these properties are ‘difficult’, being steep or unstable, and have to date remained undeveloped. However, as the demand for houses in the Ranges increases and property values rise, there will be increasing pressure for more of these properties to be developed.

Most of the vacant properties in the Coastal Villages, Bush Living and Waitakere Ranges Environments are wholly or largely bush covered, and there is considered to be a high potential for degradation in the ecological health and landscape values of these areas as a result of development. The cumulative effect of this development on these vacant bush-covered sites would be the clearance of a combined figure of nearly ten hectares of bush, spread over many sites, thereby increasing the potential for fragmentation and edge effects, as well as increasing the prominence of built structures in the natural environment. This will also have an impact on the naturalness of the parkland as more built structures become visible from the regional parkland.

5.1.2 Management Weaknesses

Certainty/Permanence of Planning Regulations

As discussed in Section 4, subdivision and development are mostly managed through regulatory processes under the Resource Management Act 1991. The current provisions in the Auckland Regional Policy Statement (ARPS) and the District Plan have been put in place over ten years of consultation, facilitated processes, and Council and Environment Court hearings. A number of these processes are still under way.

Through the new District Plan, there has been a considerable reduction in the amount of subdivision provided for in the Ranges area, when compared with the provisions in the old or 'transitional' District Plan. Many of the consent conditions now being applied can significantly reduce the effects of subdivision and development, especially in the structure plan areas where planning is better able to deal with the cumulative effects of development. For example, some of the conditions that are regularly required in granting subdivision and development consents include:

- Fencing to protect bush and streams from stock
- Permanent legal protection of bush, for instance through covenanting
- Planting /restoration of riparian margins and other areas
- Provision of esplanade reserves (also required under the Transitional Plan)
- Potential to create public access to and along the coast, lakes and rivers, and access for Maori to sites of cultural significance
- Sediment control and weed management

However the policies, standards and rules in both the ARPS and District Plan are always subject to change in the following ways:

- A review of the District Plan and Auckland Regional Policy Statement is required every 10 years under the Resource Management Act.
- The Resource Management Act allows changes to the District Plan at any time (put forward by Council or privately), although only Councils can initiate changes until the Plan has been operative for two years.
- People can challenge the rules at any time by applying for exceptions to the District Plan rules (non-complying activities) and may get approval. In some cases, such as the Oratia Structure Plan area, an exception to the Structure Plan rules (additional lots over and above what the structure plan provides for) is a Discretionary Activity.
- The Metropolitan Urban Limit (MUL) that sets a boundary to contain urban development, thus providing a broad level of protection for the Ranges, is open to change through regional processes.

The ability to change policies, standards and rules at any time provides little certainty that the values of the Ranges will be maintained in the long term, and has the flow-on effect of requiring large resources to litigate proposed changes. This also gives landowners little certainty about what they, or their neighbours, can do on their land in the future.

A lot of this litigation occurs at the expense of ratepayers through costs associated with the involvement of often both the Regional and City Council or other groups concerned with changes that may affect the special values of the Ranges. Many of these groups are voluntary not-for-profit community groups with limited resources who can find it difficult to raise the resources required to develop a case in the Environment Court, where the emphasis is on the need for (costly) expert evidence.

As an example of the costs involved in this type of work the Waitakere Ranges Protection Society undertook a report to investigate the amount of time spent by the society in public advocacy on district plan matters over the past 30 years. It is estimated that approximately 12,000 hours of voluntary work has been undertaken with an approximate cost of \$2.4 million if charged out at a consulting/legal advice rate.

Limited Ability to Protect Landscape Values

The removal from the Outstanding Landscape classification from the area surrounding Piha Road in the Piha Valley described in section 4 indicates that the current provisions for protecting landscape values are not sufficient. The development of the Piha Road ridge that has led to the loss of values, has occurred in the past ten years. It has not been the result of new subdivision, but rather redevelopment of existing sites from small baches to larger, more permanent dwellings, or development of vacant sites.

The current approach of managing the elements that make up the landscape rather than the broader character of the landscapes does not appear to be sufficient to protect the broader landscape values. The reason for this approach is partly because land-use planning under the Resource Management Act focuses on managing 'effects'. There is an acknowledged difficulty in defining and managing cumulative effects, particularly relating to subdivision and development pressures that have such significant effects on landscape values. Many small actions or dispensations and exceptions to the rules, that in themselves could be said to have minor effects, can add up over a period of time to a degraded environment. This is also exacerbated by the conflict that sometimes occurs between biodiversity protection and landscape protection where building can be directed to cleared areas of a property at the expense of landscape quality.

In addition, there is no national policy statement to provide guidance for the protection of iconic landscapes such as the Waitakere Ranges. Such a statement would provide a strong national mandate for regional and district plans and may help to put in place controls that better manage broad landscape values. The need for a more directive approach in managing iconic landscapes has also been recognised by The Parliamentary Commissioner for the Environment in the publication 'Superb or Suburb'. In this publication comment is made that to properly protect an icon landscape, planning and management may need to be prescriptive and directive (what you can do) rather than permissive (everything is permitted unless the Plan directs otherwise - in accordance with the effects based approach of the Resource Management Act).

Lack of Comprehensive Monitoring Programmes

Monitoring the implementation of relevant policies, plans and rules, and the effects they are having is patchy, and consequently, knowledge about the effects of land-use activities and interventions is incomplete. Sites which have been the subject of a resource consent have usually only been monitored at the end of 2 years from the date of consent. Native vegetation and wildlife values often decline over a longer period and hence degradation that may be occurring over longer time frames isn't monitored. The recent amendment to the Resource Management Act now provides the opportunity for resource consents to be valid for 5 years.

As discussed in section 4, monitoring in the Ranges is often fragmented and site or activity specific so that it is not possible to provide a holistic picture of the state of the values of the Ranges. This would require substantial resources to achieve meaningful results and may require the pooling of resources and better co-ordination of monitoring activities amongst management agencies.

Lack of Strategic Focus on the Ranges

Waitakere City's strategic framework for environmental protection in the Waitakere Ranges currently depends on the 'Green Network' concept, as set out in the Greenprint, the Long Term Council Community Plan and the District Plan Policy Statement. Whilst the Ranges are at the heart of the Green Network, the Green Network concept itself covers the entire city. The West Coast Plan, while it provides excellent guidance for Council policy, and could form the basis for such a plan, is a community based plan that focuses on a limited area. There is no integrated Council plan or strategy focusing solely on the Waitakere Ranges area, providing a comprehensive strategic framework for policy, rules and other non-regulatory programmes.

5.2 ANIMAL PESTS AND WEEDS

5.2.1 Future Pressures

Community groups, the Auckland Regional Council and Waitakere City Council have made great strides in the past five years in managing animal pests and weeds. However there continues to be a steady increase in both animal and weed pests, partly as a result of biosecurity incursions (such as the painted apple moth), natural spread from areas outside the Ranges and the ongoing introduction of garden plants to New Zealand that, once established here, are discovered to have weedy characteristics. The latter involves a lag phase whereby it takes time for plants that are introduced to New Zealand to move from cultivation to naturalisation to weeds. There are potentially many exotic plants that are already in the country but have not yet naturalised. These plants are not seen by the public or gardening industries as a threat until they have become widely invasive. Action at this point is often too late and much more costly.

5.2.2 Management Weaknesses

Shortage of Funding for Non -Regulatory Programmes

The Resource Management Act requires Councils to consider non-regulatory methods (such as works programmes, community information, financial assistance for weed removal) alongside policy and rules (and their enforcement), for managing the natural resources of the area. Both Waitakere City Council and the Auckland Regional Council set aside budget and resources for non-regulatory programmes, and Central Government has recently introduced a contestable fund to assist biodiversity management. At local and regional level, these programmes are mostly rates funded, and this automatically places a tight limit on the funding available for non-regulatory programmes to combat the weed and animal pest pressures on the Ranges, and staff to administer them. Section 4 provides several examples highlighting that the scale of the weed and pest issue in the Ranges requires resources beyond those currently available to manage these to a level where the values of the Ranges can be protected.

Additional resources are particularly needed to raise awareness of pest and weed problems and to support community initiatives and removal of weed species from private land.

Lack of Comprehensive Monitoring Programmes

Monitoring is essential to determine the effectiveness of animal pest and weed control programmes and to prevent re-infestation. While there are several very good programmes in place such as the forest health and bird monitoring associated with the Auckland Regional Council's Operation Forest Save, and Waitakere City's bird monitoring programme, there is a need to extend these in scope.

Co-ordination Between Groups Managing Weeds and Pests

There are several good examples of co-operation between the Auckland Regional Council, Waitakere City Council, Department of Conservation, Rodney District, other agencies, landowners, environmental groups and the community to manage weeds and pests in the Ranges. This currently occurs as a result of good relationships between the parties and priorities coinciding. A more formal mandate for co-ordination between parties would ensure the survival of current integrated animal pest and weed programmes across different jurisdictions and land tenures in the Ranges. It would result in additional control programmes, that are needed to make further progress on maintaining and protecting native vegetation and wildlife values in the Ranges.

5.3 VISITORS

5.3.1 Future Pressures

From the information that exists (described in section 2.5), it appears that the number of visitors is increasing, they are mostly coming from Waitakere City and the wider Auckland Region, that a large percentage visit the area several times a year, and that most spend a few hours to a day in the area. It is clear that the high ecological, landscape and heritage values of the Ranges can be compromised by visitor activities, and local communities are also affected by visitors, as set out in Section 4.

With the population of both Waitakere City and the Auckland Region continuing to grow it is expected that the numbers of visitors will continue to increase.

5.3.2 Management Weaknesses

Coastal Recreation Facilities

There is extensive use of parts of the City's coastline for coastal recreation, and demand for provision of jetties, boat ramps and other coastal recreation structures. The Auckland Regional Plan: Coastal provides a policy framework for the establishment of structures along the coast, and promotes the development of 'Coastal Compartment Plans' for sections of the coast. No plan has as yet been developed for coastline in the Ranges area, and no programme exists for such provision. This means that opportunities may be missed, and that a comprehensive approach to coastal recreation is not being undertaken.

Public Safety

While public access the coast, safety issues, in particular in relation to swimming, occur. Waitakere City has some of the most dangerous beaches in New Zealand, and patrolling of these areas is undertaken by volunteer lifeguards. Whilst these lifeguards receive some financial support from Waitakere City Council, and Council also provides some safety signage, this is on an ad hoc basis and largely as a response to tragic events, rather than on a pro-active basis. The reality is that Council and volunteers cannot prevent people undertaking dangerous activities on the coast, but the issue arises regarding what is Council's approach to advising people of the potential dangers.

Provision of Public Access

Public Access to the coast is identified as a Matter of National Importance under the Resource Management Act. Waitakere City Council has provided a response to this in it's District Plan, in terms of the provisions of policies seeking improved public access. However, there are some areas where the value of resources and the likelihood of damage is so great that public access should be restricted. To date no overall framework has been developed to address these issues, with no defined targets or programme for such work.

A Better Informed Public

In order to reduce the impacts of visitors, people need to be better informed. While there has been some progress made, a more co-ordinated approach could be taken to development of information leaflets, and their distribution. Suggestions from past processes for better distribution include:

- Utilising existing facilities such as shops and libraries
- Make leaflets available to tour operators
- Investigate development of a website with links to community websites
- Ensure that information about the Ranges area from a variety of sources is available at the Arataki Visitor Centre

Kaitiaki

As part of the Visitor strategy, the authorities need to work with Te Kawerau a Maki to identify partnership actions that would contribute to education and monitoring and would help fulfil their aspirations to return to the area, provide employment for their people, and give effect to their kaitiakitanga role.

Code of Practice for Local Tour Operators

While some tourist operators are well informed about the environment and appropriate behaviour, and actively educate visitors about the impact of their activities on the environment, others do not. A "code of practice" could be developed that local operators would be required to, or encouraged to adopt. This could be as part of the licensing of operators, and should ensure not only that operators are well informed but that they play an active education. The code of practice could include a requirement that all tour operators visiting West Coast locations, stop at the Arataki Visitor Centre.

Events and Celebrations

Hold events such as an annual "Care for the Waitakere Ranges" day (identified as an action in the draft West Coast Plan), to encourage visitors to participate in activities that will benefit the environment - such as removing weeds, planting and picking up rubbish. Investigate ways in which existing events, such as "Art on the Beach" could incorporate a greater educational focus.

Profiling

A strategy is needed to identify ways of helping visitors to view the Waitakere Ranges area as a special place, worthy of care and protection. This could include design and installation of special 'entries' at the main roads into the Ranges area, preferably with involvement by local artists.

Bylaws and Enforcement

A short report is needed to identify and summarise all Council by-laws that have implications for visitors to the West Coast, the level of enforcement and any major issues that may need to be reviewed. As a next step, options for improved enforcement of by-laws should be investigated, including ways to improve ranger coverage, to areas with high visitor impacts in peak periods. This could involve voluntary or paid rangers or wardens, who would not only enforce by-laws but would have an important role to play in terms of educating people and encouraging more responsible behaviour. Options utilised in the past have included using local people as "voluntary rangers", or funding the Regional Council to extend its ranger operations to areas administered by Waitakere City Council. The role of rangers would vary according to whether they were voluntary or paid and depending on the particular by-laws they were administering and the legislation governing those by-laws.

Visitor Infrastructure

While some guidance is provided in the District Plan and Parks Management Plans to manage the impact on amenity and landscape of infrastructure (roads, carparks, power, communications), signage and facilities such as toilets, consideration needs to be given to what is appropriate for each local community.

When considering upgrading of major infrastructure in the Waitakere Ranges area, such as roads and car parking, issues that should be taken into account include landscape and amenity issues, safety issues, environmental issues, local community requests, the impact on visitor experience and the potential for upgrading to act as a drawcard to more visitors. Consultation with local Communities and other key stakeholders should be routine, and the relevant sections of the West Coast Plan should be taken into account, when making decisions about infrastructure.

A question to be resolved is whether infrastructure that acts as a drawcard to more visitors should be avoided unless there are other strong justifications for it - for example expanding car parking at North Piha to cater for the current overflow that is having negative impacts. The issue is whether the primary purpose of providing and upgrading infrastructure in this area should be to assist in mitigating the adverse impacts of visitors and to fulfil an educative role, as opposed to increasing capacity.

Promotion as a Tourist Destination

The Visitor Strategy will need to resolve the question of whether the Waitakere Ranges should be heavily promoted as a tourist destination elsewhere in the country and overseas, or whether policy and action should be directed to enabling the continued use and enjoyment of the West Coast by people from within Waitakere City and the Auckland region. A draft West Coast Visitor Strategy developed in 2000 made the following points:

- During much of the peak summer season most West Coast beaches are already at or close to their peak capacity. Because the West Coast is already a major recreational destination for the Auckland Region - and the population of the region is predicted to double in the next 50 years - the number of visitors from the region to the Ranges area is likely to increase substantially in the future. If more and more tourists from overseas visit the area, it inevitably means less capacity is available for people from the Auckland region.
- The provisions of the District Plan mean that the potential contribution of the Ranges area to the local economy is not great. There is a high failure rate among small tourism operators (throughout the industry) for a number of reasons but particularly because the seasonal nature of their enterprises makes it difficult to earn a full-time living. The recreational benefits of the West Coast are therefore likely to remain much greater than the economic benefits of visitor activities.
- Local community plans and the West Coast Plan indicate that destruction of the character and local culture of the Ranges and West Coast by commodification and marketing of the West Coast as a tourist destination is to be avoided. Part of the experience of visiting the West Coast is being able to discover and explore it without feeling that you are on the 'beaten' tourist track or highway. By discouraging the active promotion of the West Coast overseas tourists have the opportunity to discover the West Coast and experience and be part of local culture.

5.4 CULTURAL HERITAGE

5.4.1 Future Pressures

Pressures on archaeological sites and many waahi tapu have included disturbance of the site itself to the point that the original features have been lost, or exposure to the weather has increased so that the natural processes of weathering are hastened. Sites such as middens are very vulnerable to earthworks, while the larger sites such as kainga and pa are affected by activities such as excavation, quarrying and ploughing. Waahi tapu can be affected by inappropriate use or by discharges.

Buildings and other structures are vulnerable to complete removal as landowners seek to release the site for other uses. Structures and their sites are also vulnerable to modification, for example, unsympathetic additions, ornamentation, cladding or joinery, or destruction of the heritage context of gardens or space around the building such that the integrity of the heritage values is lost.

5.4.2 Management weaknesses

Protection of cultural heritage in the Waitakere Ranges is currently through:

- Regulatory protection for heritage items and heritage vegetation listed in the District Plan
- Addressing heritage management in Reserve Management Plans for parkland owned by the Auckland Regional Council or Waitakere City
- Special conservation plans for heritage buildings, such as buildings on regional parkland
- Purchase by the ARC or Waitakere City Council of some significant heritage items, with a view to their protection for the public benefit, for example purchase by Waitakere City Council of the Colin McCahon House in Otitori Bay Road
- Some public information/education, especially through signage

There is no regulatory protection for items on the heritage inventory that are not listed in the District Plan. In addition, it is recognised that there is an incomplete record of heritage items, with some sites of significance that are not currently identified. For example, a register of waahi tapu on Waitakere City Council owned land is being developed, but this is not yet complete.

Whilst public authorities have purchased some significant heritage buildings for restoration, there is little in the way of active assistance for private owners to protect the cultural heritage of the Ranges.

District Plan policies and rules protect those sites of significance that are identified in the plan from active modification, such as demolition or alteration, but in many instances continuation of current management practices (such as grass mowing or informal public access) are resulting in incremental degradation of the sites. To date, no management plans and programmes have been developed for management of waahi tapu, archaeological sites and geo-preservation sites on City Council parks in the Ranges.

Work is currently underway to finalise a Heritage Action Plan for Waitakere City Cultural Heritage, and this will identify the priority actions that need to be undertaken to preserve key heritage values within the Ranges area and the City. The Plan will indicate actions that are needed in light of recent amendments to the Resource Management Act classifying heritage as a matter of national importance.

6. PROTECTION OF THE RANGES IN THE LONG TERM

6.1 INTRODUCTION

The previous sections set out the key pressures on the long-term health of the Waitakere Ranges, and gaps in stewardship and management systems that have been identified through this project. It is clear from their diversity and scope, that one easy solution to long-term protection of the Ranges is unlikely. Rather, a combination of actions may be needed that together, will provide a stronger protection than there is at the moment.

The possible actions listed here have been put together for **discussion only**. The Council and its partners, the ARC, iwi and MPs are waiting for community input before deciding what further action to take. Further work and analysis will take into account community views.

Six elements are considered an important part of any package for the long-term protection of the Ranges:

- Support for the rights of iwi as mana whenua.
- An effective statutory/regulatory framework.
- Better access to funding for expansion of non-regulatory work.
- The diverse range of areas within the Ranges, each with specific needs and issues, must be reflected.
- Community involvement, development and support of the process.
- The need to be working towards the same goal, or common vision for the Ranges.

Note that over the past decades of consultation around development of the West Coast Plan the Regional Policy Statement, the Strategic Plan and the District Plan, it is clear that the Ranges and coastline are highly valued by residents and visitors alike. A vision has been agreed through the West Coast Plan process and a number of guiding principles, goals, aims, policies and standards have been agreed through community processes.

6.2 POSSIBLE ACTIONS FOR LONG TERM PROTECTION

The list of possible actions that could be taken to protect the Ranges in the long term have been grouped, according to whether they are designed to:

- Attract better funding and resourcing for the Ranges
- Strengthen existing tools
- Find the limit of the Ranges to absorb further development
- Provide more permanence and certainty
- Establish better co-ordination

Many of these actions are complimentary and could be combined to achieve long term protection.

6.2.1 Attracting Better Resourcing and Funding for the Ranges

Councils have a limited ability to fund work that needs to be done to address the key issues that were identified in Section 2. The following are possible actions for obtaining sufficient resources:

- The creation of a Waitakere Ranges Trust that could receive tax deductible donations, bequests and funding from other sources to help with such things as weed and pest programmes, heritage protection, community assistance and incentive programmes, land purchase and land management agreements.
- Additional local, regional and central government funding could be channeled into the care of the Waitakere Ranges.

6.2.2 Strengthening protection by existing methods

- a) Develop a National Policy Statement to provide strong landscape protection measures to guide regional and local Councils.
- b) Develop a special ARC Regional Plan for the Waitakere Ranges.
- c) Amend the Auckland Regional Policy Statement to strengthen the protection of landscapes.
- d) There are agreements between the ARC and Councils across the Auckland Region about where future population growth will go. It may be possible to either reallocate the proportion of population growth intended for the Ranges into another part of Waitakere City, or to ask regional colleagues whether Waitakere could take fewer people.
- e) Development of a Visitor Management Strategy (ARC and Waitakere City)
- f) Add special objectives and policies into the Waitakere District Plan for the Waitakere Ranges area as a whole, or for specific areas (such as Piha).
- g) A Waitakere Ranges Strategy could be developed by Waitakere City to guide the management of the Ranges.
- h) Development of Heritage Action Plan for Waitakere City Cultural Heritage, to identify the priority actions that need to be undertaken to preserve key heritage values within the Ranges area and the City. The Plan will indicate actions that are needed in light of recent amendments to the Resource Management Act classifying heritage as a matter of national importance.
- i) Development by Waitakere City of design guides for roading and carpark works, to avoid impacts on natural resources and landscapes in the environmentally sensitive areas of the Ranges and west coast.
- j) Re-organise Waitakere City Council and/or Auckland Regional Council officers who deal with resource consents to form a specialist team for the Ranges area (develop specialist knowledge and expertise).
- k) Summarise Bylaw provisions affecting visitors to the Ranges, and the enforcement methods used, and investigate and implement improved enforcement.
- l) Implement the West Coast Plan.
- m) Support development of more local community plans.
- n) Vacant land:
 - Explore the voluntary amalgamation of titles (together with the potential benefits to the landowner in rates reductions).
 - Investigate the potential and priorities for retiring land for reserves, including purchase, bequests, vesting and covenanting.
- o) Some responsibilities relating to the Waitakere Ranges could be delegated to a special body.
- p) Research on:
 - More effective ways of communication
 - Health of Ranges and shoreline
 - History, including oral histories
- q) Better non-regulatory methods of protection

A core ingredient in Waitakere City's Eco City strategy, and in the protection of the Waitakere Ranges area, is the development of helpful material, and methods of sharing this with communities in order to help people live in the special landscape without damaging its unique values. Some of this work currently exists, but over the years there have been numbers of suggestions on further work that would be helpful. In particular, during the extensive consultative process that preceded the production of the West Coast Plan, a large number of further educative and community development initiatives were suggested by the local Waitakere Ranges communities. The main threads are summarised below.

Education, support, promotion and advice on:

- Pests and weeds
- Innovative water, stormwater and sewerage solutions
- Environmentally friendly products
- Composting and recycling
- Alternative weedsprays
- Shellfish protocols
- Monitoring promoting and restoring bird populations
- Living in the Ranges
- How to design environmentally sensitive buildings
- Encouraging low impact small scale home businesses
- Responsible pet ownership
- Buying local products and services

Methods suggested:

- Education officer
- Websites
- Seminars
- Well illustrated booklets
- Inventories
- Visitor centres
- Local community plans
- Community events - such as Care for Waitakere Ranges Day
- Mobile displays
- Signs-including with local 'character'
- Interpretation programmes
- Youth forums
- Archive centre

Building on existing educative programmes, for example:

- Wai care
- Existing school programmes
- Neighbourhood Watch and crime surveillance

Development of new programmes:

- Community monitoring
- Nurseries to supply eco sourced plants

Dissemination:

- Use rates notices, community newsletters, web etc
- Building consent processes

Who should be involved?

- Community
- Schools
- Contractors
- Government and Council officers

Incentives:

- Free traps for pests
- Resources provided for community events

The West Coast Liaison Group is keen that those strategies which have not yet been started and completed should be actioned without the need for further debate.

In addition to this, the Council has received clear advice from its communities that, building on the good work that had already been done, and acknowledging that Waitakere is a leader in working with its communities:

- More Council staff on the ground, working alongside groups and individuals to help guide and advise are needed
- The Council needs to continue to benefit from the expertise and wisdom in communities,
- The Council could utilise celebratory and fun events more, to share information and promote good stewardship
- More innovative methods of communication are welcomed.

Waitakere City Council has also developed a range of additional ways, as set out below, to support the community in its stewardship role. Work has started on some of these actions.

- A programme to build Green Network knowledge in the community. Sectors in the community would be targeted according to their ability to transfer that knowledge, including:
 - Industry (Nursery, Landscapers, Real Estate);
 - Community Groups (newly forming groups planting in Parks and their leaders, existing Landcare and Beachcare groups, collections of neighbours cooperating for mutual and Green Network benefit);
 - Interest groups (gardening clubs, West Lynn Garden Trust, Forest & Bird), and many others.
- Memorandums of Understanding, codes of practice, would be developed between Council and community organisations that have the skills and knowledge to implement weed control, revegetation and education.
- Establish strong links with the QEII National Trust Covenant programme to further highlight the importance of covenanting and provide assistance for implementing and resourcing the provision of covenants.
- Develop Eco-sourcing projects.
- Produce informal Management Plans for private landholders with Green Network elements of value on their property (streams bush edges, coastal edges). These become the examples in the community of what will work.
- Provision of assistance and resources for responding to community priorities, (eg. weed control on parks) that the community identifies as important, but that are not a high priority from a Council point of view.

6.2.3 Strengthening Protection Through Law Changes

- Special legislation for the Waitakere Ranges, which might deal with one or more issues such as:
 - Have a conservation emphasis;
 - Freeze current rights in the District Plan (such as subdivision potential) allowing current unfinished District Plan processes to finish their course (or a variation of this);
 - Set up a Trust or Special Heritage Area body that might have a watchdog role, and / or responsibility for administering Plans or parts of Plans where they relate to the Waitakere Ranges, or take a role in Plan development.

- Changes to the Resource Management Act, for example, to provide for natural heritage areas such as the Ranges to be classified under the heritage provisions.
- Changes to the Local Government Act to include extra protection for the Waitakere Ranges

6.2.4 Providing Better Co-ordination

- Set up a co-operative structure including the ARC, Department of Conservation, Rodney District, iwi, other agencies, and community people, to ensure integrated monitoring, sharing of information, integrated weed and animal pest programmes, and better liaison with research organisations.
- Set up an agency group (ARC, Waitakere City Council, iwi, and Watercare) to co-ordinate activities, share expertise and monitor the area as a whole.
- Regional and District responsibilities could be combined to plan for and administer the Waitakere Ranges area as a whole.

7. WHERE TO FROM HERE?

The public will be further consulted in early 2004. This consultation will look at further defining the solutions for the long-term protection of the Ranges. From this, preferred responses will be identified and presented back to the community.

1. INTRODUCTION

1.1 PURPOSE OF THIS REPORT

The Waitakere Ranges area is highly valued by many people and generally acknowledged as being one of the Auckland Region's most important landscapes with high biodiversity values. Since the 1890's when part of the Ranges were first vested as a recreation and conservation reserve a number of mechanisms and initiatives have protected these values. These have included:

- A large part of the forested and coastal area has progressively been brought into the Waitakere Ranges Regional Park by the Auckland Regional Council, often through gifts, bequests or contributions from landowners in the Ranges, voluntary organizations or other government bodies.
- A lobby group, the Waitakere Ranges Protection Society, was formed specifically to protect the Ranges.
- Numerous landowners and community groups have contributed time and resources to improve the ecological health and protect the values associated with the Ranges.
- The West Coast Plan, a strategic plan for the future management of the West Coast and Waitakere Ranges, was facilitated by Waitakere City Council and developed by a community consensus process.
- Successive regional and local councils have put in place policy and rules for the survival of valued landscape and natural features.
- Funding has gone into combating animal pests, weeds and other ecological threats.
- Information, educational material and assistance with environmental projects have been provided.
- Programmes have been initiated to involve residents in caring for their environment, for example, native tree planting days for schools, and Project Twin Streams in the Oratia, Opanuku and Swanson catchments.

Recently concern has been expressed by some local people, local MPs and lobby groups that the Ranges area continues to be under pressure and further action is needed to ensure more secure protection for future generations. The West Coast Plan also identified the need for further investigation of ways to improve the co-ordination and protection of the Ranges area. In addition, New Zealand's Parliamentary Commissioner for the Environment has questioned whether the many short-term actions on private land (especially subdivision and new housing) over a period of decades will threaten this highly valued area.

In response Waitakere City Council, in partnership with the Auckland Regional Council (ARC), iwi and local Members of Parliament, has initiated a project to investigate whether there is a need for further action. This report documents much of the material available to date in undertaking this investigation.

The investigation focuses on the following:

- The values that people associate with the Ranges area and the roles of the various parties involved in the management of the area.
- Current management regimes and the strengths and weaknesses of these.
- Possible responses and actions to improve long-term protection of the Ranges.

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9. APPENDICES

APPENDIX 1

INDIGENOUS VEGETATION OF WAITAKERE CITY

New Zealand has a unique biodiversity shaped by 80 million years of isolation. Most of the third of the country that is currently managed for conservation purposes is in mountains and remote upland areas, while lowland areas, wetlands and coastal areas have been largely settled and the habitat lost to farming and urbanisation. Those lowland biodiversity refuges that do remain are under mounting pressure from animal pests, weeds, visitors and the spread of human settlement.

Protected Natural Areas Programme (PNAP)

For the last 20 years or so a programme has been underway in New Zealand to ensure as far as possible the “preservation of all indigenous species of flora and fauna, both rare and commonplace, in their natural communities and habitats, and the preservation of representative examples of all classes of natural ecosystems and landscape which in their aggregate originally gave New Zealand its own recognisable character.” (Waitakere Ecological District Survey Report) Accordingly, New Zealand has been categorised into 268 ecologically cohesive districts on the basis of geology, topography, climate, biology and human modification. Preparation of the PNAP report for an ecological district will involve a reasonably detailed description of the entire indigenous vegetation of the district, with priority areas for protection identified according to the degree to which protection is necessary to fulfil the stated aim of the programme.

Waitakere City has three Ecological Districts partially contained within its boundaries –

- The Waitakere Ecological District, which encompasses the Waitakere Ranges and extends roughly in a line from Titirangi/Green Bay to the Waitakere Valley;
- The Tamaki Ecological District, which covers the Auckland Isthmus and in Waitakere City extends from the boundary with the Waitakere Ecological District in the west to the Waitemata Harbour, and
- The Rodney Ecological District of which a small part is found in the City in the Anzac Valley Road area.

Of these, the Waitakere Ecological District is by far the most vegetated, with approximately 83% cover of vegetation, mainly native. Both the Tamaki and Rodney Ecological Districts are far more depleted with only remnants remaining of the original vegetation cover.

PNAP reports have been completed for both the Waitakere and Rodney Ecological Districts, by the Auckland Regional Council and Department of Conservation. A PNAP type report was prepared by Waitakere City Council for the Tamaki Ecological District, covering that part of the Tamaki Ecological District that is in Waitakere City. The remainder of the Tamaki Ecological District PNAP work is still to be completed. The base information and priority sites for protection identified in these PNAP reports was used in the preparation of the proposed District Plan

Waitakere City Outstanding Vegetation

The outstanding vegetation of Waitakere City was identified and mapped primarily through the PNAP priority areas for protection information, but this was not relied upon entirely. The Council carried out its own survey work, consulted aerial photography and other case examinations and carried out extensive community consultation to identify issues and responses to those issues.

Waitakere City Significant Vegetation

Significant vegetation in Waitakere City includes all those areas of vegetation that contain greater than 50% native vegetation cover and are greater than 300m² in area. These areas of native vegetation will also meet one of the following criteria for identifying significant native vegetation. These criteria have been adapted in the Green Network Analysis from methodology in the Auckland Regional Policy Statement and the Protected Natural Areas Programme:

- It is the best or one of the best representative site(s) of an indigenous vegetation community within its ecological district.
- It is a threatened vegetation community within its ecological district.
- It contains a significant population of an indigenous species.
- It is an indigenous vegetation community type poorly represented in the City's protected area network.
- It is threatened in the short-term with loss or destruction, or significant degradation in condition or health.
- It contains a high diversity of ecological pattern, for example a change in species composition or vegetation communities along an environmental gradient.
- It is a vegetation community in an original condition, or is in a largely natural state or healthy condition.
- It will maintain or has the potential to maintain its ecological viability over time through its size, shape, health or by restoration.
- It has adequate buffering or protection from external effects, or has the potential for buffer areas to be added in the future.
- It is linked or can be linked to other protected natural areas (i.e. presence or establishment of ecological corridors).
- It is a site which has the potential for restoration of a threatened indigenous vegetation community.

APPENDIX 2:

LEGISLATION, POLICIES, REGULATORY AND NON-REGULATORY PLANS FOR THE MANAGEMENT OF THE WAITAKERE RANGES

- Auckland Regional Parks Management Plan 2003
- Auckland Regional Policy Statement 1999
- Auckland Regional Pest Management Strategy 2002
- Auckland Regional Air, Land and Water Plan (notified 2001)
- Biosecurity Act 1993
- Karekare Community Management Plan (2002 update) and Piha draft Community Management Plan 1991
- Local Government Act 2002
- Long Term Council Community Plan 2003
- New Zealand Coastal Policy Statement 1994
- New Zealand Conservation Management Strategy
- New Zealand Biodiversity Strategy (draft 2002)
- Piha Coastal Management Plan
- Piha Reserve Management Plan
- Reserves Act 1980
- Resource Management Act 1991
- Rodney Proposed District Plan 2003
- Waitakere City Council Greenprint 1999
- Waitakere City Council Long Term Council Community Plan 2003
- Waitakere City Council District Plan (operative 2003)
- Waitakere City Council Parks Strategy
- Waitakere City Council Weeds Strategy 2000
- Waitakere City Council Water Cycle Strategy 1996
- Waitakere City Council Stormwater Strategy 2000
- Waitakere City Green Network
- Waitakere City Reserve Management Plans for Council land in the Ranges
- West Coast Plan 2001

APPENDIX 3

COMMUNITY INVOLVEMENT IN CARING FOR THE RANGES

Please note that these are examples and do not cover all the groups working within the Ranges.

COUNCIL / COMMUNITY PARTNERSHIPS

1. Auckland Regional Council

The ARC works with a number of community groups in the Waitakere Ranges through its community care group programme. These groups include: Waitakere Rivercare, Karekare Landcare, Bethells/Te Henga Beachcare, Piha Coastcare, Lone Kauri Forest Restoration Group, La Trobe Restoration Group, Muriwai Beachcare, "Ark in the Park", Woodlands Park School, Forest & Bird Matuku Reserve restoration, Waitakere Weedfree Trust, and groups at Whatipu.

These groups are actively involved in ecological restoration, replanting programmes, pest and weed control, dune restoration and mainland island projects. They play a very significant role in the protection of the ranges. The ARC provides assistance to these groups through helping with the establishment and running of groups, planting days, bait and traps for pest control, technical advice. ARC also provides assistance (e.g. sources of native plants, propagation advice) to many groups and schools through its native plant nursery at Arataki. Financial assistance is provided through grants from the Environmental Initiatives Fund for on the groundwork and materials including fencing, weed and pest control and planting. A number of the groups undertake control of pests.

Some examples are set out below.

Ark In The Park

This is a community initiative originally floated by representatives from a wide range of environmental groups under the auspices of the Royal Forest and Bird Society (RF&BS). The project has been formalised through a Memorandum of Understanding between the Waitakere Branch of the RF&BS and the Auckland Regional Council.

The project includes weed and animal pest control to be carried out by community volunteers over a 250ha area on the slopes of Pukematekeo, with a primary focus on predator pest control, principally rats, mustelids, and cats. The project complements Operation Forest Save and enhances other pest control work being undertaken on Waitakere Ranges Regional Parkland by ARC park rangers, biosecurity officers and contractors.

The group intends to restore the forest ecosystem and then re-introduce native species such as the now locally extinct bell bird, white head, robin, kokako, forest butterfly and green mistletoe. Other potential works include streamside planting, the involvement of volunteers in baiting and trapping for pests, and local school involvement.

Friends of Arataki

The Friends of Arataki are a group originally formed to support the establishment of the Auckland Regional Council Arataki Information Centre. The group are now more widely involved in fundraising, promotion, and volunteer projects throughout the Ranges. Members routinely help with the running of the Arataki Information Centre and associated projects including the 'kids day' and the bush camp education project.

Friends of Whatipu

Friends of Whatipu is a group of about 30 people who have knowledge of and links with the Whatipu area and have resolved to act as guardians of the area, helping to preserve its special character, and where possible assisting the Auckland Regional Council in its management of the area.

Tree planting days have been held in concert with the Auckland Regional Council, with the latter supplying trees and the Friends supplying the labour. They have planted nearly 2,000 trees during the last two years.

The Whatipu sands area has now been gazetted as a scientific reserve, and a small number of pairs of the endangered NZ dotterel are nesting there. The ARC has a programme of predator control, which has been operating for some years, but in order to ensure breeding success of the birds, the programme needs to be intensified during the nesting season. The Friends of Whatipu have taken on, as a major project this year, to raise funds to intensify this effort.

Friends of Whatipu have the following aims:

- To hold tree planting sessions
- To keep the beach clear of rubbish
- To keep the track to Wing Head open (gorse cutting)
- To hold picnics and social events at Whatipu
- To liaise with the ARC rangers on practical ecological management, and the heritage section of the ARC to offer suggestions with the management of the heritage buildings and other matters.
- To endeavour to engender a spirit of guardianship for the Whatipu area.

La Trobe Forest Restoration Project

The La Trobe aims to develop a mainland island of about 200 hectares in the Karekare area. This group of local residents aims to establish a mainland island through intensive pest management. The group's work has greatly benefited from a Royal Society Fellowship enabling Peter King to work on the project for a year. Volunteers from the International Conservation Volunteers have also achieved significant work.

The ecosystem being restored is regenerating subtropical rainforest. The group is controlling rats, mice and possums using a bait station grid and attempting to control mustilids using kill traps. Possum numbers are below 5% and rat numbers are now down to a 3% trap catch level with ongoing regular monitoring using tracking tunnels.

They are also developing procedures to monitor pigeon (kereru) - a monthly one-hour viewpoint monitoring of kereru to record abundance and monitor the wood pigeon population - and moreporks (native owl). Other planned studies include measurement of fruiting of plant species important to kereru such as taraire, compared with pigeon reproduction, investigation of the potential presence of native bats and frogs in the area and monitoring of vegetation health and lizards to establish if the populations are recovering.

Lone Kauri Forest Restoration Group

A group of local residents established the Lone Kauri Forest Restoration Group in October 2001. This group is affiliated with NZERN - the New Zealand Ecological Restoration Network. The aim is to provide a better environment for bird life and native wildlife through pest control in an area of about 200 hectares around the lower part of Lone Kauri Road, Karekare. This group is close to, but does not overlap with, the La Trobe Forest Restoration Project.

Land ownership within the mainland island area is a mixture of private landowners and the Auckland Regional Council. There are 25 landowners with a core group of 5-6 who do most of the work.

Work to date has concentrated on animal pest control targeting possums, rats, mustelids, feral cats and exotic birds as the main targets. A combination of traps and poisons has been used to control rats and mustelids. The cats have been killed through secondary poisoning – eating rats that have been poisoned. All 200 bait stations have been logged with a Global Positioning System. The group has freeze-dried some of the trapped rats for use as stoat bait.

Future plans involve recruiting more volunteers to monitor the uptake of bait and to replenish bait stations, plus supplementary trapping and potentially a couple of people working full time on the project.

Waitakere Rivercare Group

The Waitakere Rivercare group is working toward the revegetation of the riparian margins along the length of the Waitakere River and its tributaries, with eco-sourced native plants. The aims of the group are to improve water quality, native wildlife habitat (both aquatic and terrestrial), bank stability and the quality of the landscape, and to raise local awareness of the issues. They work on both public and private land and have a strong community focus, operating initiatives such as a native plant nursery and regular “planting bees”.

2. Waitakere City Council

In line with Agenda 21, Waitakere City became an Eco-city in 1993, Council then developed its own local Agenda 21 plan known as the Greenprint, which sets out the City’s own agenda for the 21st century - the agenda for becoming an Eco-city.

As well as outlining the actions that the Council, together with its community must take, the Greenprint talks about partnerships, community led initiatives and the need to work together both within the city and across the region, the country and the globe in order to achieve those desired outcomes. The Greenprint recognises that Council is limited in the things it can influence directly, and that a key way to achieve results is to work with citizens, other stakeholders and participants - businesses, other local and central government agencies, iwi, social sector groups, and the community in general.

This makes interacting effectively with its community a key priority for Waitakere City Council. In order to achieve the strategic objectives it has set for the Green Network, Council must encourage the community to take decisions and actions that move the city towards those objectives.

A number of community partnerships have already been established and the following outlines a range that currently has influence within the Ranges (please note that many of the council partnerships are with existing individual organisations, and some have received assistance from both the ARC and Waitakere City Council, so these organisations appear in more than one category):

Bethells Beach Care

This group has adopted the dunes at Bethells Beach, which is an area of some 16ha. They also operate a community plant nursery for their restoration projects.

Birdwood Planting Group

This group has undertaken to restore the Birdwood Road and Mudgeway Road frontages, in the Swanson area.

Kaurimu Stream Group

Has adopted an area of some 3,000m² of private land along the Kaurimu Stream, Oratia.

Laingholm Weedfree Group

Has adopted an area of 2,500m² which includes both private land adjacent to the Laingholm Stream and the Laingholm Scenic Reserve.

Landing Road Riparian Care Group

Manages an area of approximately 30ha, comprising private land and Regional Park west of Lone Kauri Road.

Keep Waitakere Beautiful Trust

The Keep Waitakere Beautiful (KWB) programme was established by Waitakere City Council in 1993 as a Council-Community partnership. The Keep Waitakere Beautiful Trust was established in August 2002 to continue the KWB Programme as an independent charitable trust, now working outside of the Council, with the Ecomatters Environmental Trust.

The Keep Waitakere Beautiful (KWB) programme is managed by a voluntary committee, which comprises seven Project Group Leaders and Chairman, Dennis Finn. Mayor Bob Harvey is its patron.

The Keep Waitakere Beautiful Trust runs many high profile events in partnership with Waitakere City Council including:

- Community Street Tree Planting
- Clean Stream Waitakere
- Operation Spring Clean
- War on Weeds
- Adopt a Spot (litter)

The Weedfree Waitakere Trust

The Weedfree Waitakere Trust was formed to help protect, restore, and maintain native bush and native bush-clad berms in Waitakere City in public and private ownership. The Trust delivers a range of services including the removal of environmental weeds from public and private property using manual and/or chemical methods, and education and research on environmental weeds. The Trust also performs contractual work for Waitakere City Council, Auckland Regional Council and Watercare.

Waicare

Wai Care is a community based water quality monitoring and action programme. Community groups and schools are resourced and supported to monitor a stream or water body of their choice on a regular basis. This means that along with learning about all the interactions that occur within the environment, the groups can build up a picture of the health of their stream. Using this information, they can then plan appropriate actions to restore or enhance their local stream environment.

PRIVATE ORGANISATIONS/TRUSTS

Within the City there are a number of private organisations and trusts which are directly involved with issues relating to the Ranges. Some examples include:

Royal Forest and Bird Society (Auckland Branch)

This is an active organisation with a programme of monthly evening meetings, which are held at the Kelston Community Centre, or if sufficient members show an interest, at Helensville Primary School for its Rodney members. Regular Field trips are included in the programme, together with workdays at its two reserves. The larger is the Matuku Reserve, off Jonkers Road and north of the Waitakere Wetland, and the other is on Taylor Road. Waimauku.

Matuku Reserve, the second largest of any Forest & Bird Reserve in the country, is available for members enjoyment and is also widely used for scientific research by Auckland University, and entomological, botanical and ornithological groups, many of which it assists financially. Insects have been discovered which were thought to be extinct, and a fish survey discovered the rare Giant Kokupu. Through a generous bequest from the late Mr & Mrs Cole they have been able to improve facilities such as viewing platforms and the cabin, to sponsor environmental research and, together with a recent grant and appeal, to extend the reserve. The magnificent gift of the Colin Kerr Taylor Memorial Reserve was from his daughters, Yvonne Hollier and Vivienne Wilson, to protect in perpetuity in his memory. This reserve is a focus for the Rodney members. The Tai Haruru Lodge at Piha, situated in a quiet road close to the beach, is also available to members at modest cost.

The Auckland Branch of Forest and Bird sponsors the Ark in the Park Restoration Project and Ark in the Park volunteer days.

Karekare Landcare Group

This group comes under the umbrella of the Karekare Residents and Ratepayers Trust and has adopted the Karekare waterfall area (900m²).

Waitakere Ranges Protection Society

The Waitakere Ranges Protection Society was created in 1973. It was formed by the local community at Te Henga (Bethells Beach) to fight a proposed refuse tip in the upper reaches of the Waitakere wetland, the largest wetland remaining in the Auckland region, and now has a wide membership from the Auckland Region. The Society's fundamental goals are:

- To protect the Waitakere Ranges from degradation and to promote its conservation
- To enhance environmental values and restore disturbed areas to ecological health
- To see the region managed and nurtured by a unified and consistent philosophy of protection

The Society has initiated or assisted with major additions to Waitakere parkland in the following areas:

PROPERTY/AREA	LOCATION
Pae O Te Rangī	Waitakere Valley
Paruroa	Big Muddy Creek
Lake Wainamu reserve	Te Henga
Spraggs Bush	Scenic Drive
Gribble property	Karekare
Craw and other properties	Anawhata
Waitoru Reserve	Waitakere

The Society has also been instrumental in restricting unsympathetic proposals in the Ranges, including defending large areas of bush and rural land from subdivision.

Ratepayers and Residents Associations

Ratepayers and Residents associations represent their local Communities, with many actively involved in protecting and enhancing the Environment. They also act as a forum for discussion on local issues and concerns. For example the Piha association is actively working to protect its sand dunes during filming and surf competitions and to improve safety on roads within Piha and on the Piha Road.

There are some sixteen ratepayer associations in the Ranges and foothills, representing the following areas:\

- Green Bay
- Hui/Cornwallis
- Laingholm
- Parau
- Karekare
- Oratia
- Massey/Birdwood
- Paturoa
- Piha
- South Titirangi
- Swanson
- Te Henga/Bethells
- Titirangi
- Waiatarua

Individual Contributions and Activities

Along with the groups and organizations outlined above, there are a number of individuals who contribute to protection of the Ranges. Most of these are private landowners who are taking steps on their own land to remove weeds and/or revegetate. Many of these individuals utilise the Green Network Community Assistance programme run by Waitakere City Council and are actively involved in work on their own properties and often also with groups such as those previously described.

APPENDIX 4

LAND OWNED BY THE DEPARTMENT OF CONSERVATION

Parahara Point Marginal Strip

This is a narrow strip of land between Okaha Head and Paraka Point and includes cliffs containing the regionally significant Okaha Head dike swarm, which is the most clearly exposed set of dikes intruding into andesite conglomerate in the Waitakere Ranges. The 4.4ha strip also encompasses part of the Taranaki Bay volcanic crater. It provides habitat for the threatened species: bittern, Caspian tern and fernbird and also common bush birds, and a variety of freshwater wetland birds associated with the adjacent Okaha Head Lake. The strip also includes cultural features such as pa, rock shelters and middens.

Swanson Stewardship Area

This is a steep triangular site dissected by the Swanson Stream. The 20.5ha site contains forest (manuka/kanuka, ponga, young kauri and young mixed broadleaf) and pasture and provides habitat for common bush birds. The site unfortunately contains a number of exotic weeds.

Swanson Hall Reserve

This is a small 0.2ha flat block of pasture used for grazing across the road from Swanson Railway Station.

Swanson Stream Marginal Strip

This is a 0.5ha stream side strip with unfortunately a large amount of water weeds present. The strip provides habitat for ducks and introduced frogs.

Waitakere River Marginal Strip

This is a 4.2ha marginal strip running along the Waitakere River in the Te Henga swamp, opposite Bethells Road. The strip provides habitat for bittern, fernbird, spotless crane, various ducks and shags and pukeko.

Te Henga Recreation Reserve

This is a cliffed coastal site, which follows the northern headland of the Waitakere River and contains two small rocky island outliers. It is a geopreservation site, which includes a volcanic crater with regionally significant andesite flows at O'Neill Bay. The 83.5ha reserve displays a range of coastal landforms and coastal shrubland with broadleaf, cabbage trees, kawakawa, kanuka (*Rhabdothamnus solandrii*). It provides habitat for common bush birds and grey-faced petrel nest on the outliers. Eleven historic Maori sites are recorded on the site. The Te Henga-Goldie Bush Walkway (an NZ walkway) passes through the upper boundary of the reserve.

Henderson Valley Scenic Reserve

This 30.2ha reserve comprises two areas of regenerating forest, including a long strip along the Opanuku Stream and a moderate sloping head of an east-facing valley. The forest was previously logged and now contains manuka with emergent kauri, rimu and other podocarp and hardwood species. The site provides habitat for NZ pigeon, morepork and some common bush birds.

Opanuku Stream Marginal Strip

This 1.5ha marginal strip along the Opanuku Stream includes lowland forest of rimu, kahikatea, kauri, cabbage tree, manuka/kanuka and kamahi, providing habitat for NZ pigeon and common bush birds.

Taumata Scenic Reserve

This 0.4ha reserve includes a narrow gully and steep northern hillside in forest of scattered emergent podocarp/regenerating hardwood. One historic burial site is recorded and others are likely. The reserve contains a good range of common bush birds.

Isaachsen Scenic Reserve

This 2.3ha reserve consists of an area of regenerating native bush and large stands of bamboo.

Green Bay Marginal Strip

This is a 4.3ha coastal strip running along the Green Bay beach frontage. The site includes cliffs and foreshore with representations of pohutukawa, kauri and coprosma and various wading birds. One pa (possible destroyed) and three middens have been recorded at the site.

Whatipu Sands

This is an 820 hectare area of accretion land located at Whatipu. It is owned by the Department of Conservation but managed by the Auckland Regional Council.

APPENDIX 5

CONTROL OF INVASIVE PLANTS

In its home country a plant is kept in balance by browsers, pests, competition from other plants or climate conditions. In a new country an introduced plant becomes an invasive species where there are ineffective control mechanisms, or none at all, and favourable environmental conditions.

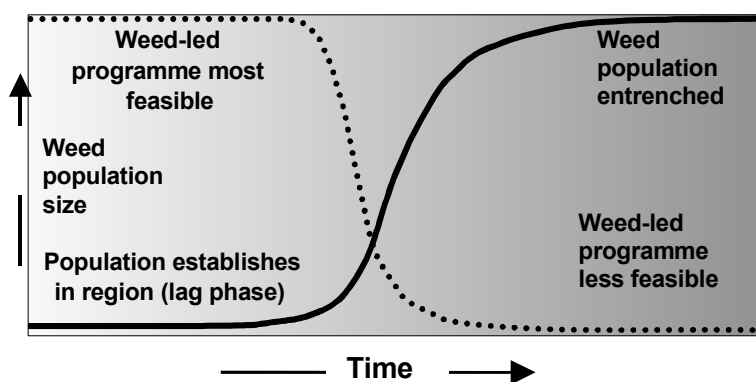
Almost all invasive plant species have not yet reached their full distribution nationwide. Invasive plants are generally present in an area for some time before they develop into serious infestations. The "lag-phase" refers to a period early in the invasion process during which the density and total population size of a weed is low, and the rate of spread is comparatively slow.

Long-lived species, such as trees, may have lag phases of 100 years or greater before they even naturalise. For example, bungalow palms have had a lag phase of approximately 110 years. The bungalow palm was first introduced into New Zealand in the 1880's but the first wild seedlings were not recorded until the 1990's.

Most future weeds are already in Auckland in people's gardens. Whether or not they become significant problems will depend on society's attitudes to weeds and willingness to respond early.

Weed control, and in particular eradication, is likely to be most successful when started during the lag-phase (Fig. 1). The best opportunities for eradication or containment of a weed are in the early stages of invasion when weed populations are small and localised and costs are low. Generally the further along the infestation curve a weed is, the more expensive it is to control.

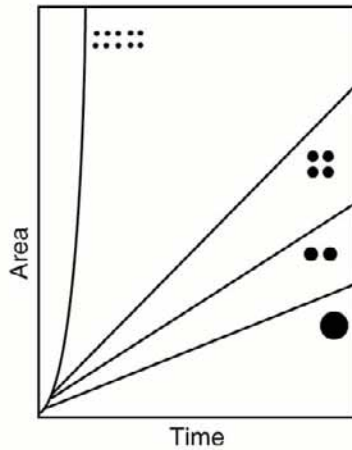
Fig. 1: Relationship between population growth and the feasibility of a weed-led programme (adapted from Williams 1997).



From Waitakere City Council's Weed Management Strategy, (2000).

The threat posed by weeds depends on the nature of their distribution. The spread of a weed from numerous, widely spread infestations will be more rapid than from one large infestation (Fig. 2). Small, remote populations, or outliers, represent the invasion front. Most new plants establish in close proximity to the parent plant, and dispersal over long distances is relatively infrequent. Removal of outliers limits dispersal and prevents further expansion of the population. Therefore, control of outlier populations, i.e., scattered individuals or small clumps of weeds, is a priority over the control of large, well-established, high-density infestations to prevent the spread of weeds into new parts of the City.

Fig. 2 Threat by population distribution



Several small infestations have a faster rate of new range occupation than fewer, larger infestations, even if the total area initially occupied and rates of spread are the same. All trajectories in this diagram start with weeds occupying the same area, and assume the same rate of spread (after Mack 1985).
From Waitakere City Council's Weed Management Strategy, (2000).

Sites of aggressive weed invasion are typically high light, high disturbance areas on the edge of vegetation and often have bare soil. Roadsides, forest margins and stream edges are classic examples of this habitat. These areas of high disturbance, light levels and edge habitats not only favour light demanding weed species, they are also areas of high native biodiversity. Weeds that typically flourish in these habitats, such as velvet groundsel, are not a direct threat to mature, intact forest but do replace edge species. These areas contain the required habitat elements for pioneer plant species – those plants that colonize bare ground – and are common habitats for many rare plants such as kumeraho and *Hebe bishopiana*.

Another, more serious environmental weed group are those tolerant of low light levels. These plants pose an even greater risk because the very habitat they flourish in, beneath intact forest canopies, not only prevents forest regeneration it also makes it very difficult to identify their presence and control measures often cause further disturbances that encourage weed growth. Mistflower, wild ginger and bartlettina are all environmental weeds capable of tolerating very low light levels and they can all spread vegetatively, by movement of pieces of stems or roots, and by seeds.

Importance of Residential Gardens.

Residential gardens surrounding the Waitakere Ranges were surveyed for key environmental weeds in 1994 and again in 1998. In just four years there was a significant spread of most environmental weeds with an average increase of 5% in all localities.

Recent research conducted by Landcare investigated the relationship between reserves, the nearest surrounding town and the plants contained in both sites. Results showed the presence of weed species in reserves was strongly influenced by the distance to the nearest town. Settlements within 200m of a reserve accounted for approximately 70% of the weeds found in that reserve.

The survival of the natural heritage of Waitakere City, and New Zealand, lies in the hands of gardeners and in the garden industries taking responsibility to prevent future weeds escaping from cultivation and removing plants from cultivation once they are identified as weeds.

APPENDIX 6

GREEN NETWORK COMMUNITY ASSISTANCE PROGRAMME – MARKET RESEARCH

Market Research was undertaken in November 2001 on the Green Network Community Assistance Programme. Results showed that 57% of participants in the programme had heard of the Green Network. Specific questions were asked about the types of assistance received and what effect the assistance had.

Planting

48% of people who received free plants stated that without the assistance they would not have undertaken planting.

Management Plan Advice

73% of those people who received management plan advice stated that it was very or reasonably helpful.

53% of those people who received management plan advice stated that they had done all or most of the plan

Telephone Advice

59% of those people who had received telephone advice found it very or reasonably helpful.

Weed Assistance

49% of people who participated in the programme were aware that contractor assistance was available.

33% of those people who received free herbicide would not have undertaken weed control without the free herbicide.

73% of people who received assistance with weed disposal were controlling weeds in an infested area up to half the size of a tennis court or larger.

17% of those people assisted with weed control fully eradicated the weeds, while 65% recognise the need for ongoing weed control.

86% of those people assisted with weed control expect to do more about weeds in the future.

18% of those people who received contractor assistance had their weeds successfully eradicated.

Conservation Covenant

56% of participants knew it is possible to covenant natural areas.

55% of those surveyed consider that six months to a year is the right time to consider issues before entering a covenant.

Fencing

24% of those surveyed were aware of fencing assistance.

Overall programme

63% of those surveyed learned something from the programme

33% of those surveyed felt there was a greater need for awareness raising.

14% of those surveyed felt that communication could be improved between staff and participants.

APPENDIX 7

NATIONAL, REGIONAL AND LOCAL POLICIES AND PLANS THAT IMPACT ON THE MANAGEMENT OF WATER IN THE WAITAKERE RANGES AREA

National Coastal Policy Statement 1994

The national Coastal Policy statement requires as a national priority in the coastal environment the protection of significant conservation values, the preservation of estuaries and of predominantly unmodified coastal wetlands, lakes and ponds and the restoration of degraded water quality. Local plans must give effect to its policies.

Sustainable Development for New Zealand Programme of Action 2003

This programme sets directions and outlines the initial actions the government will be taking, focusing on four priorities, including freshwater quality and allocation. The overarching goal for freshwater is 'adequate, clean freshwater available for all'. The programme of action seeks to achieve three desired outcomes.

- Freshwater is allocated and used in a sustainable, efficient and equitable way
- Freshwater quality is maintained to meet appropriate needs
- Water bodies with nationally significant natural, social or cultural heritage values are protected.

Auckland Regional Policy Statement 1999

This document is about managing the use, development and protection of the natural and physical resources of the Region, including water. It has policy objectives that require water quality to be maintained and enhanced.

Auckland Regional Plan: Coastal 1995

This plan provides a framework to promote the integrated and sustainable management of Auckland's coastal environment. It identifies the values of the coastal environment and sets out objectives, policies and rules to promote sustainable management of these values. It acknowledges that water and sediment quality is probably the major environmental issue for the Auckland coastal marine area, and seeks to ensure that water quality is maintained or improved.

Auckland Regional Council Low Impact Design Manual 2000

The Auckland Regional council's Technical publication No. 124, Low Impact Design Manual for the Auckland Region, sets out the ARC's vision of an alternative approach to site design and development. Aimed mainly at reducing the long term adverse environmental effects of development generally, it takes a minimum disturbance approach to earthworks and erosion and sediment control, which also avoids and remedies the adverse effects of stormwater runoff.

Proposed Auckland Regional Plan: Air, Land, and Water 2001

This plan deals with the integrated management of these resources. For water, it sets out the values, and identifies objectives, policies and rules to ensure that these values are sustainably managed.

Waitakere City Long Term Council Community Plan 2003 (LTCCP)

The strategic platforms of most relevance set out in the LTCCP are:

- Urban Villages, incorporating the Metropolitan Urban Limit, designed to contain the urban area and protect the Ranges area and the countryside from urban development
- The Green Network, described earlier in this report, which focuses on protecting and restoring trees, bush and native wildlife corridors, waterways and their aquatic ecosystems, including revegetating the banks of streams. Streams are key parts of both the natural world and the City's stormwater system. Plants, ponds and wetlands provide wildlife refuge. At the same time, they help to reduce flooding, act as a natural filter for stormwater, help to protect the quality of the water in streams, harbours and oceans and maintain their delicate ecosystems,
- Three Waters looks to Waitakere City taking an innovative approach in managing drinking water supply, wastewater and stormwater together, providing efficient, reliable and high quality services while minimising impacts on the environment over the long term.

Waitakere City District Plan 2003

The District Plan, developed under the Resource Management Act, was proposed in 1995, becoming operative in 2003. It is designed to sustainably manage the natural and physical resources of the City and ensure adverse effects on the environment are avoided, remedied or mitigated. The Green Network provisions in the Plan, discussed earlier in this report, and particularly the policies and rules relating to Riparian Margins (the edges of streams, lakes and wetlands) and Coastal Edges Natural Areas, are central to the management of water quality in the City.

Water Cycle Strategy 1996

This strategy endorses the idea of water management within the natural water cycle and integrated catchment based water, wastewater and stormwater planning. The environmental target commits to supporting the progressive improvement and restoration of all water bodies, including the Manukau Harbour, towards a healthy natural state.

Waitakere City Stormwater Management Strategy 2000

This document sets out Waitakere City Council's approach to managing the City's stormwater over the next twenty years.

Waitakere City Non-Regulatory Incentives Strategy 1999

This strategy sets out a programme of economic incentives for private bush and riparian margin protection and restoration in the city, both of which will benefit water quality.

Waitakere City State of the City Report updated 2002

The State of the City report has a chapter titled 'The State of our Water' which contains information about Waitakere city's water resources and flooding issues, outlines sources of water pollution and water quality issues and monitoring results in the city's streams, lakes, lagoons and harbours.

Stormwater Catchment Management Plans

Waitakere City has developed a number of stormwater Catchment Management Plans over the past decade, aimed at managing the impacts of stormwater. These plans look at issues and options for managing stormwater from both developed areas and from anticipated new development, and set out detailed guidelines.

Eco Water Solutions Business Plan

This Plan sets out key objectives for management of the ‘three waters’ (water supply, wastewater and stormwater), including ‘to ensure continual improvement of environmental outcomes’. Key strategies are outlined for each objective, together with goals, targets and action programmes. The strategies relating to this objective include environmental management communication to promote community awareness and education of the water cycle strategy and the benefits of water conservation, reduction of wastewater network overflows, reduction of the adverse effects of stormwater quality on the receiving environment and restoration of riparian areas.

Asset Management Plans

The asset management plans for water, wastewater and stormwater identify the nature and cost of the work programmes for the management, maintenance and operations and the improvement of the City’s water services. The basis for consultation is outlined, together with a framework for consideration of projects and costs and the relative priorities of the planned work, and a means for reviewing and improving the quality of the information on which the plans rely.