Forest Fragment Management Series

LIFE IN FOREST FRAGMENTS

FACTSHEET 2

TAWA FOREST

Selective logging of rimu from mixed podocarp-broadleaf forests has resulted in the dominance of tawa in Waikato forests, particularly on rolling hill country with moderate to high rainfall. Other broadleaf species in the canopy include mangeao, rewarewa and pukatea at lower altitudes, and northern rātā, miro, kāmahi and Hall's tōtara at higher altitudes. Tawa has large fruit and relies on large birds like kererū and kōkako to spread its seeds.

MIXED BROADLEAF FOREST

Where tawa is not naturally dominant, or has been logged for pulp and paper production, other broadleaf species dominate the forest canopy. Pōhutukawa, pūriri, kānuka and kohekohe dominate in coastal areas. In the southern Waikato, fragments are dominated by mangeao or kāmahi and rewarewa, often emerging through scrublands that developed after fire or logging removed the forest canopy.

TŌTARA FOREST

Before land clearance, tōtara was usually scattered among other trees in mixed podocarp-broadleaf forests, especially in the western part of the Waikato region. Today, dense stands of tōtara are common because it is relatively tolerant of stock grazing compared with other native tree species. The biggest known tōtara, growing near Mangapēhi in the King Country, is believed to be 1800 years old.

KAHIKATEA FOREST

Kahikatea forest fragments dot the fertile lowlands of the Waikato. They are either the scattered remains of the forested wetlands and wetland margins that covered poorly drained areas of the Waikato, or have arisen on better-drained land following clearance.

Many kahikatea fragments have a small core of massive, older trees (200-500 years) surrounded by a stand of younger trees (80-120 years old) that regenerated shortly after early European land clearance.

Kahikatea seedlings do not survive in the dense shade under a forest canopy, so in most of these stands (particularly if drained) broadleaf species like tawa, with more shade tolerant seedlings, will become more abundant. However, most of them will still have kahikatea in the canopy for another 500 or so years.

Photo: Moniqua Nelson-Tunley

The Waikato region is a large and diverse landscape that was once mostly covered in native forest. Most of our forest patches are small scattered fragments of the original tracts of forest.

This factsheet describes the types of vegetation in our native forest fragments and the animals that live in them.

The Waikato region has over 7500 native forest fragments (stands smaller than 25 hectares). The most common forest types in them are tawa (56 per cent), mixed broadleaf forest (25 per cent) and kahikatea and tōtara (10 per cent). The remaining 9 per cent include kānuka or mānuka, kauri and beech forest.

FEATHERS, FUR AND FEELERS

Although forest fragments are unlikely to have the range of plant and animal life found in larger blocks of native forest, they are very important refuges, food sources, dispersal stepping stones and seasonal habitat for many native species.

BIRDS

Common species of native bird (fantail, grey warbler, silvereye, shining cuckoo, morepork and kingfisher) are found in most forest fragments of 5-25 hectares. Fruit and nectar-eating native birds like bellbirds, tuī and kererū are less likely to be resident in small and isolated forest patches, but may visit fragments, or even individual trees, at particular times of the year to nest and feed. These mobile species are invaluable because they carry seeds and pollen between fragments.

Less common native birds may be missing from fragments if:

- predators like rats, possums, stoats and cats are abundant
- there is no year-round food supply
- there is very little understorey to provide cover and nest sites.

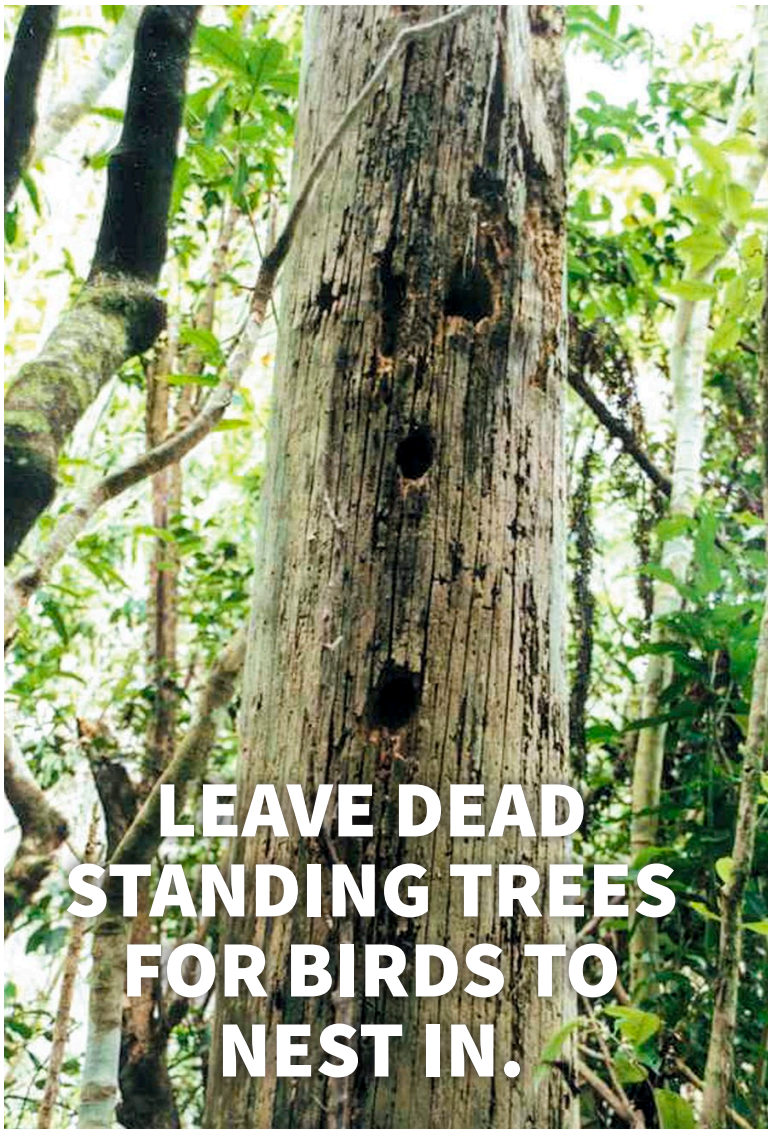
Intensive pest control projects like Hamilton Halo and Sanctuary Mountain Maungatautari have lead to an increase in tuī and bellbirds in the Waikato, so they may become more common in forest fragments.

Rare or threatened native birds such as brown kiwi, kōkako, falcon and kākā are absent from nearly all fragments now.

Many introduced bird species, including blackbird, chaffinch, eastern rosella, goldfinch, greenfinch, house sparrow, magpie, myna, songthrush, starling and yellowhammer, are now common in Waikato remnants. Few of these penetrate the larger native forests which native birds prefer, although they find food, shelter and nest sites at forest margins.

Native and introduced birds may disperse seeds but only the native honeyeaters (bellbird and tuī) are specialised pollinators, and only kererū and kākā can carry large seeds like tawa between fragments.

Photo: Jeanine Ashdown



BRINGING BACK THE BIRDS . . .

All forest birds need a year-round food supply and few predators so that nesting is safe. These tips will help.

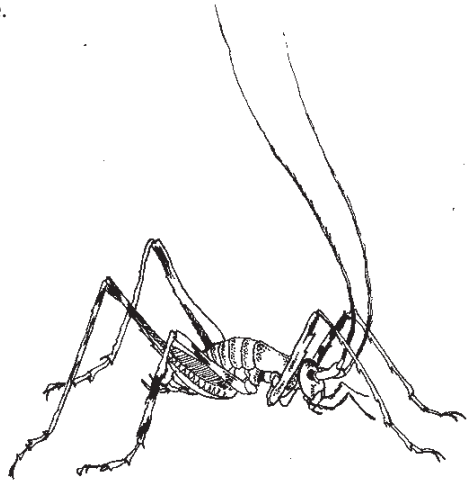
- Fence fragments to help a diverse understorey to develop and canopy trees to regenerate.
- Predation of young birds and eggs by stoats, cats, rats and possums is the main cause of nest failure. Regularly control these predators to help more young to fledge, especially just before nesting (around September).
- Leave dead standing trees for birds like kingfisher to nest in.
- Plant trees like miro, karamū, kōhūhū, korokio, lemonwood, five finger, putaputawētā and kohekohe for a winter supply of fruit and/or nectar. Some species have separate male and female (fruit-bearing) plants, so plant many saplings of each species to guarantee fruit.
  Even individual trees of a fruiting or nectar-producing species planted in a garden setting can in time provide a valuable food source which birds may return to year after year.

Photo: Karen Denyer

FORGOTTEN FAUNA

Invertebrates (animals without backbones) are by far our most numerous animal group. For every native animal species with a backbone in New Zealand, there are at least 35 without one. Invertebrates are a critical component of healthy ecosystems, but little is known about invertebrates in our forest fragments. Here are some of the things we do know from studies in the Waikato.

- Fragments with a diverse, dense understorey and thick layer of leaf litter have far more invertebrates than heavily grazed fragments.
- Beetle and moth species are more abundant in native forests than in pastures. Some fragments have twice as many beetles as nearby pastures.
- Forest fragments have mostly native invertebrate species.
- Kahikatea fragments have a high number of native indigenous beetle species, and are important refuges in the Waikato's pastoral landscape.



Invertebrates have many roles in healthy ecosystems. They help keep the nutrients cycling, the birds and reptiles fed, and the plants pollinated.

- **DECOMPOSERS:** When you're standing in a forest, most of the animal life around you lies under your feet! Invertebrates like litter hoppers, springtails and worms live in the litter, breaking down wood and leaves to release nutrients back to the plants.
- **POLLINATORS:** Most forest plants have small, open flowers that allow flies, beetles and night-flying moths to reach the nectar and pollinate them. Thrips and looper caterpillars are important pollinators of māhoe and five finger.
- **HERBIVORES:** Stick insects, caterpillars, weevils, scale insects and other herbivores feed on leaves, branches and twigs. Unlike possums, they cause relatively little damage to the forest as our native ecosystems are adapted to them.
- **PREDATORS OR PARASITES:** Native praying mantis, peripatus and introduced wasps prey on other invertebrates. Parasites feed on living organisms, like the white-spotted ichneumon wasp that lays its eggs in the pupae of butterflies, including the red admiral.
- **PREY:** Invertebrates in forest fragments are important sources of food for native lizards and native birds like morepork, kingfishers, fantails and grey warblers. They are also eaten by introduced birds like blackbirds, starlings and sparrows, and by mammals including possums, rodents and hedgehogs. The pests take food away from native animals.

Photo: Neil Fitzgerald

. . . AND THE BUGS

Fragments with moist soil, shade, thick leaf litter, rotten wood, rocks, dead trees and a range of plants will provide a home for many invertebrates. Here are some tips to encourage invertebrates.

- Control the predators – especially possums, rats, mice and hedgehogs.
- Help develop or maintain a diverse, closed understorey by keeping stock out.
- Leave large, old or dead and rotting trees in the forest.

If the habitat is suitable, some invertebrates will return to the forest by themselves.

REPTILES

Skinks and geckos are an important part of the forest ecosystem; they pollinate flowers, disperse seeds and control insect numbers.

The Waikato has over 15 skink and gecko species, most of which prefer forest habitats. They are all becoming rare because of loss and fragmentation of habitat and predation by mammals.

Our skinks and geckos are relatively long-lived, so adults may hang on in forest fragments, however, pest-infested or heavily grazed forest fragments may no longer support them. Copper skinks are the native reptile most likely to be found in small forest fragments.

FROGS

The Waikato currently has two species of native frog, but small fragments are not ideal homes for them. Both Hotchstetter's and Archey's frogs have been discovered in large forest fragments (Whareorino and Maungatautari) years after mammal predators have been suppressed. Our frogs are very unusual; they don't croak and they live in bush and streams instead of ponds.

BATS

Long-tailed bats are known to live in pine and native forests, and may use fragments close to larger tracts of forest and along waterways. They may visit several fragments during nightly forays that can take them up to 20 kilometres from their roost sites.

Fragment edges may provide good hunting ground, particularly where a nearby pond or stream adds to the insect life. Bats roost and rear their young in tree cavities and under bark, so leave large, old or dead trees standing if you want to provide a home for native bats.

FRAGMENT STREAM LIFE

Fragments with streams running through them may provide habitat for fish, freshwater insects, freshwater mussels and native crayfish. Fragments shade the water and keep it cool, provide habitat among tree roots, and drop leaf litter into the water to feed insects.

Most of New Zealand's native fish species evolved in forest-clad streams with clear, cool, low nutrient waters. Land clearance and agriculture have reduced clarity and increased temperature and nuisance weed growth, making many of our streams unsuitable habitat for native fish and invertebrates.

Many fish species make journeys to the ocean to complete their life cycle. Some Waikato streams have been cut off from the migration path by dams or perched culverts, so fish can't reach them. However, they may still contain non-migratory fish species such as the common bully.

Streams with unrestricted flow to the sea and reasonably clean waters have populations of eel, banded kōkopu and torrentfish. Banded kōkopu and giant kōkopu depend on riparian forest for breeding.

PESTS IN FOREST FRAGMENTS

Unfortunately, forest fragments are also home to pests such as possums, rats and mice and are favoured feeding grounds for stoats, cats (feral and domestic), rabbits and hares (see Factsheet 3). These pests destroy adult trees, seedlings and seeds, and prey on or compete with native animals for food. Even our top predators like the morepork and falcon are at risk from introduced animals. Many techniques are available to help pest control, including trapping, poisoning and shooting. Contact Waikato Regional Council for advice.

MAKING FRAGMENTS FISH FRIENDLY

You can improve stream habitat for native fish and aquatic invertebrates by:

- fencing and planting streambanks downstream of fragments to increase shade, reduce water temperature, provide food and reduce aquatic weed growth
- replacing perched culverts or providing fish ladders
- planting up sunny canopy gaps along stream margins in forest fragments
- establishing effective filter zones of dense low plants (even long grass) along riparian margins to reduce nutrient and sediment inputs from farmland.