

Threatened and uncommon plants

Twenty-five species listed in the 2004 national checklist of threatened and uncommon plants (de Lange *et al.* 2004) have been recorded in the ecological district (Appendix 6), 22 of which have been seen in recent years (P. Cashmore pers. comm.).

- a) *Sicyos australis* (mawhai, native cucumber) is classed as Acutely Threatened, Nationally Critical. This species occurs in pine forest near Otamarakau.
- b) *Olearia pachyphylla* is classed as Acutely Threatened, Nationally Endangered¹.
- c) *Rorippa divaricata* (matangoa, NZ cress) (classed as Acutely Threatened, Nationally Endangered) was recorded from the Wairere Falls track up the Whakamarama escarpment in 1975, and the species has recently been found in Ottawa Scenic Reserve and Kaharoa Conservation Area.
- d) *Dactylanthus taylorii* (pua o te reinga) is classed as Chronically Threatened, Serious Decline, and occurs in two protected natural areas in the Oropi-Ngawaro area. There is another unconfirmed record from RAP 42.
- e) *Marattia salicina* (para, king fern) is classed as Chronically Threatened, Serious Decline. It is found at several sites in the ecological district; examples include Otanewainuku Conservation Area, Upper Kaituna Scenic Reserve, RAP 8 and 38, and a Water Works Reserve contiguous with Ottawa Scenic Reserve (see Beadel 1992b). It is known from at least six other sites.
- f) *Pimelea tomentosa* (a shrub) is classed as Chronically Threatened, Serious Decline. It is known from the Matata Hills and may also occur in the north-western corner of the district (it is known from inland of Katikati). Matata Scenic Reserve contains one of the largest known populations in the country.
- g) *Pterostylis paludosa* (Chronically Threatened, Serious Decline was recorded from RAP 26 (Capella Road Wetland) in 1985 (NZFRI 15753).
- h) *Brachyglottis kirkii* var. *kirkii* (Kirks daisy, kohurangi; Chronically Threatened, Serious Decline) has been recorded from several sites in the ecological district, e.g. Te Matai Road-Otanewainuku area.
- i) *Pittosporum kirkii* (thick leaved kohuhu), classed as Chronically Threatened, Serious Decline, is known from several sites in the ecological district, including Opuiaiki and Mangorewa Ecological Areas.
- (j) *Austrofestuca littoralis* (hinarepe, sand tussock) is classed as Chronically Threatened, Gradual Decline. A small population of about five plants, occurring near Otamarakau, is threatened by vehicles, trampling, and rabbits. This population has recently disappeared.
- k) *Desmoschoenus spiralis* (pingao) is classed as Chronically Threatened, Gradual Decline. A few plants are scattered along the coast.
- l) *Mida salicifolia* (mida) is classed as Chronically Threatened, Gradual Decline. This species has been recorded from several sites

1. Doubtful record. There are old records of *O. pachyphylla* from the ecological district (P. de Lange pers. comm.).

in the ecological district, e.g. Matata Scenic Reserve, Otanewainuku Conservation Area.

- m) *Olearia cheesemanii* is classed as Chronically Threatened, Gradual Decline. It is known from the vicinity of the McLarens Falls area.
- n) *Peraxilla tetrapetala* (a red flowering mistletoe), is classed as Chronically Threatened, Gradual Decline. It was recorded from Kauri Knob on the Papamoa Range in 1967 (Ogle 1967). Despite searching, this species has not been relocated at this site, and as most of the tawheowheo and kamahi, thought to be the host species (C. Ogle pers. comm.), have died it is unlikely that *P. tetrapetala* still occurs there. However, it is present in Opuiaki Ecological Area in the Kaimai-Mamaku Forest Park.
- o) *Raukaua edgerleyi* (raukawa) is classed as Chronically Threatened, Gradual Decline. It has been recorded from a range of sites in the ecological district (including RAP 58).
- p) *Tupeia antarctica* (pirita, green mistletoe) (classed as Chronically Threatened, Gradual Decline) is known from two sites in the ecological district. A large population is present in Taumata Scenic Reserve and a small population of approximately seven plants has also been found on the edge of the Raparapahoe Stream (RAP 40).
- q) *Peperomia tetraphylla* (classed as At Risk, Sparse) occurs on the edge of the Raparapahoe Stream (RAP 40) and headwaters of the Parawhenuamea Stream (Hobbs 2001) and in Ottawa Scenic Reserve.
- r) *Corunastylis pumila* and *Corunastylis nuda* (leek orchids) are classed as At Risk, Sparse, and have both been recorded in the ecological district, including RAP 7.
- s) *Hymenophyllum* aff. *flexuosum* (filmy fern) (AK177370: Mt Burnett) is classed as At Risk, Sparse. It has been recorded at Wairere Falls (P. de Lange pers. comm.).
- t) *Hymenophyllum atrovirens* (filmy fern, mauku) (At Risk, Sparse) has been recorded from some stream margins in the ecological district, including a range of sites in the Kaimai-Mamaku Forest Park, such as Rapurapu and Wairere Falls, the Onaia Stream, and Mangorewa River.
- u) *Lindsaea viridis* (fern) is classed as At Risk, Sparse, and is known from a range of stream margins in the Otanewainuku Ecological District. Populations are present in the Kaimai-Mamaku Forest Park (several populations), Onaia Stream, Mangorewa River, and Otanewainuku Mountain.
- v) *Microsorium novae-zelandiae* (fragrant fern) is classed as At Risk, Sparse. It is known from Otanewainuku Mountain.
- w) *Schizaea dichotoma* is classed as At Risk, Sparse. It has been recorded from Kaharoa Conservation Area (Shaw 1991).
- x) *Tetragonia tetragonioides* is classed as At Risk, Sparse. It has been recorded from one site along the coast.
- y) *Kunzea ericoides* var. *microflora* (prostrate kanuka) is classed as At Risk, Range Restricted. This species occurs in the Taheke geothermal area (most of which is within RAP 15).

Distribution limits

Seven species reach limits of distribution in the district;

- a) *Agathis australis* (kauri) occurs at a few sites. It reaches its southern distribution limit on the eastern side of the North Island near the Kakahu Stream (approx. 37° 59' S). Kauri does extend a little further south on the western side of North Island (38° 07' S) (Ecroyd 1982). On the Papamoa Hills a few rickers mark its eastern limit (approx. 176° 13' E).
- b) *Leionema nudum* (mairehau) reaches its known southern limit on the eastern side of the North Island in RAP 7 at latitude 37° 51' S. It extends further south on the western side of the island (Gudex 1963).
- c) *Lepidosperma laterale* reaches its known southern limit on the eastern side of the North Island in RAP 1 at latitude 37° 42' S. It extends further south on the western side of the island (Moore and Edgar 1970).
- d) *Gabnia rigida*. Whilst relatively common in the South Island, *Gabnia rigida* is known from only three locations in the North Island. One of these is Mamaku Lagoons wetland on the Mamaku Plateau (RAP 62) where it attains its northern limit (Wallace 1986).
- e) *Coprosma arborea* (mamangi) reaches its known southern limit on the eastern side of the North Island in RAP 1 at latitude 37° 42' S. It extends further south on the western side of the island.
- f) *Tbelymitra aemula*. There is one unconfirmed record of this orchid. This would be a southern limit for this species.
- g) *Peperomia tetraphylla* (At Risk, Sparse) reaches its northern and western limit of distribution in Otawa Scenic Reserve (Beadel 1985).

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Bats

The long-tailed bat is classed as an Acutely Threatened, nationally vulnerable species, and the central short-tailed bat is classed as At Risk, Range Restricted (Hitchmough 2002). Both species have been reported from the margins of the larger indigenous forest tracts throughout the district. Most of these sightings are likely to be of long-tailed bats but short-tailed bats have been recorded in the Mangorewa River area (Kiwi Stream) south-east of Otanewainuku and more recently in the Pongakawa Ecological Area of Rotoehu Forest. An unidentified bat, probably long-tailed bat, was recently detected in the Papamoa Hills.

Neither species is easy to detect due to their near-exclusive nocturnal behaviour and it is likely they are more widely distributed within the larger and more intact forest habitats in the region than the records to date suggest. This does not mean, however, that their conservation status is secure as it is also likely that continued loss/fragmentation/degradation of their habitat and introduced mammalian predators threaten their survival.

(Source: A. Garrick pers. comm. 1994)

Avifauna

Seventy-two bird species (49 native and 23 introduced) have been recorded or are likely to be present in the district (Appendix 5). These include 18 threatened species (Hitchmough 2002; refer to Appendix 6). Acutely threatened species are North Island kokako (Nationally Endangered), whio (blue duck) (Nationally Endangered), Australasian bittern (Nationally Endangered), North Island kaka (Nationally Endangered), New Zealand falcon (nationally vulnerable), and Caspian tern (nationally vulnerable). Kereru (New Zealand pigeon) is listed as a Chronically Threatened, Gradual Decline species because of the ongoing decline of its habitat, its low breeding output due to both predation and intrinsic factors, and continued illegal harvesting. Other Chronically Threatened species are North Island brown kiwi (Serious Decline), long-tailed cuckoo (Gradual Decline), banded dotterel (Gradual Decline), and yellow-crowned kakariki (Gradual Decline). At Risk species are New Zealand dabchick (Sparse), fernbird (Sparse), northern New Zealand dotterel (Sparse), banded rail (Sparse), marsh crake (Sparse), spotless crake (Sparse), and little black shag (Sparse).

Kokako, falcon, kiwi, kaka, robin, and yellow-crowned parakeet are forest-dwelling birds. The blue duck lives in fast flowing streams/rivers surrounded by forest. The New Zealand dotterel, banded dotterel, variable osytercatcher and Caspian tern primarily inhabit sandy beaches and dunelands, and the North Island fernbird dwells in shrublands often associated with wetlands. Shallow lowland wetlands are the habitat of dabchick and bittern.

The North Island rifleman or titipounamu has been recorded in “Rotoehu Road Bush” on the Rotoiti breccia fan (Owen 1994). This sub-species is generally confined to the larger upland forest tracts of the North Island south of Mount Te Aroha¹, where modification is slight and the quality of habitat high.

(Source: A. Garrick pers. comm. 1994)

Reptiles (lizards)

Relatively few records of reptiles have been made in the district, however this is probably a reflection of their inconspicuous appearance and cryptic behaviour rather than an indication they are rarely present.

The striped skink (*Oligosoma striatum*) (classed as data deficient in Hitchmough 2002) has been recorded from two locations and there is an unconfirmed report of its presence at one other. The copper skink (*Cyclodina aenea*) has been recorded in the Kaharoa area and this species plus the common green gecko (*Naultinus elegans elegans*), common gecko (*Hoplodactylus maculatus* or *H. pacificus*) and forest gecko (*Hoplodactylus granulatus*) are likely to occur throughout the district in areas of suitable habitat. *H. granulatus* has been recorded at a number of sites in the northern Mamaku Plateau, in the Opuia

1. Found in Warawara Forest in Northland, the first record north of Mount Te Aroha for decades (A. Garrick pers. comm.).

Ecological Area (Whitaker 2000). An introduced species, the rainbow skink (*Lampropholis delicata*) has been recorded from the Mangatoī Road area of the Mamaku Plateau. A large unidentified gecko was reported several years ago from the Mount Otanewainuku area but a field survey did not confirm its presence.

(Source: A. Garrick and Keith Owen pers. comm.)

Amphibians (frogs)

The native Hochstetter's frog (*Leiopelma hochstetteri*), an At Risk, Sparse species (Hitchmough 2002), is found in low numbers from the Raparapahoe Stream catchment within the Ottawa Forest. More intensive searching may reveal it's more widespread occurrence in unmodified catchments in the southern Kaimai range. Surveys on the main part of northern Mamaku Plateau have failed to find it there (Whitaker 2000).

The introduced green and golden bell frog (*Litoria aurea*) and the southern bell frog (*Litoria raniformis*) have been recorded in the district, and are believed to be widespread. Both species are under threat in their native Australia.

(Source: A. Garrick and Keith Owen pers. comm.)

Freshwater fish

The Otanewainuku Ecological District contains a diverse range of fish species. A major contributing factor is its proximity to the coast. Most of New Zealand's indigenous freshwater fish require access to the sea to complete their life cycle and usually a wide range of species can be found in streams and rivers close to the coast without artificial or natural barriers. Some notably diverse rivers and streams include the Wairoa, Kaituna, Waitahanui, Pikowai, Mimiha, and others, all supporting a wide range of indigenous fish species. Some of the smaller catchments, particularly those between Otamarakau and Matata are very significant and deserve protection against threats to water quality and quantity.

The typical range of species found in a generalised river or stream of the district could include the following species. Near the river mouth a number of estuarine species including yellow-eyed mullet (*Aldrichetta forsteri*), grey mullet (*Mugil cephalus*) and flounder (*Rhombosolea* sp.) may be found. Some of these may also persist above the salt influence where more "typically freshwater" fish exist, such as giant bullies (*Gobiomorphus gobioides*), common smelt (*Retropinna retropinna*) and inanga (*Galaxias maculatus*). A little further upstream and in addition to smelt and inanga, common bullies (*Gobiomorphus cotidianus*) are often abundant along with shortfinned eels (*Anguilla australis*) and long-finned eels (*A. dieffenbachii*), while giant kokopu (*Galaxias argenteus*) may also be present. Further upstream still, long-finned eels persist along with redfinned bullies (*Gobiomorphus buttoni*) and banded kokopu (*Galaxias fasciatus*). Indigenous species present in the steep upper catchments will usually only include those with climbing ability: longfinned eels, banded kokopu and to a lesser degree bullies. Another accomplished climber, the koaro (*Galaxias brevipinnis*), is not well represented in rivers of this district.

Obstructions have a direct influence on the distribution of fish species, as can be seen in the Wairoa catchment which has been developed for hydro-electric power production impeding passage, and also contains McLaren Falls which is likely to have been an impassable natural barrier to many species. Upstream of McLaren Falls, diversity is generally limited to remnant eels (pre-dating hydro construction) and self-sustaining trout populations. A very significant exception to this is the presence of shortjaw kokopu (*Galaxias postvectis*) immediately above McLaren Falls (presence confirmed during a survey in March 1994).

Introduced fish species of the district include brown trout (*Salmo trutta*) and rainbow trout (*Oncorhynchus mykiss*). They are present throughout a number of catchments and provide some significant trout fishing waters, for example: the Wairoa and Kaituna Rivers. Other introduced species include goldfish (*Carassius auratus*) and mosquitofish (*Gambusia affinis*) both of which are widespread. Other significant introduced species are tench (*Tinca tinca*) and rudd (*Scardinius erythrophthalmus*) which have been illegally released into Lake McLaren. Tench have been observed spawning in the lake margin in March 1994, and rudd are regularly observed during the summer months also in the lake margins. The potential impacts of tench and rudd on the ecology of Lake McLaren and the lower Wairoa River is unknown.

In summary, the Otago Ecological District contains a wide range of indigenous freshwater fish in addition to a number of introduced species. Significant indigenous fish species present include shortjaw kokopu (Chronically Threatened, Gradual Decline), giant kokopu (Chronically Threatened, Gradual Decline), and lamprey (At Risk, Sparse) (Hitchmough 2002). Notable introduced fish include trout, which provide a local fishery, and tench and rudd which were illegally introduced and whose potential ecological impacts are unknown.

(Source: Gavin Williamson and Kim Young pers. comm.)

Invertebrates

Invertebrates were not included in this survey, but the invertebrate fauna is likely to be diverse and to contain local or biogeographically significant species. Some general points have been outlined below.

Insects

“Recent collecting of Heteroptera and carabid beetles, especially the genus *Mecodema*, suggests the occurrence of a Kaimai movement ‘corridor’ linking the insect fauna of Coromandel Range and eastern Bay of Plenty. It is likely that the recently described endemic Cydnidae (Heteroptera), *Chilocoris neozelandicus* Larivière & Froeschner, found on the east coast of the Coromandel region also occurs in coastal areas in this district. If the corridor does exist, it is important that its fauna should be surveyed more thoroughly. Movement corridors often are required to maintain diversity (richness) or to conserve genetic uniqueness” (M. Larivière pers. comm.)

This district contains a transition zone between two subspecies of cicadas,

Kikibia cutora cutora (Walker) and *Kikibia cutora cumberi* (Fleming). This would reflect an area of genetic change between north and south populations (John Dugdale pers. comm.).

Snails

The diverse range of forest types present is reflected in the snail populations: ninety-eight indigenous snail species having been recorded so far from the district (Mayhill 1994, listed in Appendix 5). Several of these species have very restricted ranges: e.g. *Chaureopa depressa*, found only in the Bay of Plenty, and *Liarea egea*, which reaches its southern limit in the district.

As well, there are several introduced species found in the district, including the large native kauri snail *Paryphanta busbyi busbyi* introduced to Kaukaumoutiti Stream, (RAP 21) from a Northland kauri forest. Another of the introduced species, *Cionella lubrica*, is omnivorous and often invades forests following logging. This species may be reducing native snail populations at some sites.

(Source: P. Mayhill pers. comm. 1994)