BIODIVERSITY OF THE WAITAKERE RANGES HERITAGE AREA

(*Adapted from the Waitakere City Biodiversity Report 2007)*

The forests of Waitakere sit on an ancient volcanic system and are strongly influenced by the marine coastal environment; being surrounded on three sides by the Waitemata and Manukau Harbours and the Tasman Sea.

The Waitakere Ranges were formed by an ancient massive uplift of hard volcanic basalt creating an elevated plateau with a cool climate, catching the clouds and a rainfall twice that of the rest of Auckland. Stands of rimu thrive on the cool plateau. Within the Ranges, softer rock has eroded away creating steep rugged hills with good drainage that suits kauri stands. Very steep slopes of crumbling, actively eroding rock release nutrients in this infertile landscape and provide a refuge for trees like puriri that normally abound in preferred fertile lowland soils or young volcanic areas.

The hard basalt is exposed in many sites to form spectacular gorges, waterfalls and bluffs. These rockland habitats support communities of specialised plants that can tolerate droughts and little soil. In this habitat the Waitakere Ranges has an especially drought-tolerant kowhai. Silt has collected from slowly eroding hills in a few small valleys to form alluvial forests of kahikatea pukatea, puriri and ti kouka.

The lowland areas of Waitakere, which are now urbanised, were once covered by great broadleaf forests; the Waitemata lowlands. East of the Waitakere Ranges, the soils are more sedentary than volcanic, holding more moisture in summer and are highly fertile. On these Waitemata soils lowland totara is more common and the lush kohekohe, puriri, karaka and nikau are notably more widespread and abundant.

Climate and topography are key influences over what grows where and this is especially the case in Waitakere's wild west coast. Storms from the Tasman Sea dump salt spray on to the rugged landscape creating a band of salt-resistant pohutukawa forest and a whole array of other salt-hardy plants.

The unrelenting coastal elements have moved mountains of sand, damming valleys to create wetlands and dune-impounded lakes, partially burying pohutukawa trees, and creating a new coastline that in one locality has grown 1.5km in 100 years.

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Richness of Waitakere's Biodiversity

Although only 20% of the forested area is unmodified by logging or farming, the Waitakere Ranges are botanically rich containing 20% of all New Zealand's flowering plant species and 60% of all native fern species. Although the following statistics are drawn from a number of sources and subject to change, the Ranges are home to:

- 542 species of native plant (111 species of these being native ferns)
- Many species of nationally threatened and regionally threatened plant
- 50 species of native bird
- 3 species of kauri snail (large land snail)
- 11 species of native freshwater fish
- 5 species of native reptiles
- 1 native frog
- 1 native mammal (long-tailed bat)

Although records are not complete, it appears that we have lost 13 native bird species from the Ranges and 17 species from the lowlands. The short-tailed bat was once common in the region but has not been recorded for some time.

In contrast to the Waitakere Ranges, the lowlands under urbanisation have small remnant native bush patches which are still important and contain a different mix of species but exhibit lower diversity.

There are now 240 introduced plant species identified as actual or potential threats to native vegetation, and there are 19 introduced bird species, 9 introduced mammals and 2 amphibians, all competing with our native species.

Habitat types in the district can be broadly grouped into:

- Forests and shrub lands
- Freshwater wetlands, lakes and streams
- Coastal wetlands, dunes, and estuarine tidal flats and channels
- Urban area

The ecotones, or transition zones of one habitat type into another, and the corridors that link fragmented habitats are equally important.

Forests and shrub lands

There are many categories of forest types within Waitakere, from the complex mature and regenerating forests of the Ranges to the lowland forest remnants and scrub.

The forested areas of the Waitakere Ranges support species such as pied tit, shining cuckoo, long-tailed bat, Hochstetter's frog and kauri snail as well as the more common tui, kereru and fantail. There are some particular species that capture the public interest, whether or not they may be indicators of overall ecological health. Such species are kereru, tui, giant and banded kökopu, kauri and any rare species.

Some of the more iconic species are listed below:

Banded kökopu

KERERU

Bird counts in the Ranges carried out by Auckland Regional Council over the past five years were established in order to monitor changes in bird numbers as a result of Operation Forest Save, the possum control programme (the brush-tailed possum originally from Australia is a pest species in New Zealand). There is insufficient data to statistically show a change although numbers of tui and kereru show an increase in 2001 compared with 1997 but may be just normal fluctuation. However, monitoring associated with operation Forest Save has indicated that possum levels are at 5% of the population before the programme began.

It is known that brush-tailed possum out-competes kereru for food resources, and kereru require substantial amounts of their fruit food source to maintain body weight. Kereru numbers are considerably higher per hectare on the gulf islands where possums are absent. Kereru numbers have also increased through successful nesting in areas where possums have been dramatically reduced, such as at the Wenderholm Regional Park in neighbouring Rodney District.

Kereru

TUI

Like silvereye, tui tend to flock in winter and move over long distances in search of food (nectar and fruit). This explains why bird counts for these species are so variable. Tui maintain a home territory during summer breeding when nectar is in abundance and while their diet comprises a high intake of insects. During winter tui will move between the offshore islands and the mainland in search of food.

A favoured food source at the start of breeding is kowhai nectar. Tui will take advantage of the earlier flowering on the east coast (August/September) then move to the west coast to feed in October/November.

During breeding (October–January) tui feed on nectar and insects. A favourite tree for nesting sites and nesting material is kanuka. Kanuka forest also harbours high insect numbers, needed to feed the nestlings with protein. Dense stands of kanuka also protect the nest and fledglings from being dislodged by high winds. Shelter, the right nesting sites, adequate source of nectar and insects are necessary for successful breeding in this large nectar feeder.

Tui

KAKA

Kaka are occasional visitors from the Hauraki Gulf islands to the mainland, including the Waitakere Ranges. Visits usually occur during June-August. This may represent a remnant of the flocks that made the seasonal migration every year. There are records of traditional hunting of kaka during this migratory period by the Wai-o-hua, a Maori hapu who moved into the Upper Harbour each March for shark fishing; and then to the wooded gullies to catch kaka in snares called tumu.

Kaka visit the land around the Upper Harbour each winter, and in the summer of 2001, a pair nested at Campbell's Bay on neighbouring North Shore City's east coast, and produced one fledgling. It is conceivable that kaka could also breed in the Waitakere Ranges. There is some anecdotal evidence of a small flock of kaka at Bethells/Te Henga on Waitakere's west coast.

HOCHSTETTERS FROG

These frogs occur in the Waitakere Ranges particularly around the water reservoir areas. This species is regionally threatened and unusual in that there is no tadpole stage, progressing directly from egg to frog. A tunnel has been built beneath the Scenic Drive in the Waitakere ranges to provide a link between habitat areas as many of these frogs have previously been killed by vehicles while trying to cross the road to move between habitats.

LONG-TAILED BAT

There are still several small colonies of the long-tailed bat in the Waitakere Ranges and their eastern foothills. These bats are insect feeders and forage over large distances, venturing into the urban fringes.

WAITAKERE ROCK HEBE

This plant is found in isolated locations and one population is vulnerable to destruction through roadside maintenance. The species is being cultivated for revegetation projects according to the recovery plan prepared to ensure its continued survival.

KAURI SNAIL

The geographic range of kauri snails coincides with the historic geographic range of kauri forests. Kauri snails were traditionally found in the large clumps of dense vegetation that grew as epiphytes on the kauri, their eggs being laid at the foot of these large trees. The habitats associated with old kauri forests have been destroyed. Colonies of the kauri snail still survive in several areas of the Waitakere Ranges, in thick, damp patches of scrub and fern. These snails are highly mobile and are carnivorous, feeding mainly on worms. The heavy shell of the large kauri snails gives them protection from predation by birds and rats, but not from pigs.

Kauri snail

GREEN GECKO

The green gecko is found in manuka and kanuka stands and is a very striking green with a bright blue tongue. Geckos feed on nectar, fruit and insects.

Freshwater wetlands, lakes and streams

Waitakere has a good network of streams, regionally significant wetlands at Te Henga and Whatipu, and naturally occurring (dune-impounded) lakes.

TE HENGA WETLAND
The largest freshwater wetland in the region (80 hectares) and home to a wide range of wetland species including fernbird, bittern, marsh crake, spotless crake and banded rail.

Te Henga Wetland

WHATIPU WETLANDS
These freshwater wetlands lie within a scientific reserve, which also incorporates the unconsolidated sand areas. This is an important nesting site for the white-fronted tern and feeding area for the Caspian tern and blue reef heron. Whatipu now forms part of the regional park and is administered by the Auckland Regional Council.

Whatipu Wetlands

LAKES KAWAUPAKA AND WAIMANU
These are impounded freshwater dune lakes on Waitakere's west coast and provide habitat for little black shag, bittern and spotless crake.

Lake Wainamu

STREAMS
Many streams in Waitakere are still in a natural state with good riparian vegetation. Intact stream systems - from estuaries to the headwaters - that present no physical barriers are important for migratory species of native fish, such as inanga, banded kōkopu and giant kōkopu. The juveniles of these species make up whitebait swarms which migrate each spring from the sea to live in streams until they are about a year old. The adults migrate down-stream, in autumn, to estuaries where they spawn among streamside vegetation. On the high spring tides the hatched larval fish are washed out to sea where they live for five to six months, growing into the whitebait that migrate back to the adult freshwater habitats. In spring, the adult whitebait are often found living right up in the headwaters.

The region's whitebait population depend upon small inland, bush-covered streams remaining navigable from the coast to inland headwaters.

NATIVE FISH SPECIES

The most common native fish species found in streams in the Auckland Region are shortfin eel, longfin eel, common bully, banded kokopu, inanga, redfin bully and common smelt. Uncommon species are Crans bully and giant kokopu.

Streams will commonly support up to five species of native fish. There are two fish communities that indicate high diversity in streams. For shady streams they comprise shortfin eel / longfin eel / banded kökopu / redfin bully and for open lower gradient streams they comprise shortfin eel / longfin eel / common bully / inanga / redfin bully.

Redfin bully (male)

The National Institute of Water and Atmospheric Research (NIWA) has identified 17 native fish species that are found in the Auckland region, although only a maximum of 8 of these are expected to be found in any one stream. Fish surveys In Waitakere City in 1997-99, found only 2-3 native fish species in the streams surveyed. In 2001, 4-6 species were found. The native fish survey work for the 2003/04 season recorded a total of 11 native fish species at 29 survey sites, and 1-6 species, with an average of 3 species found at any one site. Riparian vegetation restoration and removal of barriers to fish passage are the most effective methods of encouraging native fish species back to the streams.

Among the less frequent species found in urban Waitakere Streams are the freshwater crayfish or koura, the freshwater crab and giant kokopu. Recently, the regionally rare short-jawed kökopu was discovered in a stream in the Waitakere Ranges.

Freshwater crayfish or koura

Coastal wetlands, dunes and estuarine flats

Waitakere's coastal environment offers a variety of habitats from sheltered mangrove forests, shell banks and mudflats of the Waitemata and Manukau Harbours to the rocky coast, islands and dunes of the west coast.

WEST COAST DUNES

These mobile sand dunes support pingao (a golden grass-like plant) and where the area is not disturbed, provide nesting habitat for New Zealand dotterel and white-fronted tern.

Pingao protected with fencing at Piha

HARBOUR MARGINS

The tidal flats, sand bars and mangrove forests around the Waitemata Harbour and Manukau Harbour are all important feeding areas, roosting and nesting sites for a wide range of migratory birds, such as the eastern bar-tailed godwit, lesser knot and non-migratory pied stilt.

Mangroves at Little Muddy Bay, Manukau Harbour

Urban area

The urban areas of Waitakere are also important for biodiversity maintenance. Urban areas include the peri-urban mixed use habitats associated with residential, industrial, horticultural, agricultural and lifestyle landscapes.

URBAN GARDENS

Exotic plantings often provide additional food sources for birds and insects, particularly during winter when food is limited. Many flowering shrubs and trees from Australia and South Africa provide winter nectar for tui and insects, and the Himalayan Strawberry tree is a favourite for visiting kaka during winter. However, the down side is that many exotic fruiting species attract birds (including tui and kereru) that then distribute the seeds that establish and flourish in bush areas. *Acmena*, privet species, *Elaeagnus,* woolly nightshade and many other species come into this category.

Urban gardens can provide habitat for a rich variety of invertebrates, including weta species, skinks as well as birds. Choice of plant species and garden maintenance practices can dramatically influence the ecological value of your garden.

There are also areas of grassland and herbs on industrial properties used by birds and skinks.

Above: urban gardens can provide habitats for wetas

Below: Tui are attracted to flowering harakeke or flax in urban areas

Revegetation group at the Waitoru Reserve

RESERVES

Reserves, particularly remnant native bush reserves, function as wildlife refuges, breeding areas and seed source for the regeneration of native bush. For the bush area to support small bird species, such as fantail and grey warbler, as well as a rich variety of invertebrates there does need to be a dense under storey and good ground cover. However, a one or two tier canopy will still attract tui and other wider-ranging species. Size matters as well as plant species composition, if it is to support breeding populations of some bird species.

It is important to recognise that older, decaying and dead trees are an important component of any forest and should be left to decay rather than be cleared away. Long-tailed bats are known to roost in hollows in large, old macrocarpa trees and many species inhabit and rely on decaying wood serving a useful ecological purpose in nutrient recycling.

STREAMS

Intact urban stream systems provide ecological linkages from the sea to the headwaters. Vegetated riparian margins protect in-stream habitat for aquatic species and accessible water resources for terrestrial species.

History of Waitakere's Biodiversity

Prior to the arrival of Maori in New Zealand, 1000 or so years ago, Waitakere was covered with virgin forest. This forest contained extensive groves of kauri. As the Maori population grew, they cleared the forest to create patches of coastal land for habitation and cultivation. Commonly the Maori broke down the undergrowth which when dry was set alight to burn off. The large trees were then felled and the land prepared for planting. Crops were grown for one or more seasons, then abandoned and another area of forest brought into cultivation. The abandoned gardens usually passed into bracken fern which was periodically fired and the roots harvested for food. Once an area had been in bracken for a few years, the soil became sour and even the bracken was abandoned in favour of clearing more forest.

When the first Europeans passed through the area in the 1820s, they described the eastern lowland parts of Waitakere as a wasteland of fern and scrub with only a few small patches of kauri forest remaining. With European settlement in the Waitakere Ranges from the late 1830s on, the remaining virgin forests came under further pressure. Although many of the early efforts to establish farms were in areas already cleared of forest, a number of later pioneering farms were in the rugged heart of the Ranges.

Titirangi in the mid 1800s.

Between the 1850s and 1920s kauri gum, the solidified resin of kauri trees, was of considerable value as the main ingredient of oil varnishes. A large group of gumdiggers, was involved in the search for it. Kauri gum was dug up in most parts of the Waitakere Ranges. The undergrowth was commonly burned to make the digging easier.

The fourth group to make an impact on the forest were the timber millers. They clear-felled the vast majority of the kauri trees that were in the area when Europeans arrived, and also caused a great deal of damage to the remaining forest in their endeavours to get the kauri logs out of the rugged hills and down to the mills. In many instances settlers or gumdiggers moved in after the valuable kauri timber had been harvested, set fire to the dry kauri heads and damaged undergrowth in order to clear the land.

By the 1920s very little virgin forest remained in the Ranges. Fortunately that which remained was preserved and became park land and water catchment area.

Along with destruction and fragmentation of the forest, many animal species dependant on the forest cover were also lost. Bird species known to be present in the Waitakere Ranges but disappeared between mid-1800s and mid-1900s include:

- North Island brown kiwi
- North Island weka
- North Island kokako
- Bellbird
- Stitchbird
- North Island robin
- Whitehead
- Kaka – now an occasional visitor from Little Barrier Island
- Red-crowned käkäriki
- Yellow-crowned käkäriki
- Brown teal
- New Zealand scaup
- New Zealand dabchick

In addition, bird species lost from the lowland area but still present in the Waitakere Ranges include:

- Pied tit
- Marsh crake
- Spotless crake
- Australasian bittern

Of the only three species of mammal indigenous to New Zealand, the long-tailed and short-tailed bat species were found in the Waitakere Ranges. Sadly, only the long-tailed bat remains in a few small colonies.

Short-tailed bat (illustration)

Threats to Biodiversity

Urbanisation - Habitat loss

The Auckland region is experiencing a population growth rate of 3.1% with Waitakere's at 2.7% per annum. Increased population means pressure for further development which usually results in further loss of habitat, whether it is loss of bush, loss of rural land or encroachment of coastal and riparian areas. Along with increased population, development and noise; urbanisation brings more weeds and pests to compete with indigenous biodiversity.

On the positive side, there are some bird species that enjoy an advantage provided by the variety of garden plants that provide winter forage in particular. The more we can use native plants in our gardens and parks, supplemented with nectar producing and fruiting exotics, the more urban areas can support species such as tui, kereru or even bellbird once more.

Despite insectivores and frugivores enjoying some benefit from plantings in urban areas, the insectivorous bird species definitely suffer unless bush remnants with full undergrowth are left intact to support invertebrate communities.

Plant Pests

Plant pests are a major threat to biodiversity by changing environmental conditions through shading, smothering, or preventing other species from establishing. Within natural communities they affect vegetation structure and composition, regeneration, plant and animal biodiversity, hydrology and nutrient regimes.

Problem plant pests in Waitakere are numerous, and include agapanthus on the west coast, woolly nightshade, wild ginger, mignonette vine, moth plant, blue morning glory, climbing asparagus, ladder fern, bamboo, honeysuckle and jasmine in the Waitakere Ranges. In the urban area pest plants also include privet, *Arundo donax*, climbing asparagus, pampas and monkey apple. These plant pest species have invaded native bush areas, grow at a rapid rate and out-compete native species.

Animal Pests

Animal pests browse on palatable plant species, reducing the success rate of new plantings, degrading existing habitats and compete with native species also using these food sources. Some also prey on native birds, invertebrates and fish. Firmly established animal pests include Norway rat and ship rat, mouse, brush-tailed possum, various wasp species, freshwater pest fish species, ferrets, weasels, stoats, feral goats and feral pigs in the Waitakere Ranges.

In addition, there is an ongoing threat to coastal bird species, particularly the New Zealand dotterel, banded dotterel, variable oystercatcher and little blue penguin from dog predation and disturbance. Dogs and domestic cats also have easy access to valuable lowland fauna habitat, such as wetlands and tidal mudflats, because of the close proximity of residential development to these areas.

Climate Change

Little is known at this stage about how climate change will affect biodiversity in the Waitakere Ranges. Increasing temperatures and more intense rainfall events may result in the climate becoming marginal for certain species while making conditions more favourable for some pests. This is an area not well understood at present and the Council is planning to assess the likely effects of climate change in more detail during the next year. However, it will still be unpredictable how particular species will respond to change.

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