

Restoring the Balance

BIODIVERSITY SELF-HELP KIT



This resource kit aims to help you -

- Identify the existing biodiversity values of your land and protect what you've already got
- Find out about pest control, planting trees, habitat protection (both physical and legal) and access to outside funding
- Find and record essential information that is often requested when seeking funds
- Set up an action plan.

From this you will have the information to start making informed decisions about protecting and enhancing what lives around you.

You can also use the kit as a personal diary about the comings and goings of native animals in the changing landscape around you, a personal story about your own environment.

Foreword from Minister for the Environment, Hon. Marian Hobbs

It is with considerable pleasure that I write this foreword to Restoring the Balance Northland Biodiversity Self-Help Kit. I would like to congratulate the Northland Biodiversity Enhancement Group for launching this outstanding document. I look through the pages of this self-help kit and can't help but be impressed by all the practical suggestions for Northland landowners wanting to take action to look after biodiversity values on their land.

Even more than that I am impressed by what this publication represents. It is a big step forward for Northlanders coming together from different interests and backgrounds to tackle a really pervasive environmental problem. I am reassured to know that so many people are working in Northland to make a real difference for our special plants and animals.

In the New Zealand Biodiversity Strategy released in February 2000 one of the goals is to halt the decline of our country's indigenous biodiversity. This is a tall order. It will take the combined efforts of all New Zealanders to come together and work on this common goal.

A big responsibility now rests on the shoulders of private landholders. I know that a lot of the hard work in fencing and pest control will come down to individual farmers and their families. We all owe them a big debt. I hope that documents like Restoring the Balance will make the task just a bit easier.

I am very pleased that the Biodiversity Advice Fund has funded Restoring the Balance. It is exactly what I had in mind when I launched that fund and the Biodiversity Condition Fund in December 2000 to help landowners look after biodiversity on their land. This publication sets a shining example for other regions. Well done.

Hon. Marian Hobbs

30 August 2004



Remember - landowners and communities have an important role in restoring biodiversity.

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At BDO Spicers we care about our environment and are proud to be part of the community that ensures the protection of our biodiversity

Supporting biodiversity and the community in Northland - now and in the future

What's so Special about our Natural World?



Hochstetter frog, Brynderwyn Range.



N.Z. Dotterell, Sandy Bay.

What's so Special about our Natural World?

New Zealand's plants, animals and landscapes set us apart and help define us as a nation – the land of the silver fern and kiwi. Our unique biodiversity has been shaped through millions of years of isolation. Nowhere else has a large landmass become characterised by lush forests dominated by birds, reptiles and large invertebrates.

Since the arrival of people however, our biodiversity has been in retreat. Habitat destruction, over-harvesting and successive waves of pests, weeds and diseases have taken their toll. All of this has occurred despite humans being dependent on healthy biodiversity for their survival.

While there is now a substantial network of publicly owned conservation areas in New Zealand, the vast majority of land remains in private ownership. Many habitats, species and features are found mainly in these privately owned areas.

A number of experts consider that our decreasing biodiversity is our most urgent environmental problem.



Juvenile Tuatara,
Hen & Chickens Islands.



Flax flower, Three Kings.
Lisa Forester



North Island Brown Kiwi. DOC

What has happened in Northland?

By the time Europeans settled in Northland large areas between the Bay of Islands, the Hokianga and Aupouri Peninsula were in manuka-kanuka shrubland or bracken fern, probably as a result of fire, either natural or deliberate.

Nearly all the megafauna like the flightless moa, large frogs and giant reptiles had already disappeared. Fortunately, the tuatara and large Cyclodina lizards found refuge on small and generally rodent-free offshore islands.

Destruction continued and today natural areas in Northland have been described as little more than fragmented islands within a sea of human induced environments that are being, or have been, colonised by a large number of introduced species.

Since the arrival of humans Northland has lost approximately:

- 99% of its podocarp forest
- 96% of its kauri and volcanic broadleaf forests
- 95% of its freshwater wetlands and dune forests

The loss of habitat and introduction of a plethora of plant and animal pests has resulted in the further loss of plant and animal species, but some such as the robin, stitchbird and whitehead still occur elsewhere in New Zealand.

What makes Northland Special?

Despite the human impacts of the past few hundred years, Northland retains a high diversity of ecosystems and landscapes, ranging from internationally important estuaries, harbours and offshore islands to a variety of freshwater wetlands and forest types. Some unusual ecosystems, including geothermal habitats and dunelands, are well-represented in Northland. The number of species in the region is correspondingly very high.

The habitats and native flora and fauna of Northland have evolved through extreme climate changes and coastal influences (no point in Northland is further than 40km from the coast). This has included alternating periods of isolation and connection with mainland New Zealand as sea levels rose and fell over thousands of years.

The high species diversity is also reflected in the numbers of threatened species with the region having more plants and animals at risk of extinction than most other regions in New Zealand. The causes of decline for most plants and animals are primarily combinations of habitat loss or degradation and impacts of pest animals and pest plants.

Many pest-free islands around the coast of Northland are a refuge to an assortment of rare plants and animals. These islands are a storehouse of biodiversity, some of which has the potential to recolonise the mainland. This is already happening with birds such as kaka, kakariki and bellbirds dispersing from these islands to the mainland.

Increasing settlement in many parts of Northland is contributing to increased interest in and care for the environment. More and more people are undertaking restoration initiatives, either individually or as groups, collectively turning the tide for biodiversity recovery in Northland.



Flowering Pohutukawa, Poor Knights Islands. Nan Pullman

What's so Special about our Natural World?

Websites

DoC Science and Research has lots of publications on many topics. Good technical information
www.doc.govt.nz/Publications/004-Science-and-Research/index.asp

NIWA Atlas of Freshwater Fish [www.niwa.co.nz.rc.freshwater/fishatlas](http://www.niwa.co.nz/rc.freshwater/fishatlas)

Bank of New Zealand Kiwi Recovery www.kiwirecovery.org.nz

Provides comprehensive support and advice to people and groups wishing to protect kiwi. They also have funds available for community groups doing kiwi protection.

Biodiversity site www.biodiversity.govt.nz

The Green Toolbox – a database that assists in the selection of native vegetation for a set of given criteria (eg. ecological region, soil, coastal, drought conditions)
www.landcareresearch.co.nz/research/biodiversity/greentoolbox

Nga Tipu Whakaoranga / Peoples Plant Infobase – Information on traditional uses of native plants.
www.lawsite.co.nz/landcare

Manaaki Whenua Press – Online bookstore for NZ natural history www.mwpress.co.nz/store/dynamicIndex.asp

Ecological education databases – basic education tools, aimed at school level. Good for explaining basics and ecological terminology www.landcareresearch.co.nz/education/index.asp

Further reading

General

Conning, L. 2001: *Northland Protection Strategy: A Report to the Nature Heritage Fund Committee*.

DoC Science and Research has lots of publications on many topics email sciencepublications@doc.govt.nz or DoC PO Box 10420, Wellington.

Hutching, G. 1998: *The Natural World of New Zealand; An Illustrated Encyclopaedia of New Zealand's Natural Heritage*, Penguin Books.

Stevens, G.; McGlone, M.; McCulloch, B. 1995: *Prehistoric New Zealand*, Reed, Auckland.

Ecology

Brockie, R. 1992 : *A Living New Zealand Forest*, Bateman, Auckland.

Dawson, J.& Lucas, R. 2003: *Nature Guide to the New Zealand Forest*, Random House, Auckland.

DoC. *Natural Areas of each Northland Ecological District* (PNA survey reports, ecological survey data.)

Native Plants

Brownsey, P. & Smith-Dodsworth, J.C. 2000: *New Zealand Ferns and Allied Plants*, 2nd ed., Bateman, Auckland. (contains photos).

Crowe, A. 1997: *A Field Guide to Native Edible Plants of New Zealand*, Godwit, Auckland.

Poole, L. & Adams N. 1990: *Trees and Shrubs of New Zealand. DSIR Field Guide*, DSIR Publishing, Wellington.

Salmon, J.T. 1992: *The Native Trees of New Zealand*, Reed, Wellington. (Smaller field guide also available).

St. George, I. 1999: *The Nature Guide to New Zealand Native Orchids*, Godwit, Auckland.

Wildlife

Forster, R.R. & Forster, R.M. 1970: *Small Land Animals of New Zealand*, John McIndoe, Dunedin. (Covers reptiles, frogs, slugs, snails, worms, insects, spiders etc).

Fuller, E. & Ching, R et al. 1990: *Kiwis*, (Collation of scientific information and R.Ching drawings).

Kiwi Survival Guide – free publication produced by the Kiwi Recovery Programme and available from a range of agencies.

Lindsay, T., Morris, R. 2000: *Field Guide to New Zealand Wildlife*. HarperCollins Publisher, Auckland.

Robertson, H.A. & Heather, B. D. 1996: *The Field Guide to the Birds of New Zealand*, Penguin Books, Auckland. 2nd Edition 2000.

McDowall, R.M. 2000: *The Reed Field Guide to New Zealand Freshwater Fishes*, Reed, Auckland.

Organisations with information to help you

NZ Fish and Game, NZ Landcare Trust, NIWA, NRC, QEII National Trust, DOC. (Refer to Appendices for contact details).



Ruru, Aroha Island, Kerikeri.

What do you Want to Achieve?



Irrigation dam at Douglas property, Titoki. NRC

The first step towards *Restoring the Balance* on your property is to **decide what you want to achieve**. Thinking about this and working out the steps to achieve it, before you begin a project, will save you time and money later.

It should be possible to state, simply and clearly, **why** you are doing **what** you are about to do; for example, improving the health of your forest remnant, stream or wetland.

Specifically, you may want to

- Encourage bird life and other native animals such as lizards, land snails, insects and freshwater fish, including threatened species
- Establish long-term legal protection of habitats
- Work with neighbours and the local community to restore and enhance natural values
- Maximise land use in sensible and sustainable ways. Ensure economic returns along with improved ecological values.

The table below highlights some common objectives and the tasks that are likely to be associated with them.

Objectives	Key tasks
Legal protection	Covenant – see legal protection section for details, and other options
Restoration of riparian zones, corridors, habitat sequences, etc. and return of key plant species	Exclude livestock, goats and pigs; control key weeds; plant species that are currently absent but ecologically appropriate to the site
Forest understorey recovery	Spring rat control; control of shade tolerant weeds; goat and livestock exclusion by fencing and shooting
Forest bird (especially kukupa) recovery	Rat and possum control, especially in spring; integrated predator control (adding mustelids, cats, German wasps)
Kiwi and/or pateke (brown teal) recovery	Dog, mustelid and cat control
Invertebrate recovery – landsnails, insects, etc.	Rat, possum, pig control year round; exclude livestock
Lizard recovery	Rat control year round; also cat and mustelid control

Initial Survey

You may think you know your bush remnant really well but it is time to look even closer. Before you begin any pest and/or weed control or monitoring programme you need to familiarise yourself with the bush and its current state.

What to take

Take a notebook to jot things down, a plastic bag to take plant samples for later identification, a camera and binoculars. Binoculars will help you to see what's happening in tall trees, e.g. flowering, fruiting, possum browse. Coloured tape and a felt-tip pen are useful for marking so you can find a particular tree or pest sign on your next visit.

This is also a good time to choose some photo points that you can revisit on a regular basis to show changes over time. It will be handy to show a general landscape or 'edge of the bush' photo as well as some interior shots.



QE2 National Trust covenanted pa site, Paparoa.

Pest animal sign

Begin by walking around the edge of the bush, keeping your eyes open for the obvious signs of pests e.g. possum trails through the grass, scratched tree trunks, obviously browsed foliage.

In particular, if there are any kohekohe and mahoe trees, scan their leaves for possum browse, because these are two of the best indicators for the presence of possums. If the trees look healthy note that too.

Livestock

If there are fences, assess how stock proof they are. Can you see any cow pats on the wrong side of the fence? Are there areas of long grass or is it short and grazed? Are seedlings and shrubs being browsed? If there are no fences and you want to fence stock out then also look at some practical lines for fencing and estimate the distances involved.

Pests

Bush edges are a favourite place for weeds and Northland has plenty of them. So look out for pampas, privet, elaeagnus, blackberry, ginger, climbing asparagus, smilax, moth plant, jasmine or honeysuckle. If you see a plant that you don't know take a piece for identification and ideally mark the plant with coloured flagging tape. Keep an eye out for possum or goat droppings?



Cow in stream.

What do you Want to Achieve?

Native biota

Now you need to walk through the interior of your bush trying to view a cross-section of the different terrain and plants. For example you need to look at any ridges, as well as the head of a valley, down the stream and maybe check out any wet, swampy areas. Are there any particularly large trees?

Take a good look around when you're inside the bush and try to describe what it is like. Is it quite dark or light with some very open sunny areas? Can you feel any wind or is the interior still and sheltered?

What about the ground. Is it dry or wet? Is there a thick, moist leaf litter or bare ground? Are there any ferns or plants on the ground? Do you see lots of seedlings and fruit on the ground? Any sign of kiwi probes and droppings?

If you stop and listen do you hear or see any birds? What are they? Are any sensitive species present, e.g. kukupa, tomtit and is there a core area that they appear to use the most?

Recording your data

Using your notes see if you can draw a simple plan of the main features of your bush, noting both positive and negative factors. Keeping a diary of all this information is also a good way to build up a comprehensive picture and to record changes over time.

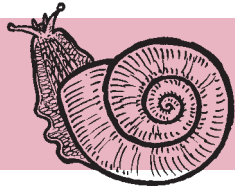
At this stage you should be beginning to see some issues and thinking about what you want to achieve? If some objectives have become obvious it is a good time to stop and write them down.



Covenanted bush remnant, Mata. Nan Pullman



Grey heron, Woolley's Bay.



Even though the pocket of streamside, forest or wetland you may want to protect is quite small, it could make a significant contribution to local biodiversity

Note: If your land or parts of it are covenanted with the QEII National Trust, contact your regional representative for more information. (See contact details in Appendix). The Protected Natural Areas (PNA) survey information is available from DOC Conservancy or your local district council. Significant Natural Area (SNA) maps indicate an area's uniqueness/rarity and what species may be appropriate for revegetation or reintroduction.

You may like to record these areas on your farm map, an aerial photograph or a topographical map. (Contact Northland Regional Council for assistance in sourcing photos and maps.)

Altitude: (Metres above sea level)

Present Economic Use: (e.g. regularly grazed/ seasonally grazed/livestock excluded/other)

Vegetation: (e.g. dominant species - totara, puriri, taraire, kahikatea, kauri, rimu, pohutukawa, kanuka/manuka, raupo, flax. Large specimens. Try to estimate the percentage of two or three main species e.g. totara 60%, taraire 15%, puriri 10%)

Planning your Project

Wildlife Values: (Kiwi, kukupa, kauri snail, bittern, freshwater fish, frogs, lizards, bats, insects or any known threatened or regionally significant plants. For more information contact DOC.)

Known and Potential Threats: (e.g. livestock, pest animals - possums, mustelids, cats, dogs, goats, pest plants, logging, erosion, other)

Historical/Cultural or Landscape Features: (e.g. pa, midden, kauri dams, old farm buildings, rock formations, other.)

Planning your Project

Neighbours: Include contact details for consultation about management, especially for any projects they are carrying out - particularly poisoning.



Kiekie flower, Maungapere Mountain, a favourite food of Possums. Nan Pullman



Stepping stones of native and (for some fauna) exotic vegetation can be important wildlife corridors linking larger features and helping plant and animal dispersal

Further Reading

Andrew Crowe's plant identification series

Dawson, J. & Lucas, R. 2003: *Nature Guide to the New Zealand Forest*, Random House, Auckland.

Hitchmough, Rod. 2002: *Threatened Species....* Ray

Pierce, R., Moodie, H., Coulter, G. 2002: *Biodiversity values and opportunities for restoration at Whangarei Heads*, Wildlands Consultants report.

Organisations to help you

New Zealand Fish and Game, NZ Landcare Trust, NRC, QEII National Trust, DOC (Refer to Appendices for contact details).



Conservation volunteers with wandering jew rolled and ready to spray, Hikurangi. Nan Pullman

Having worked through the 'Planning Your Project' section you should have a good idea about what indigenous biodiversity values your land has, and the threats to those values.

You may have written down some objectives, and noted any existing ecological management in your area.

The following section is designed as a reference for the different tasks you may need to do as part of your action plan, including:

- pest animal control
- weed control
- restoration tree planting.

However, you need to remember that the techniques and tools available are under constant review. **Restoring the Balance** is based on techniques understood to be "best practice" at the time of publishing. References are provided in the appendices for finding updated information on techniques. It also provides information on:

- developing an action plan
- sourcing funding for projects
- accessing more detailed information (See Appendices at back of kit)
- working with your neighbours
- forming community Landcare groups
- legally protecting the special places on your land for future generations to enjoy
- combining biodiversity protection with economic farm and horticultural management.

Pest animals - Plan your Attack

Pest animals can be defined as all species introduced to New Zealand that have a negative impact on native plants and animals and/or production areas.

The major threats to our terrestrial flora and fauna come from:

- possums, which destroy forests and birds' nests
- rats, which prey on seeds, seedlings, invertebrates, lizards, birds' eggs and chicks
- mustelids (ferret, stoat, weasel) which prey on lizards, invertebrates and birds
- cats, which prey on lizards, invertebrates, birds, bird eggs and chicks
- dogs which kill kiwi, penguins and shorebirds.

Other threats include pigs, goats, escaped deer, livestock, hares, rabbits, hedgehogs, mice, wasps, Argentine and other exotic ants.

Freshwater systems are threatened by introduced fish such as mosquito fish (*Gambusia*) and koi carp.

Widespread eradication of most pest species on the mainland is impractical in most cases, therefore control needs to be a long-term commitment to control as most pest populations can recover quickly.

Remember some pests are intelligent enough to learn from bad experiences and will quickly discover how to avoid poisons, traps and spot lights if your first attempts to kill them are not successful.

The more you understand their behaviour and interactions with other plants and animals (see integrated pest control p32) the better your control plan and outcome will be.



Possoms

Possoms can devastate forests and their fauna. They alter the composition of the forest by heavily browsing their favoured species and also disrupt vital ecological processes such as flowering, fruiting, seed dispersal and germination.

For native wildlife the possum is both a food competitor and a predator. “Nest cam” video has confirmed that possums eat eggs and chicks of kokako and kukupa, and autopsies have revealed that they munch through a wide range of invertebrates.

While it may currently be impossible to eradicate possums in New Zealand, coordinated control can reduce local populations to much less damaging levels.

- Possoms feed at night and sleep during the day
- Live in trees but also move across open country and graze on pasture
- Often follow the same track, forming flattened paths about 20 cm wide
- Have favourite trees that are visited regularly, often recognised by extensive scratch marks in their bark and heavy browsing of leaves, and fruit.

There are many ways to kill possums. The time you have, the finance available, terrain to be covered, safety and the need to be humane all need to be considered when planning your control. It is especially important to know what level you need to get them down to in order to protect specific values. For example to protect kohekohe and maintain viable populations of kukupa and kokako, very low levels of possums are needed, e.g. lower than 5% residual trap catch (see glossary).

It is usually most effective to begin possum control with an intensive blitz, followed with an ongoing maintenance programme. Alternatively, intensively control possums and rats on a smaller scale in a core area.

Because they eat almost anything, possums are attracted by a variety of baits. But they learn quickly, so sub-lethal poisoning - often the result of low quality or degraded poison baits or not putting out enough at each site - may result in them becoming bait shy.

Their dislike of wet weather – although they can swim – makes possum control much more successful in periods of fine weather. Colder temperatures are better as well.



Possom trail, Kaihu. Nick Match



Possom scratched tree, Waipu.



Possom browsed kohekohe, Pukehuia.

Control

Poisoning

Poisoning via bait stations is generally the most cost-effective method of possum control. Poisons can be divided into two main groups: slow-acting ones that can be used by the public without special training and licensing, such as Talon, Pestoff, Campaign and Feracol, and those that require special licences and/or permits, including, Cyanide, in either a paste or encapsulated pellet form.

Avoid prolonged use of anticoagulant based poisons which can be detrimental to many species in the food chain.

A good strategy is for several local groups to collaborate for the cyanide licensing of one or two operators in their area. Initial hits are best done with cyanide.



Philproof bait station

A variety of bait stations are commercially available to keep baits dry and out of reach of non-target species. An intensive knockdown will be initially required with approximately three monthly pulsing to maintain low levels of possums.

With all possum poisons it is important to use good quality fresh baits and to remove any left over bait once bait take stops. Stale, mouldy baits lose their potency, and possums quickly become poison shy after taking sub-lethal doses of toxin. Ideally use anticoagulants only when possum densities are low to very low.

For the maximum benefit to birdlife, possum poisoning is best concentrated just before and during the bird breeding season, which for most species runs from August to about January. This is particularly important for kukupa, which usually signal their breeding with aerial display flights, involving upward flapping, a stall and swooping dive.

Bait stations are best spaced 100 –150 metres apart along well-defined bush/pasture margins, along tracks through larger areas of bush or on possum runs or other frequently used sites. In large blocks it may be necessary to place the stations in a grid pattern to get accurate application and distribution of poison stations.



Biobag containing Feratox

Trapping

There are three general types of possum trap – cage, leg hold and kill.

Cage traps are best suited for small blocks and close to houses. They are too bulky and expensive to be used in high numbers on large projects and they need to be checked daily. These traps are best baited with a small piece of fruit or vegetable sprinkled with cinnamon. Possums caught in cage traps have to be killed humanely. In the countryside, where it is safe and legal to do so, they can be shot with a .22 rifle. Putting the cage containing the possum into a large rubbish bag and then running exhaust gas from your (petrol) car into the bag, is also a humane way of dispatching them.



Kill traps such as the Timms trap are very simple to use, but they are relatively expensive and too bulky for large-scale use. Kiwi have been caught by their beaks in Timms traps so it is necessary in kiwi areas to firmly mount them well off the ground (70 cm). Timms traps are best baited with a piece of fruit, eg. apple sprinkled with cinnamon.



There are other types of kill traps on the market, available from pest management suppliers and it is important that they are also raised and mounted in a bracket which keeps them stable.

Leg Hold Traps are more suited to large projects where lines of 50 or more traps are used, often on a rolling front through large bush areas. The standard recommended type is the Victor 1 inch hard jaw. It is cheap, light and causes little injury. As with Timms traps, leg hold traps can severely injure non-target species and must be set at least 70 cm off the ground in kiwi areas. It is also necessary to secure each trap with a tether long enough so that the trapped animal can rest on the ground. Because the target pest will be held by a leg or paw, all leg hold traps must be checked within 12 hours of sunrise and trapped animals humanely killed.



Shooting

Night shooting with spotlights can sometimes be effective in more open terrain, around the margins of small forest blocks and in isolated trees.

Regular night shooting is a useful gauge on the number of possums in an area. You will need a firearm's licence from the police and must comply with all safety requirements for the use of firearms.



Possoms eat pasture as well as native plants - They have a preference for well fertilised grasses and clover

Rats

There are two main species of rat on the New Zealand mainland, the ship rat or black rat of the forests and the terrestrial Norway rat, usually found near water, buildings and dumps. Both species are rapid breeders, with ship rats in the central North Island being able to breed at 2-4 months of age and have three litters per year, each of about 5 young.

In areas where wildlife values are the highest, intensive rat control should be focused prior to and during the breeding season of your local birds. (See Appendix 7 for Pest Control Timetable)

Control

All rats eat a wide range of foods, are quick to find bait stations and communicate their location to other rats, and are capable of detecting some poisons, especially cyanide and cholecalciferol if not used appropriately.

A dominant rat will protect a large food supply such as a station of baits and stockpile the baits in or on the ground, which means only a few rats will be taking most of your bait.

Poisoning with bait stations on a grid of 100 m x 100 m, using 1-2 “pulses” is often sufficient to protect nesting birds. Alternatively, if you have a grid for possums at 150 metres (and possum densities are low from Feratox etc) you could use the same grid for rats putting stations at 50 metre intervals, i.e. 150 x 150 m grid. Rats have relatively small home ranges (c.1 ha) so the grid measurements need to be accurate.

Maintain poison availability continuously until the take stops then remove it otherwise the bait will go off and potential aversions develop.

Poisoning options include Colicalciferol (prefeeding needed and can be used in conjunction with Feratox), Racumin paste, and anticoagulants such as Warfarin, Pindone, Ditrac, Pestoff and Talon. In many cases it will be possible to integrate possum and rat control, e.g. with Feratox (cyanide) pills contained in rat poison paste and prefeed. Avoid prolonged use of the more persistent anticoagulants, which can accumulate in the food chain and potentially kill top predators e.g. kiwi, morepork. Seek advice from DOC on recent developments.

Snap-trapping with Victor Easy Sets can be very effective in areas up to a few hectares. Use grids of about 50 m x 50 m and bait with almonds or chocolate buttons. Traps will quickly rust in a salty environment.



Rat in Mark 6 Fenn trap



Sentinel block

Mustelids – Ferrets, Stoats, Weasels

Ferrets, stoats and weasels (in descending order of size) belong to the mustelid family. All are good swimmers and can prey on animals up to 3 times their own body weight.

	Colour	Av. Length	Average weight	Comments
Ferret	Generally creamy with black tips	52cm	M 1200 g F 600 g	Size of a small cat, active at night; take mainly rabbits and rodents but can kill kiwi up to 2.5 kg in weight.
Stoat	Brown back, pale belly	37cm	M 325 g F 205 g	Bushy tail with black tip; active day and night; take mainly rodents, but also most kiwi chicks are killed by stoats. Peak dispersal of young is December-March.
Weasel	Deep brown to light tan	22cm	M 125 g F 60 g	Short tail – no black tip; active day and night; prey on small animals only.

Mustelids can breed rapidly in response to the availability of food – rats, rabbits and mice are staples but, birds, bird eggs, lizards and invertebrates are also targeted.



Dead ferret in Fenn trap, Matapouri.



Mark 6 Fenn trap

Control

Trapping is the main weapon in the war against mustelids.

All three species are attracted to tunnels in which kill traps are set.

Currently the most successful trap set-up for killing mustelids is two number 6 Fenn traps set in a tunnel about 700 mm long with wire netting or bars at each end to allow mustelids through, but exclude kiwi chicks and other non-target species.

These are usually baited by placing rabbit meat (fresh if you can replace it every few days, otherwise salted or freeze-dried), or rodent between the traps. Rabbit meat is the most effective lure in Northland, but it pays to rotate lures if nothing is caught for a long period.

Siting the tunnel near a bank, forest margin, track, stream or at the intersection of natural pathways improves capture rates.

Tunnels can be made from rough sawn 150 mm and 200 mm by 25 mm boards. But purpose built plastic tunnels are considerably lighter and stack together to make carrying in the bush much easier, and are just as effective. Use the same access tracks used for

Pest animals - Plan your Attack

possum or rat control and space traps at approximately 200m or less.

In general mustelids are difficult to trap, and only trapping to a high standard will bring about increased survival rates of birds. Keep a watchful eye out for them and their tracks and droppings. Input from an experienced mustelid trapper can be very helpful when setting up your programme.

Other new mustelid traps are being trialled and registered for mustelid control. Diphacinone paste is also commercially available for ferret poisoning, but one study has shown fenn trapping to be more effective.

Cats

All cats, whether feral or domestic, kill the same groups of native wildlife, including insects, eels, koura (native crayfish), fish, lizards, birds (including kiwi chicks) as well as rabbits and rodents.

Cats are often present in far greater numbers than is obvious as they are extremely alert and quick to hide. Keep a watch out for their droppings. They have large overlapping home ranges with males known to roam up to 20 km, although females with kittens seldom move more than 500 m from their den.



The main methods for targeting cats in Northland are:

- Live capture cages – that need checking daily.
- Conibear traps – elevated 70 cm – recommended for larger blocks.
- Timms traps – a kill trap that should be elevated 70 cm.
- Leg hold traps - elevated 70 cm.
- Shooting – supplementary to trapping and needs to comply with all aspects of firearm's safety.

Traps are best baited with rabbit or fish meat. Minced bait is best for conibear traps. Much secondary poisoning of cats occurs with brodifacoum and 1080 poisoning of possums and rodents, but sustained control may be difficult to achieve by this method.

Dogs

All dogs, whether they are family pets, hunting, working or wild, retain an inherent drive to track, chase, hunt, grab and kill other animals. Dog control is an important part of biodiversity enhancement and protection projects.

Some of the wildlife currently at risk of being killed or having nests disturbed by dogs are:

- Kiwi, and other ground dwelling birds, in bush, scrub, long grasses
- Shorebirds nesting or feeding on beaches or dune areas
- Seabirds, especially penguins, nesting along the Northland coast
- Wetland birds, like the bittern, nesting or living in swamps and long vegetation

The safest way to avoid your dog harming wildlife is to ensure it does not go into areas where wildlife live. If you must take it into a wildlife area have it on a short lead. Avoid using dogs for pest control unless you are sure there are no vulnerable wildlife in the area; that the dog is specifically trained for targeting only the pest and has undergone aversion training for native birds.

New Zealand Dog Control legislation now covers the need for people to control their dogs so they do not attack or harm threatened wildlife.

Goats

Goats have the potential to impact on forest and shrubland regeneration, particularly if they camp in an area for prolonged periods. Shooting can be locally effective in removing goats and forcing dispersal (but often they end up being someone else's problem). Eradication of goats in discrete areas can be achieved by coordinated hunting, while poisoning is an option for licensed operators. Rounding up large herds of goats and selling to the freezing works has also been achieved. In larger areas sustained cooperative hunting by landowners or neighbours can keep numbers to desirable levels. Monitor sensitive species, such as Coprosma, for goat browse.

Rabbits and hares

Rabbits and hares can impact on sensitive dunelands and orchid habitats. Rabbits can also increase in numbers when predators are being effectively controlled, particularly in dry seasons. Options for control include shooting, poisoning (Pindone) and release of RHD. For further information contact NRC.

Pigs

Pigs have a serious impact on forest understorey and some threatened species. Kauri snails are particularly sought after by pigs and kiwi have been recorded as prey. Options for control include hunting (follow aversion training guidelines for dogs in kiwi areas), trapping with cages, baiting into larger compounds and shooting or poisoning and ground-based poisoning. For further information contact pest control staff of DOC or NRC.

Hedgehogs

Hedgehogs eat large numbers of invertebrates from many habitats, including forest remnants and they prey on the eggs of dotterels and other ground-nesting birds. There is no specific control method for hedgehogs, but many are trapped in Fenn traps, Timms and cage traps (baited for cats) and Victor traps and they are also susceptible to brodifacoum in cereal baits. For further information contact DOC.

Mice

Mice can impact on invertebrate and lizard species. Sustained mouse control is more problematic than rat control, but good results have been achieved for limited periods using anticoagulants. For further information contact DOC.

Argentine ants

Argentine ants are a recent colonist of Northland and are impacting on native ants and other biota. They are widespread in settled areas and can hitch-hike to new sites on vehicles and equipment. Keeping vehicles and equipment clean is an essential precaution

Pest animals - Plan your Attack

to halt the spread of these ants. Poisoned meat can control their spread and intercept new ants arriving at likely invasion points such as car-parks and garages.

Particular care needs to be taken during revegetation projects to ensure the new plants are ant-free. For further information contact DOC.

Wasps

There are two main types of introduced wasps in Northland – paper wasps (narrow bodied) and the plumper Common and German wasps.

They are a problem because they have no natural predators in Northland, our winters are mild and there is plenty of food. They are voracious eaters of honeydew, which is an important food for native birds, bats, insects and lizards. Wasps also prey on insects and have even been seen killing newly-hatched birds.

Wasps will strongly defend their nests if humans or animals get too close. Paper wasps build umbrella-shaped nests which hang by a single stalk from the branches of trees or eaves of houses.

German and common wasps most often live in underground nests with one or more entrance holes, although their nests may also be found in trees. For information on finding and destroying wasp nests see the NRC's 'Animal Pests' fact sheet or contact any DOC office.

Pest Fish

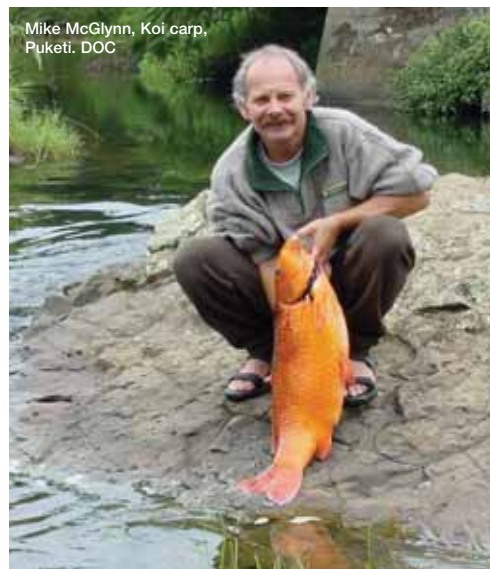
Some types of introduced fish have spread into the wild, become pests, and are threatening New Zealand's freshwater species and environments.

The following fish are considered major pests in the wild:

Gambusia, introduced into New Zealand to control mosquito larvae are ironically not very good at it. Although small, Gambusia breed rapidly to large numbers, attack adult native fish and eat their eggs. Once established, it is nearly impossible to control Gambusia, so it is important to keep them out of new areas.

Koi carp are large fish that cause water quality to deteriorate. If your pond is small and you suspect contaminated with koi temporary drainage is suggested. Fish can then be removed and destroyed. Don't empty your pond into the storm water system, drain it onto the grass.

Remember - Fish can't make the great escape on their own. People are illegally moving them around, accidentally and on purpose – it is vital that people help control the spread. For further information contact DOC.



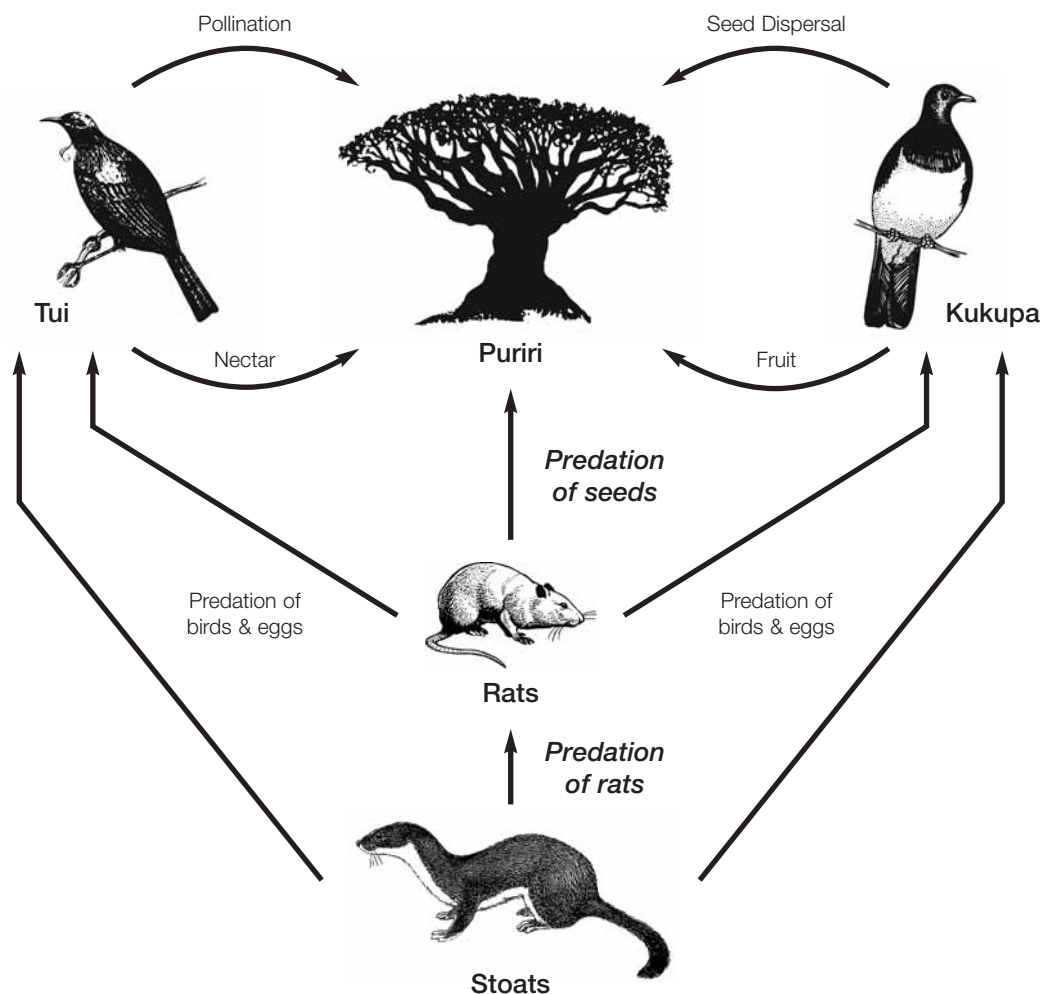
Ecological complexity

All ecosystems have complex interactions between plants and animals. The diagram below gives an example of ecological interactions that need to be considered when planning your pest control. It illustrates the connections between puriri, tui, kukupa and some introduced predators.

The puriri tree relies on birds like the tui for pollination of its flowers, and the kukupa to spread its seed. By carrying out these roles, the birds gain a source of nourishment from the puriri (nectar from the flowers for the tui and flesh surrounding the seed for the kukupa), and the puriri is able to reproduce and spread. This relationship is termed 'symbiotic'. Thus, all three species are in some way reliant on the other, as part of a healthy functioning ecosystem.

The rat eats tui and kukupa eggs and chicks and also puriri seeds, and thus can affect the functioning ecosystem on multiple levels. This removes the pollinator (tui), seed disperser (kukupa) and the food source for both of them, leading to a breakdown in the ecosystem.

The stoat further complicates the ecosystem relationship being a predator of tui, kukupa and also the rat. Thus, the removal of stoats from the ecosystem may lead to an increase in the rat population, which is called the 'ripple effect'. Similarly, predator control that only targets rats and not stoats as well, removes one of the stoat's food sources, possibly leading to the stoat relying more on birds and other valuable wildlife. This is called 'prey switching'. It is important to take these factors into consideration when planning your pest control. Often an integrated approach to animal pest control is required.



Integrated pest control

Often our pest programmes concentrate on targeting individual or a few pest species in order to recover one or more threatened species or habitats. For example, our kiwi programme targets dogs, mustelids and cats because these are the main predators of kiwi.

However, some of these predators prey mainly on other pests and kiwi are an unfortunate addition to their staple diet. Mustelids for instance, prey mainly on rodents and rabbits, so it is possible that one or more of these animals (mice, rats and rabbits) will thrive if the control is particularly efficient. This response might be even more marked in a favourable season for the rodents and rabbits. In a dry spring and summer with high fruiting levels of podocarps more rodents will survive. But the resulting higher numbers of prey species could also attract more predators to the area.

Little is known about the likely outcome of these sorts of “ripple” effects. It is possible that higher numbers of rats and mice impact on seedling germination, the numbers of invertebrates and lizards and the nesting success of small birds.

Planning an integrated pest control programme that targets dogs, cats, mustelids, rats, rabbits and possums is advisable in the most sensitive habitats in order to avoid serious consequences. Nearly every type of pest control will have a potential ripple effect or side effect. For example fencing livestock from a habitat will allow some weeds to increase, so the more integrated a project can be the more balanced the outcome for local biodiversity and ecological processes.

Further Reading

Blair, D. 2002: *Field Guide to Mustelid Trapping*, Yellow-eyed Penguin Trust, Dunedin. (More detailed information)

Kiwi Survival Guide, 2003: *Photographs of mustelid traps and basic details of trapping regimes*, available from DoC and NRC offices.

Kukupa Survival Guide, available from DoC and NRC offices.

Porteous, T. 1993: *Native Forest Restoration. A Practical Guide*, QEII National Trust, Wellington.

King C.M. 1998: *Handbook of New Zealand Mammals*, Oxford University Press, Auckland.

New Zealand Journal of Zoology Vol 31 (2001). *Advances in New Zealand mammalogy 1990-2000*. (Series of animal pest papers).

Organisations with information to help you

Northland Regional Council, DOC, QEII National Trust, NZ Landcare Trust, NZ Kiwi Foundation. (Refer to Appendices for contact details).



A weed is simply a plant in the wrong place. However, the weeds we most need to worry about are those that have the ability to invade an area and the potential to alter it in any way.

Because weeds have not evolved with native fauna and flora they are often capable of overtaking natural ecosystems, penetrating the margin of a forest first, then interfering with the life cycles of plants growing in the main forest tiers.

When the native seedlings destined for the forest canopy are smothered the forest changes from a state of regeneration to a state of collapse. They can similarly impact on plantings of native and indigenous species. They can also affect areas of productive farmland and be costly to remove or toxic to livestock and native fauna.

Early settlers

Northland was the first province in New Zealand to receive permanent European settlers. With them came fruit trees, vegetables and garden ornamentals. The first weeds also came, some picked up at ports of call during the settlers' long journeys here.

Many of these plants have flourished in Northland's benign climate with the region's older settlements now facing some of the more serious weed problems.

Biosecurity

Stop the spread of weeds by checking there is no contamination from nurseries, boats or vehicles when coming from weed prone areas. Check for weeds before bringing soil or fill in to a site.



On average, eight garden plant species become naturalised in the wild in New Zealand each year. Of the estimated 2,500 plants introduced to New Zealand more than 270 are causing serious damage to our native plant communities.



Remember, not all weeds are created equal. Some weeds will be more of a problem than others. Canopy closure will control many weeds but the worst ones are those that continue to grow in low light situations.

To control or not?

Weed control can be expensive and labour intensive. The reason for weed control is not simply to kill weeds but to restore natural ecological processes and protect productive areas of your property.

Before you decide whether or not to control particular weeds, try to find out more about them from your Regional Council, District Council or Department of Conservation. See the Appendix for contact details and a list of available pamphlets. Ask lots of questions and then make a clear plan.

Try and assess if the weed is a problem in your situation. Sometimes killing it will make matters worse or it will be succeeded by natural regeneration anyway.

There is no simple recipe – the more thorough your planning the more chance of success.

Tackle the problem as soon as possible because once established and dominant, weeds become more difficult to remove. Many weeds also re-invade very quickly after control, from seeds or viable roots left in the ground.

Try to avoid ‘over-clearing’ and soil disturbance as many weeds thrive in disturbed sites. Match clearing of sites to your ability to replant and control regrowth. The weed that re-invades could be worse than the weed that is there now.

Note: If planting trees or shrubs it is advisable to carry out initial weed control before planting.

To assess the risk from a particular weed it can be helpful to ask the following questions

- What conditions does it like to grow in (lots of light, shade, frost free). What will happen if you do nothing? Is that acceptable?
- How quickly does the weed establish and grow? How does it reproduce, (seeds and/or cuttings), and how long does it take seed to mature? How does the seed disperse? (wind, water or bird)
- Is it possible to kill the weed? Can natural re-growth be managed longterm? What is the likelihood of re-invasion? Where are the weed sources? What measures can be taken to avoid re-invasion? You may need to work with your neighbours.
- Will you need to replant the area after you have controlled the weeds? For example if it is an erosion-prone riverbank after ginger has been controlled.
- How does weed control fit into your goals and budget?

Control Options and Methods

The key principle is to choose the Method Of Least Disturbance or M.O.L.D. Control options are often used in combination e.g. chemical control of mature plants, followed by hand pulling of seedlings. Some control options are:

Succession

Letting nature take its course with weeds being naturally replaced by native plants and minimal intervention. This is a long-term solution and is a great option if you have the patience. In some situations, some shade intolerant weeds, such as gorse can act as a nursery for native plants.

Biological

Check with your Regional Council to see if there are any biological control options available. Biological control is a longer-term option designed to tilt the balance in favour of native plants, helping them to dominate the weeds.

Physical control

Options include – shading, hand weeding, ring barking, grubbing, felling and mulching. These methods are labour intensive but have the advantage of targeting the weed in question. Apply the M.O.L.D principle to help decide which control option to use. For example, ring barking could be a better option than felling trees if this avoids opening up light wells to allow invasion of more weeds or damaging native seedlings and it will provide nest holes for birds such as kingfishers and parrots.

Chemical control

There are often several herbicides available to control a particular weed. Always read and follow the label instructions regarding safety and dose rates.

Options for using chemicals include

- Spraying with knapsacks or other spray units.
- Injecting herbicides into trees; the drill and fill methods and cut and squirt methods work well for softwood trees such as wattle and woolly nightshade.
- Stump swabbing using a paintbrush, stump stick or drench gun to apply stump gel or herbicide immediately after the tree has been cut down.

Important issues to consider when selecting a herbicide:

- Selectivity. Some herbicides are very selective and the herbicide will only kill targeted groups of plants. For example Gallant only kills grasses and sedges while Versatile only kills legumes and daisies.



Tradescantia (wandering willie) is one of the most extensive weeds in New Zealand and it has never set seed. It spreads exclusively from cuttings carried by stock hooves, machinery, floodwater and by people.

- Persistence (the length of time the herbicide remains in the soil). Residual herbicides don't break down in the soil, while non-residual herbicides such as glyphosate break down on contact with the soil.
- Cost effectiveness.

Spraying Tips

Reduce spray drift by:

- Spraying in calm conditions, usually early in the morning or late in the afternoon.
- Using a spray shield.
- Use just enough herbicide to cover the target with a fine mist. Some residual herbicide will kill the plants you want to keep if too much is applied.

Safe disposal

Many plants can grow from the bits you remove. Check for the best way to dispose of your weeds. Parts of some species such as wild ginger rhizomes should not be composted. Other methods for disposal include deep burying, mulching or alternatively put the weeds in a plastic bag and leave in bright sunlight until they are dead.

Ensure that weeds are not dumped in areas where they may become a problem for someone else.

Advice

Don't take on too much at once. It is more important to do a small area effectively and go back the next year, control any re-growth, then move on to a new area.

Hint – make a habit of carrying a small bag with you when out walking so you can remove weeds when you see them. For bigger weeds a folding pruning saw is useful.

The Northland Regional Council and the Department of Conservation have a variety of pamphlets identifying Northland's pest plants and they can advise you on the best methods of control.



Privet is a problem throughout the region. NRC.

Websites

Biodiversity site
www.biodiversity.govt.nz

Organisations with information to help you

New Zealand Fish and Game, Northland region
www.fishandgame.org.nz (09) 438 4135 Contact Rudi Hoetjes Email rhoetjes@clear.net.nz

Northland Regional Council
www.nrc.govt.nz Quayside and Robert St Office (09) 438 4639; Dargaville (09) 439 3300; Kaitia (09) 408 6600; Opuia (09) 402 7516 Can identify plants and provide advice and information on control methods

Environment Bay of Plenty Pest Plants site – has a list of plant pest fact sheets – ecological impacts, identification, control methods etc...
www.ebop.govt.nz/Land/Plants/Pest-Plants.asp

Auckland Regional Council Biosecurity Site.
Links to ARC sites for animal and plant pest sheets, ecology, control etc...
www.arc.govt.nz/arc/environment/biosecurity/pest-control.cfm

Northland Regional Council Pests and Weeds Site – General information on Northland ecological pests, how we can help, resources available and downloadable fact sheets.
www.nrc.govt.nz/pests.and.weeds/index.shtml

Weedbusters - another way of seeking technical and practical advice about weed management
www.weedbusters.org.nz

Further reading

Porteous, T. 1993: *Native Forest Restoration. A Practical Guide for Landowners*, Queen Elizabeth II National Trust, Wellington,

Pritchard, E.A. 1997: *A Guide to the Identification of NZ Common Weeds*. NZ Plant Protection Society.

Roy, B.N. et al. 1998: *An Illustrated Guide to Common Weeds of NZ*. NZ Plant Protection Society.

Coffey, B.T. & Clayton, J.S. 1988: *A Guide to Plants Found in New Zealand Freshwaters*. MAF, ISBN 0-477-08004-9



Saltmarsh, Ngunguru River.

Wetlands

Wetlands that once covered vast tracts of New Zealand are today some of the rarest and most at-risk ecosystems.

They support an amazing array of wildlife, including 22 percent of our bird species and 30 percent of native freshwater fish. Birds such as bittern, crakes and grebes are dependent on quality wetland habitat. But these animals face an uncertain future in Northland because more than 95 percent of our wetlands have been drained.

Fortunately, now that the value of wetlands is better understood, more is being done to protect and enhance what remains.

Function

Think of wetlands as giant filtering sponges with wetland plants slowing the flow of water off the land, trapping sediment and cleaning the water before it gets to rivers and streams.

In the right conditions, bacteria living in damp wetland soils can convert up to 90 percent of the nitrogen from farm runoff into nitrogen gas, which is then released into the atmosphere.

By trapping silt most of the phosphates are removed as they stick to silt particles. This helps prevent algal blooms and nuisance plants in our waterways.

In times of flood the soils absorb water, and in summer this stored water is released slowly to maintain water flows, providing better habitat for stream life.

Wetlands support an amazing array of wildlife, some of it very unusual. Most of New Zealand's wetland plants and animals are found nowhere else in the natural world.

Managing your natural filters

For wet areas to be most effective as filters and habitat they:

- Must remain wet for all or most of the year
- Must have livestock excluded. Most sedges, rushes and flax are palatable to livestock. These plants need to be protected as they have an important role in slowing flow, filtering water and providing a carbon source for the bacteria that remove nitrogen. Cattle trampling will also reduce the ability of wet areas to absorb water.
- May need some planting. Native sedges, raupo, rushes and flax grow well in these areas. All these plants can be divided and the sections planted out. Too many trees can be counter-productive in or beside wetland areas as they dry out the soil and shade smaller plants.

To maximise the use of wetlands, swamps and seeps to improve water quality on your farm, use them to filter runoff from a variety of sources. For example:

- Direct any tile and mole drains into wetlands before they flow into streams.
- Divert race and track runoff into wetland areas but take care not to smother the area with sediment.

Why create wetlands?

Because drainage for development has drastically reduced the habitat available for wetland dwellers, it is vital that new wetlands are created if New Zealand is to retain its full range of unique plants and animals.



Well planned and constructed ponds can provide habitat attractive to a variety of plant and animal species. They are especially valuable as breeding places and can provide hunting sites during the game season.

Ponds frequented by native and introduced animals, fish and birds are places of absorbing interest and can provide much enjoyment to owners and the public.

What makes a good wetland/pond?

In general the larger the pond, the better, as larger ponds encourage more diversity of wildlife. However ponds of 0.5 ha can be good brood-rearing areas, provided there is suitable cover and minimum disturbance.

A 1:1 ratio of open to swampy water versus swampy to dry margin is recommended to increase the diversity of habitat being created.

Looking after Wetlands and Streams

The most successful ponds have a balance of the following desirable features.

Shallow water: With the exception of scaup, New Zealand ducks are dabblers feeding mostly in shallow water which is rich in food - insects, seeds and aquatic plants.

Sloping margin: Gently sloping, saucer-shaped ponds provide different habitat zones for plants and animals.

Resting places: Open water margins, low lying mud banks and half submerged logs provide ideal places for waterfowl to roost, preen and sun themselves.

Irregular edge: The edge of the pond provides the best places for feeding, resting and shelter. The more irregular (and thus longer) the better.

Islands: These provide additional edge and less disturbed nesting and resting places.

Ground cover: Patches of tall grass and low, bushy shrubs close to the pond provide good nest sites when fenced off to exclude stock.

Overhead cover: A few trees overhanging the water will provide cover for young birds before they are able to fly. Rushes, sedges, trees or other vegetation growing in the water will also provide essential escape cover as well as secluded feeding areas.

Building a Pond

There are many technical aspects to building ponds. Information and advice on development and enhancement of ponds and wetlands is available through Fish & Game New Zealand, Northland Region.



Pond construction, Maunu. Nan Pullman



Finished pond four years later.

Summary

Managing wet areas, seeps and swamps on your land can:

- Improve water quality by filtering sediment, faecal bacteria, nitrogen and phosphate from runoff
- Provide habitat for eels, native fish, birds and invertebrates and improve local biodiversity
- Reduce stock losses from bogging
- Help reduce flood peaks and maintain summer water flows
- Improve livestock health by removing their access to liver fluke breeding areas

If work (other than planting or fencing) is being undertaken in a wetland a resource consent may be required. Contact Land Management staff at the Northland Regional Council before proceeding.



Clean Streams

By managing the margins next to your waterways you can enhance water quality and provide valuable habitat corridors for birds, lizards, plants and invertebrates.

Riparian margins include the land beside streams, lakes, wetlands, rivers, estuaries and the coast. It's also important to think about gullies, which often don't hold permanent water but channel runoff into main waterways during wet periods.

Water quality

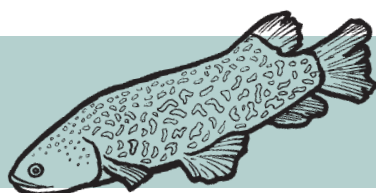
By excluding stock from riparian margins, bank erosion and the runoff of sediment, nutrients and harmful faecal bacteria into waterways should all be reduced.

Riparian margins can provide food and habitat for a range of freshwater life. Inanga spawn in grassy areas in the lower floodplain and leaf litter provides important food for aquatic animals.

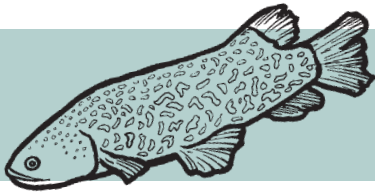
Shade along stream edges reduces water temperature for sensitive freshwater life and cuts down the growth of nuisance plants in waterways.

Well-managed riparian margins improve biodiversity by providing habitat for birds, frogs, lizards and invertebrates and double as important native wildlife corridors, helping link any remaining bush areas.

Encouraging undercut banks and retention of stumps and tree roots also provides ideal habitat for kokopu, eels and ducks.



What you do on your land affects water downstream, which eventually ends up at the coast carrying any extras with it.



Managing wet areas, seeps and swamps in the headwaters of catchments will provide the most benefit to water quality.

What's in it for farmers

Managing riparian margins can provide productive benefits by stabilising banks, keeping stock out of dangerous wet areas, reducing the need to clear drains and streams, excluding stock from natural water that can sometimes carry disease organisms, and enhancing the farm landscape. Your industry may require some of this work to be undertaken.

Shading can also lead to big savings in cooling costs if water is taken for dairy shed use.

For more information see the NRC 'Clean Streams' booklet or contact Land Management staff at the regional council.

Websites

NIWA Atlas of Freshwater Fish [www.niwa.co.nz.rc.freshwater/fishatlas](http://www.niwa.co.nz/rc/freshwater/fishatlas)

Northland Regional Council – www.nrc.govt.nz

DOC - Whitebait Connection – www.doc.govt.nz

New Zealand Fish and Game – www.fishandgame.org.nz

Further reading

Buxton 1991; *New Zealand wetlands: a management guide*. Department of Conservation, Wellington.

Johnson, P.N. & Brooke, P.A. 1989: *Wetland Plants in NZ*, DSIR Publishing, Wellington.

Managing wetlands on farms, Ministry for the Environment, (comprehensive A4 folder)

McDowall, R.M. 2000: *The Reed Field Guide to New Zealand Freshwater Fishes*, Reed, Auckland

Beginners Guide to Wetland Restoration. NRC

Clean Streams: A Guide to riparian Management in Northland. NRC

Organisations with information to help you

Northland Regional Council, NZ Fish & Game, New Zealand Landcare Trust, DOC. (Refer to Appendices for contact details).



There are many good reasons for having trees in the landscape. They provide habitat and food for a vast range of fauna and flora. A single tree can host dozens of different and often interdependent colonies ranging from microscopic organisms to bugs, insects and birds.

Trees, shrubs and smaller plants have the ability to link habitats throughout the landscape. They also control erosion, suppress weeds and provide timber. Then there is the sheer visual pleasure of a specimen tree or the shimmering beauty of the bush.

Many Northland properties have pockets of remnant or regenerating native plants that are a big advantage when starting a habitat enhancement programme. The shade and shelter they provide will make it much easier to establish a range of other plants.

However, natural regeneration can be a slow process, particularly where exotic grasses like kikuyu or smothering weeds are present. A carefully planned planting programme will dramatically hasten the process.

At the very least nurturing a range of native plants will help to restore a diverse community of flora and fauna characteristic of Northland.

Planning your planting

Careful site selection and preparation are big factors in successful planting. Survey your site – at least have a good critical look at it and list any limitations. Is it frost prone, does it have poor, swampy, dry or sandy soil? Is the site exposed to wind, especially salty coastal wind. Which way does it face and how much sun does it get? What animal communities are you wanting to encourage, e.g. honeyeaters, kukupa, lizards, wetland birds, all of which favour different plant groups.

A look at what else is growing near your planting area is often a good indicator of what will do well there.

Now select plants to suit your conditions. Depending on soil moisture levels, start planting from Autumn onwards to maximise the plants' establishment before the next summer. If your area is frost prone you will need to select frost-hardy plants.

Advice and information is available from Farm Forestry Association members as well as Northland Regional Council staff. See contact details in the Appendices.

Getting Your Plants

If you are planning a large project it is likely that you will need to order your plants well ahead, in some cases at least a year. It is often more cost effective to deal with wholesale nurseries that specialise in growing plants for revegetation projects.

Ecosource your plants where possible. This has two benefits –

- It increases plant survival as seed or seedlings from plants adapted to growing in your local environment will do better than those that have developed under different conditions.
- By using plants from your local environment you will be protecting the distinctiveness of your local biodiversity.

The idea of ecosourcing comes from the observation that plants of the same species, but from different localities, can vary.

Growing Native Plants

With a minimum of effort and money, you can grow a range of easy-care native plants from seed and some species also do well from cuttings.

Try species that are easy to grow, hardy and tolerant of extremes in temperature, terrain, soil type and drainage. Manuka, kanuka, karamu, flax and cabbage trees are all good examples. By using plants that attract birds, such as pohutukawa, you will also get additional seeds and plants courtesy of perching birds.

Densely planted manuka, kanuka and karamu are capable of shading out kikuyu and similar aggressive grasses. They also attract a range of birds which then enhance the area's biodiversity by dispersing other seeds.

It is often possible to transplant many of the above hardy species from driveways, road-edges etc.

Farm Forestry

Where harvesting woodlots is your goal, there are species other than pines and eucalypts that will provide an economic return.

There are three branches of the Farm Forestry Association in Northland. The organisation produces an informative quarterly magazine "National Tree Grower" and branches have local newsletters and field days at farm woodlots.

There is a large resource of knowledge on forestry options and silviculture techniques within the organisation. See the Appendices for contact details.



Mixed planting of Pines and Eucalypts.

Pest control

Covered in more detail in a previous section of this guide, pest control needs to be considered in the planning stage of any planting or restoration project. Possums, rabbits, hares and goats can wipe out entire plantings in a night or two.

Note: Control measures need to be in place before planting.

Fencing

Stock control also needs to be planned early. Fencing can be time consuming and it must be completed before planting to avoid wasting time and money. It is often best done when tractor or four-wheel drive access is possible, not in the bog of winter.

Websites

The Green Toolbox – a database that assists in the selection of native vegetation for a set of given criteria (eg. ecological region, soil, coastal, drought conditions etc...)
www.landcareresearch.co.nz/research/biodiversity/greentoolbox

Northland Regional Council Pests and Weeds Site – general information on ecological pests, how we can help, and downloadable fact sheets.
www.nrc.govt.nz/pests.and.weeds/index.shtml

Northland Regional Council Land Resources site – Information on land and riparian management, Landcare Groups, environmental fund etc.
www.nrc.govt.nz/land/index.shtml

Farm Forestry website www.nzffa.org.nz.

Much grass roots and technical knowledge and information is available on growing trees for both production and other reasons.

Further reading

Bergin, D. O. Totara - *Establishment, Growth and Management*. NZ Indigenous Tree Bulletin No1. Available through the publications officer, Forest Research, publications@forestresearch.co.nz, Private Bag 3020 Rotorua, or through Tane Tree Trust.

Brown, Ian & Nicholas, Ian. *Blackwoods, A handbook for Growers and end users*. FRI Bulletin No 225. Available from publications@forestresearch.co.nz or Forest Research, Private Bag 3020, Rotorua.

Brownsey, P. & Smith-Dodsworth, J.C. 2000: *New Zealand Ferns and Allied Plants*, 2nd ed., Bateman, Auckland. (Contains photos).

Crowe, A. 1997: *The Quick find Guide to Growing Native Plants*, Viking Press, Auckland.

Fisher, M.E., Satchell, E. & Watkins, J.M., 1970: *Gardening with New Zealand Plants, Shrubs and Trees*, Collins, Auckland. (Propagation and growing information).

FRI – Also to be published in 2004- *Kauri, Establishment, Growth and Management* and *Native Trees, Guidelines for Establishing Native Trees for Wood Production and Other Benefits*.

Metcalf, L. 1995: *The Propagation of New Zealand Native Plants*, Godwit Publishing, Auckland.

Salmon, J.T. 1992: *The Native Trees of New Zealand*, Reed, Wellington. (Smaller field guide also available).

St. George, I. 1999: *The Nature Guide to New Zealand Native Orchids*, Godwit, Auckland.

Trees for the Land, NRC booklet.

DoC/NRC, 1999: *A planters handbook for Northland Natives*.

Organisations with information to help you

Northland Regional Council, Farm Forestry Association, QEII National Trust, DOC. (Refer to Appendices for contact details).



Kowhai flower, Bay of Islands.

Developing an action plan and timeline

An action plan (as developed in section 3) is a working guide for achieving your objectives. It is a record of what you plan to do. See Appendix 1 for property details and timeline.

It should help you clarify issues, suggest solutions, estimate likely costs, record the best time for fieldwork and help you keep track of results. It may sound quite daunting but a good management plan does not need to be unnecessarily complicated.

Any funding application is likely to be more successful if you include an action plan and timeline. The following template will guide you through the process, fill in the appropriate sections for your project.

Further reading

Environment Waikato, 2003. Practical Guide to Natural Features on Farms, Farm Environment Award Trust.

Vision sketch (attach landscape sketch/diagram of how the restored land may look)

Action Plan

General Description of site (eg. dry ridge/s, wetland/s etc...)

Main soil types

Current Vegetation (eg. main plant types, photos can be attached)

Exposure and aspect (eg. coastal wind, sunny north facing etc...)

Special features (eg representative and rare ecosystems, habitat sequences, threatened species, cultural and historic sites etc...)

Pest Animal and Predator Control

What needs protecting e.g. kukupa, kohekohe, kiwi

Initial Methods (Identify pests for initial control; methods and timing of control)

Maintenance Methods (Identify control methods and timing for ongoing maintenance.)

Timing for pest control (Identify the pests you are going to target and timing of your initial pest control and maintenance control.)

Pest	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Fencing

Type of fence, distance, materials. You will need quotes from fencing contractors or quotes for fencing materials – posts, wire, battens - if you are applying for funding.

Type of fence	Distance of fence	Materials required	Labour required	Voluntary work	Overall costs

Details of other work needed (eg. earthworks, spraying etc...)

	Estimated costs

Action Plan

Planting

General intentions eg. erosion control, riverside (riparian) protection, food for birds (actual plant species to be listed in table at the end of document)

Plant sources (eg. local wholesale nurseries, home grown, schools etc...)

Additional requirements (eg. slow release fertiliser, stakes for tall shrubs etc)

Equipment/Materials	Estimated Costs

Overall Costing

Item	Year 1	Year 2	Year 3	Year 4
Herbicide				
Equipment hire				
Spray contractor				
Fencing materials				
Fencing contractor				
Animal pest toxin				
Bait stations				
Traps				
Animal pest control contractor				
Plants				
Slow release fertiliser				
Plant stakes				
Mulch				
Planting contractor				
Totals				

Total estimated cost of project \$

Potential funding sources: See section 4.9 for some funding sources.

Item	Source	Source	Source
Fencing			
Plants			
Herbicide			
Pest control			
Other			

Total cost of project \$

Organisations with information to help you

- Northland Regional Council
- DOC
- NZ Landcare Trust



The main reasons for monitoring are to determine the effectiveness of your project and to enable you to fine tune management as necessary. It can also be important to show that you have reached your earlier objectives when applying for (additional) funding assistance.

Start at the start

Ideally begin monitoring at the start of your project so you can see what's happening right from the beginning. By monitoring you will be able to record the benefits of your work. It will also help to encourage you – it is very easy to miss the progress of a project if you haven't recorded where you started.

You can monitor at a very general level or for more specific reasons:

- General monitoring checks for any current threats that need intervention, such as possum damage, goat or stock browse.
- Specialist monitoring checks on a specific forest indicator or group of indicators, for example kukupa and tui abundance, the presence and numbers of native seedlings or weeds.

Methods to answer important questions

Good monitoring collects simple information in a consistent way to answer clear and important questions. See the following examples.

Is the forest canopy improving?

- Take annual photopoints of browse susceptible trees (e.g. rata, kohekohe, pohutukawa) to show canopy density.
- Record annual foliar browse indices of browse susceptible trees (e.g. kohekohe, mahoe) to show browse levels, canopy density and fruiting and flowering levels. See glossary.
- Observe annual fruiting levels of browse susceptible trees (e.g. taraire).

Is the understorey improving?

- Annually observe seedling plots that are representative of the site to measure species abundances and height of seedlings.
- Take annual photopoints of understorey.

Have key birds increased?

- Do 10 x 10 minute observations of kukupa and tui over wide vantage points each spring; or transects or point counts.
- Take part in annual kiwi call count monitoring in May-June. See Kiwi Recovery Programme listing in Appendix 1.

Are pest levels sufficiently low to meet objectives?

- Possums - bait interference or trap catch monitoring
- Rats - bait take, trap catch or tracking tunnels – undertake at sensitive time for key biota (e.g. spring for protection of nesting birds; year round for seedling, kauri snail and lizard protection)
- Cats and mustelids - annual capture rates and sightings.

Is my stream healthy enough for fish to thrive in?

- Spot lighting at night – identify and count eels, kokopu, bullies, kawai
- Invertebrate diversity – MCI index (See Glossary)
- Weed/turbidity of water levels.



Water from an unfenced drain, disturbed by stock, muddies the clear flow from a wetland (left) and a fenced forestry plantation (top), Kiripaka.

Is my wetland healthy?

- Weed invasion – species and abundance
- Livestock invasion – check fences, browse sign
- Plant diversity and abundance
- Wetland fauna – presence of species such as grebes, shags, pateke (brown teal) crakes, bittern, fernbirds, lizards
- The number of ducks using a wetland throughout the year is a good indication of the health of the wetland environment.

Monitoring support

If you are uncertain what you should be monitoring, talk to experts or consult Peter Handford's book on native forest health monitoring.

A useful recording of bird calls is Birds of New Zealand (20 land birds and 18 sea birds) produced by DOC and Radio New Zealand and distributed by Viking Sevenses Ltd, PO Box 152, Paraparaumu.

Forest Monitoring and Assessment Kit. FORMAK provides a simple monitoring kit for immediate use by land owners and managers.

Websites

www.mfe.govt.nz The Handford book is available on this site.

www.formak.co.nz

Further reading

Handford, P. 2000: Native Forest Monitoring – A guide for forest owners and managers, Forme Consulting Group Ltd, Wellington.

McDowall, R.M. 2000: The Reed Field Guide to New Zealand Freshwater Fishes, Reed, Auckland

Organisations with information to help you

Northland Regional Council, DOC, QEII National Trust, NZ Landcare Trust. (Refer to Appendices for contact details).

There is another step you can take to ensure your work has an impact into the future.

A covenant is a legal agreement that protects the natural values of private land for a specified time, often in perpetuity. It is registered on the land title and binds future owners for the term of the covenant. You typically retain ownership and management of the land.

There are three main ways of covenanting

1. An open space covenant with the Queen Elizabeth the II National Trust.

The Trust is an independent body that provides for permanent legal protection of natural features including - landscapes, bush, wetlands, coastline, lakes, streams, geological features, cultural and archaeological sites.

QEII acts as permanent trustees. They typically contribute to fencing costs and pay for the survey and legal services associated with setting up a covenant. Northland has two field officers who help set up new covenants and liaise with the landowner to check and advise on the health of each covenant. See Appendix for contact details.

2. A conservation covenant with the Department of Conservation or a local government agency, or other authorised body.

In many cases the costs of protecting an area under a covenant may be met either fully or partially by the agency administering the protection mechanism, especially if the conservation values are nationally important.

Under the Nature Heritage Fund protection can be achieved using a conservation covenant where the landowner retains title of the land, or by direct purchase on a willing seller, willing buyer basis at fair market rates.

3. Nga Whenua Rahui. provides a mechanism and funding for Maori owners to identify and protect land with significant indigenous forest, wetlands and cultural values. This protection can be by way of a kawenata (covenant) or the creation of a Maori reservation. The fund also considers the cultural and spiritual significance of the land to tangata whenua. An important feature of this voluntary protection programme is that the owners retain ownership, control and management of the lands. Assistance is available for pest control on the protected areas. (See DOC contact details in appendix)

Websites

Queen Elizabeth II National Trust www.qe2natrust.org.nz

DoC www.doc.govt.nz

Whangarei District Council www.wdc.govt.nz

Kaipara District Council www.kaipara.govt.nz

Far North District Council www.fndc.govt.nz

Further reading

Porteous, T. 1993: *Native Forest Restoration. A Practical Guide*, Queen Elizabeth II National Trust, Wellington.

"Your Land, Your Choices" - *Voluntary Protection of Nature on Private Property*. A pamphlet produced by DoC and supported by Local Government New Zealand, Nature Heritage Fund, Nga Whenua Rahui, Federated Farmers of NZ and the Queen Elizabeth II National Trust.

Organisations with information to help you

Nature Heritage Fund and Nga Whenua Rahui, QEII National Trust, DOC, Whangarei District Council, Kaipara District Council, Far North District Council. (Refer to Appendices for contact details).

Caring for the land, the environment and our natural resources often requires community participation. If you have a problem it's highly likely your neighbours will have a similar problem and the best solution is probably community based. Neither predators nor weeds respect legal boundaries so working with your neighbours makes good sense.

For example, clearing your weeds may not be a long term solution if a source of reinvasion remains nearby. Similarly the worst killers of native birds – mustelids, feral cats and dogs - have large home ranges and are extremely mobile. Cats often roam more than five kilometres and even the small, but deadly stoat, has a home range of around 200 hectares.

More and more people are joining with their neighbours, either formally or informally, to work on land management in their local area.

The 50 or so landcare groups in Northland work on projects including weed and pest control, riparian management, kiwi protection, bush fencing and coastal revegetation.

Formed to help support these groups, the NZ Landcare Trust fosters sustainable land management and biodiversity initiatives by working with community groups around the country. It seeks to develop wider community adoption of biodiversity protection as an everyday part of land management.

The northern regional co-ordinator of this independent organisation is available to help you get started, to find funds and materials and to provide practical advice.

The Northland Regional Council also encourages and supports communities in achieving sustainable land management. It has an annual contestable fund (Environmental Fund) for projects and works closely with the Landcare Trust to assist groups by providing technical advice on water quality, erosion control, pest management and habitat protection. There is limited start-up funding for landcare groups that qualify.

Websites

NZ Landcare Trust www.landcare.org.nz

Organisations with information to help you

New Zealand Landcare Trust, Northland Regional Council, World Wide Fund, Forest and Bird Protection Society. (Refer to Appendices for contact details)



Landcare enthusiasts discuss community action, Tutukaka. Herb Christophers



Blechnum filiforme climbs a young kahikatea, Matakōhe. Nān Pullman

While many projects can be carried out without significant external funding a grant from an outside source is sometimes needed to start or complete projects.

To increase your funding application's chance of success it is highly recommended that a management plan is submitted with it. This needn't be long or complicated, but needs to give an indication of planning and forethought. (See plan template)

The key to successful fund applications is often the ability to tailor the project to meet the stated criteria of the fund. Valuing of the 'in-kind' contribution is also important – that is all the time, resources and money that the applicant will put in.

Information on who will fund what is available from a range of sources:

- Environ-funz is an internet based database that holds searchable and detailed information about environmental and conservation project funding. It may be accessed on www.envirofunz.org.nz.
- FundView is another computer database of information about funding for community groups. Available to subscribers (including the Landcare Trust), it can also be accessed at public libraries, the Department of Internal Affairs and other information centres around Northland.
- The Department of Conservation has included a summary of national funding schemes in its recent publication "From Seeds to Success". Copies of this are available from your local DOC office or from the DoC website www.doc.govt.nz.
- The Landcare Trust regional coordinators have a good understanding of the different funding sources, and are able to help groups with their funding proposals.

Every year the **Northland Regional Council** allocates money to its Environmental Fund to help improve and protect Northland's natural environment.

Groups and individuals can apply to this fund for finance to assist with qualifying projects. But it is just one of many organisations which fund conservation. Some only fund group projects, some require that the group be a legal entity (such as a trust or incorporated

society), most have specific application forms and many are only open for application at specific times.

Central government is now supporting landowners who are seeking to manage indigenous biodiversity on private and Maori land. The **Biodiversity Condition Fund** aims to improve and maintain the condition of areas of indigenous vegetation, species and habitats (including wetlands and water bodies). It is jointly allocated by the Department of Conservation and the Ministry for the Environment.

If you want to fence off an area of bush or wetland and are considering legally protecting that area with a covenant then the **Queen Elizabeth the II National Trust** may assist with establishment costs like fencing and survey.

The **Nature Heritage Fund** provides funding for voluntary protection of biodiversity on private land where habitat values are very high. Assistance can be given with fencing, surveying and some legal costs.

New Zealand Fish and Game has a fund for landowners seeking to enhance wetlands or develop farm ponds for game bird habitat. Approved projects can receive up to 50% financial support. Applications close in April each year. (See the contact details below)

There are a variety of trusts and organisations that you can apply to for funds for projects. These include – **World Wildlife Fund, Sustainable Management Fund, Pacific Development and Conservation Trust and Nga Whenua Rahui, ASB Trust, and the Transpower Landcare Trust Grant, New Zealand Kiwi Foundation.** (See contact details in Appendix 3)

The **Nga Whenua Rahui Fund** protects indigenous ecosystems on Maori land by providing incentives for voluntary protection. Assistance is available for fencing and pest control on the protected areas and the fund covers the expenses associated with registration and legal costs. (See contact details in Appendix 3)

Organisations with information to help you

New Zealand Fish and Game, NZ Landcare Trust, NRC, QEII National Trust, WWF, Transpower Landcare Trust Grants Programme, Sustainable Management Fund, Pacific Development and Conservation Trust, Forest Heritage Fund and Nga Whenua Rahui, ASB Trust, NZ Kiwi Foundation. (Refer to Appendices for contact details)

Case Study: Whangarei Heads Landcare Group

This group formed 6 years ago as local residents became increasingly concerned at the spread of weeds such as woolly nightshade, wild ginger and eleagnus in the area. The Whangarei Heads Landcare Group formed as a sub-committee of the local Citizens Association and the weeds were seriously under threat. Six years of weed control carried out by a range of projects from community working bees to subsidised Task Force Green workers has left the battle against weeds in the area winable.

Funding for this has come from a range of sources, including the World Wide Fund for Nature, the Landcare Trust Transpower Grant scheme, Pub Charities, the NRC Environment Fund, Whangarei District Council, Work and Income and the QEII National Trust.



Flax flower, Three Kings. Lisa Forester

Property Information

Having property information all together will make future paperwork simpler because this type of information is often required for funding and legal applications.

Each section is optional and need only be filled in if you think it will be of use.

We recommend that you use the kit alongside a topographical map and/or aerial photograph of your property. The NRC can provide aerial photos and information about soil types. Contact land management staff on 09 438 4639.

Owner: (As on your certificate of title)

Manager:

Address:

Postal address, if different from above:

Legal description: Deposited Plan number/Certificate of Title - look on your council rates demand.

Size of property (ha): Can be found on your rates demand.

General description of land use: Beef, dairy, sheep, farm forestry, catchment protection, reserve.

Land description: Basic soil types, geology (if known), steepness, any erosion, average rainfall, aspect - which direction does the majority of your land face?

Types of natural areas and size: (See the "Describe Your Property" section, mark the streams, wetlands, forest remnants , shrubland or other obvious features on the supplied map)



Primary forest

Now extremely rare. This is mature bush that has not been logged or otherwise significantly disturbed.

Mature secondary forest

A tall, closed canopy often dominated by a few species. Much of Northland's forest comprises secondary growth forest following removal of the original forest. The main types of forest include – kauri, podocarp, broadleaf and combinations of these.



Regenerating forest

Taller forest trees (e.g. podocarps) emerging above surrounding scrub and shrubland species, such as manuka, kanuka, mahoe, hangehange. Can also include gorse.



Floodplain forest

Bush on a floodplain or alongside a stream or river, that periodically floods. This is now a rare forest type.

Common species - cabbage tree, lowland ribbonwood, kowhai, kahikatea, pukatea, titoki. On slightly drier areas totara, taraire, kohekohe, matai, kanuka and others may occur.



Swamp forest

A bush type containing water tolerant trees and swamp species such as kahikatea, cabbage tree, swamp maire and pukatea. It may occur on flood prone valley floors, but also on poorly drained, semi-level sites within forests at higher altitudes and in collapsed volcanoes.



Shrubland

Vegetation in which the canopy is dominated by woody plants with trunks less than 10cm diameter at breast height. Species such as manuka, kanuka, mahoe, hangehange, bracken, kumarahou.

Habitat Types

Wetlands

An area of land that is permanently or frequently wet and supports animals and plants adapted to wet conditions. Examples – lakes, ponds, swamps.

Saltmarsh

Found in estuaries at the interface of salt and freshwater systems. Vegetation dominated by reeds and sedges and salt-adapted woody species e.g. saltmarsh ribbonwood. Important habitat for fern bird and banded rail. Plays a critical role in filtering run-off from land into estuaries.

Planted Production Woodlots or larger forests

Some production forests have surprisingly high biodiversity of fauna in their understorey e.g. kiwi and tui in eucalypts plantations.

Stream margins

Stream habitats are a very important feature for biodiversity. The vegetation along the stream edge (riparian) can act as a connecting corridor between forest remnants and other habitats, helping plant and animal dispersal. It also acts as a buffer, preventing fertilisers, sewage and sediment from entering the waterway. A well shaded, cool stream is home for a range of native plants and animals e.g. kokopu, koura and inanga.

Lakes and dams

Many farms have fenced lakesides or artificial ponds and these areas can provide useful habitat for native plants and animals, e.g. matuku, crakes.



ASB Trust www.asbtrusts.org.nz

Contact: PO Box 68 048, Newton, Auckland.
(09) 360 0291 0800 272 878
Email: reception@asbtrusts.org.nz

Auckland Regional Council Biosecurity Site

Links to ARC sites for animal and plant pest sheets, ecology, control etc...
www.arc.govt.nz/arc/environment/biosecurity/pest-control.cfm

Bank of New Zealand Kiwi Recovery Trust www.kiwirecovery.org.nz

This website provides comprehensive support and advice to people and groups wishing to protect kiwi. They also have funds available for community groups doing kiwi protection.

Email: KiwiRecoveryTrust@bnz.co.nz

Provides information on – kiwi, pest and predator control options, kiwi friendly forestry, legal protection, how you can help kiwi.

Biodiversity Condition and Advice Funds www.biodiversity.govt.nz

Department of Conservation www.doc.govt.nz

For general information ring your local area office.

Whangarei (09) 430 2133 Bay of Islands (09) 407 8474 Kauri Coast (09) 439 3011
Kaitaia (09) 408 6014

For more specialist information contact the Northland Conservancy office. (09) 430 2470

Environment Bay of Plenty

Pest Plants site - has a list of plant pest fact sheets - ecological impacts, identification, control methods etc...

www.ebop.govt.nz/Land/Plants/Pest-Plants.asp

Environment Waikato www.ew.govt.nz

Website has a wide range of ecological and management information

Farm Forestry Association www.nzffa.org.nz.

Much grass roots and technical knowledge and information is available about growing trees for both production and other reasons.

There are three Northland branches - Far North, Mid North and Lower North. Contact the national office for details of current secretaries.

There are special interest groups - AMIGO (Tasmanian Blackwood), Cypress Action Group,

List of Contacts

Eucalyptus Action group and the Indigenous Forest Section.

National administration office. (04) 472 0432 nzffa@clear.net.nz.

Far North District Council www.fndc.govt.nz

0800 920 029 / (09) 4052 750

Forest & Bird Protection Society www.forest.bird.org.nz

Email: office@forestandbird.org.nz

Kaipara District Council www.kaipara.govt.nz

(09) 439 7059 / 0800 727 059

Lands and Survey (09) 438 7568, 18 Reyburn Street.

Sells maps, aerials, and copies of certificate of titles

Ministry for the Environment www.mfe.govt.nz

The Handford book is available on this site.

Nature Heritage Fund and Nga Whenua Rahui

PO Box 10 420, Wellington. (04) 471 0726 and your local DoC office.

NIWA Atlas of Freshwater Fish [www.niwa.co.nz.rc.freshwater/fishatlas](http://www.niwa.co.nz/rc.freshwater/fishatlas)

NZ Fish and Game, Northland region www.fishandgame.org.nz

Contact Rudi Hoetjes (09) 438 4135 rhoetjes@clear.net.nz

New Zealand Kiwi Foundation kiwi@aroha.net.nz

PO Box 541, Kerikeri (09) 407 5243

New Zealand Landcare Trust www.landcare.org.nz

Regional Coordinator – Helen Moodie, RD 4, Whangarei.

(09) 436 3170 helen.moodie@landcare.org.nz

Northland Regional Council www.nrc.govt.nz

Quayside and Robert St Office (09) 438 4639 Dargaville (09) 439 3300

Kaitaia (09) 408 6600 Opuia (09) 402 7516

Advice and information

Pacific Development and Conservation Trust www.dia.govt.nz

Contact – Department of Internal Affairs, PO Box 805, Wellington. (04) 495 7200
Email: info@dia.govt.nz or webmaster@dia.govt.nz

Queen Elizabeth II National Trust www.qe2nattrust.org.nz

Freephone 0508 732 878, email: qe2@qe2nattrust.org.nz

Far North Regional Representative and Aroha Ecological Centre
Greg Blunden (09) 407 5243; kiwi@aroha.net.nz

Central Northland Regional Representative, Nan Pullman
(09) 4343 457 aqualine@igrin.co.nz

Sustainable Management Fund www.smf.govt.nz

Email: smf@mfe.govt.nz

Address: Ministry for the Environment, PO Box 10 362, Wellington.

Tane Tree Trust www.tanestrees.org.nz

To promote indigenous forestry as an attractive land use, using networking, trials, workshops and publications

Transpower Landcare Trust Grant www.landcare.org.nz

PO Box 39-141 Christchurch Ph 0508 LANDCARE Email info@landcare.org.nz

Whangarei District Council www.wdc.govt.nz (09) 4304200

Some aerial photographs available on this site.

Whangarei Native Bird Recovery Centre

State Highway 14, Maunu (09) 438 1457

World Wildlife Fund www.wwf.org.nz (04) 499 2930

PO Box 6237, Wellington.

Pest Control Product Suppliers

Supplier	Toxin	Traps	Other	Contact details
Animal Control Products	*	*	Bait stations	Private Bag 3018, Wanganui. Ph: 06 344 5302 Fax: 06 344 2260 Web: www.pestoff.co.nz Email: info@pestoff.co.nz
Connovation	*	*	Bait stations, repellents, monitoring equipment	PO Box 58613, Greenmount, Auckland Ph: 09 273 4333 Fax: 09 273 4334 Web: www.connovation.co.nz Email: info@connovation.co.nz
Geosystems			Flagging (coloured) marking tape, survey equipment	PO Box 33-970, Takapuna, Auckland 1332 Ph: 09 915 6760 Fax: 09 915 6769 Web: www.geosystems.co.nz Email: sales@geosystems.co.nz
M. S. Woodcraft		*		128 Marine Parade, Mt. Maunganui Ph. 07 575 5920 Fax: 07 574 8910 Email: mswoodcraft@mswoodcraft@mail.com
Pest Management Services	*	*	Repellents, bait stations	P O Box 121, Waikanae, Kapiti. Ph: 0800 11 466 Fax: 04 293 1456 Web: www.nopests.co.nz Email: general@nopests.co.nz
Philproof	*	*	Bait stations, trap covers, monitoring equipment	P.O. Box 4385, Hamilton. Ph/Fax: 07 859 2943 Cell: 021 270 5896 Email: philproof.feeders@clear.net.nz
Trapper Cyanide	*	*	Bait stations	251 Styx Mill Rd, Christchurch 5. Ph: 03 359 4150 Fax: 03 359 4156

Animal pest control products are often available from farm and rural supply retail centres. The Northland Regional Council Biosecurity Team will also supply a wide range of products to the public, including ammunition, at cost price.

Lands and Survey (09) 438 7568, 18 Reyburn Street.
Sells maps, aerials, and copies of certificate of titles

Northland Regional Council www.nrc.govt.nz
Quayside and Robert St Office (09) 438 4639;
Dargaville (09) 439 3300; Kaitia (09) 408 6600; Opua (09) 402 7516
Can provide aerial photographs, land and soil information, land use and erosion information.

Whangarei District Council www.wdc.govt.nz (09) 4304200
Some aerial photographs available on this site.

Kaipara District Council www.kaipara.govt.nz (09) 439 7059 or 0800 727 059

Far North District Council www.fndc.govt.nz 0800 920 029 or (09) 4052 750

Species	J	F	M	A	M	J	J	A	S	O	N	D
Akeake (<i>Dodonea viscosa</i>)	◆											
Astelia spp.	◆	◆	◆							◆	◆	◆
Clematis	◆											◆
Five-finger	◆	◆									◆	◆
Hangehange	◆	◆	◆	◆								
Harakeke (flax)	◆	◆	◆									
Hebe spp.	◆	◆	◆	◆								◆
Hinau	◆	◆										
Horoeka (lancewood)		◆	◆	◆	◆							
Houhere				◆	◆	◆						
Houpara	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Kahikatea			◆	◆								
Kamuka			◆	◆	◆							
Karaka	◆	◆	◆									
Karamu and other <i>Coprosma</i> spp.	◆	◆	◆	◆	◆							
Karo				◆	◆	◆	◆					
Kauri		◆	◆	◆								
Kawakawa	◆	◆	◆									
Kiekie			◆	◆	◆							
Kohekohe					◆	◆	◆	◆				
Kotukutuku (<i>Fuchsia</i>)	◆	◆									◆	◆
Kowhai (<i>Sophora microphylla</i>)	◆	◆	◆	◆	◆	◆						
Mahoe	◆	◆	◆	◆								
Makamaka	◆	◆	◆									
Makomako (wineberry)	◆	◆	◆	◆								◆
Mamaku									◆	◆	◆	
Mangeao										◆	◆	
Manatu (lowland ribbonwood)		◆	◆									
Manuka	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Mapou	◆	◆	◆	◆	◆							
Miro			◆	◆	◆	◆	◆	◆				
Ngaio	◆	◆	◆	◆								
Native broom	◆	◆	◆									
Nikau	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Pate					◆	◆	◆	◆				
Pigeonwood								◆	◆	◆	◆	◆
Pingao	◆											◆
Pohutukawa		◆	◆	◆								
Ponga									◆	◆	◆	
Poroporo	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Puka	◆	◆	◆	◆								
Puriri	◆	◆	◆	◆	◆	◆					◆	◆
Putaputaweta	◆	◆	◆									◆
Rangiora	◆	◆									◆	◆
Rengarenga lily	◆	◆	◆									◆
Saltmarsh ribbonwood	◆	◆										
Tainui (<i>Pomaderris apetala</i>)									◆	◆		
Tairare					◆	◆	◆	◆	◆			
Tawapou					◆	◆	◆	◆				
Ti kouka (cabbage tree)		◆	◆	◆								
Titoki	◆	◆	◆								◆	◆
Totara	◆	◆	◆									
Turutu	◆	◆	◆	◆								◆
Tutu	◆	◆	◆	◆							◆	◆
Wharangi	◆	◆	◆								◆	◆
Whau	◆	◆	◆								◆	◆

References

Data derived mainly from Frank Holman (undated) Propagation of NZ plants; Matakoho/Limestone Island Restoration Plan 2000, Pierce 1995 (kukupa ecology) and pers. obs (tui and kukupa diet Mt Tiger), Lawrie Metcalf 1995, The Propagation of New Zealand Native Plants, Godwit Publishing Ltd, 1995.

Calendar for some key action and monitoring tasks

Management or monitoring task	J	F	M	A	M	J	J	A	S	O	N	D
1. PEST CONTROL AND MONITORING												
Possum control (forest, kukupa recovery)	■			■			◆	◆	◆		■	
Possum index										◆	◆	◆
Rat control pulse (bird protection)	■							◆	◆	■	■	■
Rat control pulses (seeds, seedlings, lizards, invertebrate protection)	■	■	■	■	■	■	■	◆	■	■	■	■
Rat index (autumn index not essential for bird-only objectives)	■	■		◆	◆		■	■		◆	◆	
Mustelid trapping (kiwi recovery etc) Fortnightly ◆ vs monthly ■ checks	◆	◆	■	■	■	■	■	■	■	■	◆	◆
Cat control (bird, lizard recovery)	■	■	■	■	■	■	■	■	■	■	■	■
Weed control	■	■	■	■						■	■	■
Planting and releasing	■	■			◆	◆	◆	◆	◆		■	■
2. BIOTA MONITORING												
Canopy photography e.g. rata, pohutukawa (possum control)						◆	◆	◆				
General flowering/fruiting index (possum/rat control)	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Taraire fruiting level and/or seedfall (possum/rat control)							◆	◆				
Foliar Browse Index (possum control)						◆	◆	◆				
Bird indexing - 5 min counts, transects (pest control)									◆	◆	◆	
Kukupa monitoring - 10 min counts (pest control)	■	■	■	■	■	■	■	■	◆	◆	◆	◆
Kiwi listening (predator control)	■	■	■	■	◆	◆	■	■	■	■	■	■

◆ = key months
 ■ = maintenance or potential supplementary months etc

Anticoagulant	Poison or toxin that results in thinning of the blood and internal bleeding. Sometimes broken down into first generation anticoagulants (e.g. warfarin), which is less persistent and potent than second generation anticoagulants (e.g. brodifacoum).
Biodiversity	The diversity of plant and animal life in an area, including the habitats, species that are present and their genetic make-up.
Biota	The sum of plant and animal life at a site, e.g. a pond.
Broadleaf forest	Forest dominated by species with broad leaves, c.f. kauri, podocarp, kanuka etc. forests.
Browser	An animal that eats the foliage, flowers, fruits, etc. of plants.
Buffer	An area - normally adjacent to a very sensitive area - that can absorb the impact of a negative force (example = trapping reinvading predators on private lands adjoining Bream Head).
Community	A collection of plant and animal species at a particular well-defined place, e.g. pond or forest remnant.
Corridor	Narrow tongue of habitat, e.g. shrubland that links two larger areas. If corridor is discontinuous, the term "stepping stones" is used.
Covenant	Voluntary agreement that ensures legal protection for a habitat.
Creche	Relatively secure area (e.g. island or fenced area) where young birds, e.g. kiwi chicks, can be temporarily kept until they are big enough to be released into a larger and less secure area.
Cryptic	Retiring or difficult to see, e.g. some swamp birds including spotless crakes.
Diadromous	Migrating between freshwater and salt-water habitats.
Divaricating	Plants, e.g. many Coprosmas, that have twigs branching off more or less at right angles to stems.
Ecological District	An area of land where the landforms and habitats are distinct from the adjoining area(s), e.g. Manaia Ecological District is distinct from Whangaruru ED to the north.
Ecological process	Important natural processes that affect ecosystem functioning, e.g. flowering, fertilisation, seed dispersal, germination, nutrient cycling.
Ecological restoration	The restoring of one or more of the ecological processes above.
Ecology	The study of organisms in relation to their environment.
Ecosourcing	Growing plants from seeds collected from trees in the same ecological area growing in a similar habitat to where they will be planted.
Ecosystem	All living and non-living components of a defined area and the relationships between them.
Ecotone	The edge between two or more distinct habitats.

Endemic	Plants or animals confined to a specific area, e.g. kiwi are unique to NZ.
Eradicate	To completely remove (a pest) from an area (e.g. goats have been eradicated from Bream Head), as opposed to “sustained control” where the pest is still present but at lower and less impacting densities than previously present.
Gondwana (land)	Single southern hemisphere landmass in Palaeozoic times, comprising present-day Africa, Madagascar, India, Australasia (including New Zealand) and South America.
Grazer	An animal that feeds predominantly on grasses and herbs.
Habitat	The environment of a particular individual or species.
Habitat mosaic	An area of several interconnecting habitats.
Habitat sequence	An intergrading sequence of different habitat types, e.g. mangroves giving way to saltmarsh, shrubland, forest.
Home range	The total area over which an animal may roam in a year or it’s lifetime. See also territory.
Indexing	Gaining a semi-quantitative measure of abundance, frequency, etc. For example annual measures of relative abundance of seedlings, foliar browse index (level of possum browse), bird numbers. See also rodent indexing.
Indicator species	Species that can indicate the general health of a particular site at that time, e.g. canopy density and level of possum browse on kohekohe, numbers of kukupa.
Indigenous	Native to an area, but not necessarily endemic. For example, a fantail is indigenous (native) to NZ, but not endemic, because it also occurs in Australia.
Integrated management	Management that is aimed at targeting a wide spectrum of disruptive forces in the environment, e.g. targeting all or most mammalian pests and pest plants, restoration planting etc. See also ripple effect.
Invertebrate	An animal without an internal skeleton, e.g. insects (6 legs), arachnids (8 legs), molluscs, worms and crustaceans.
Lagomorph	Rabbit or hare
Landcare Group	A group carrying out activities under the auspices of the New Zealand Landcare Trust.
Linkage	Habitat that connects other habitats, e.g. pine forest sometimes links previously separated indigenous forest remnants.
Loam	A permeable, easily crumbled soil of different particle sizes.
MCI Index	A measure of diversity and abundance of invertebrates in streams that provides an indication of habitat quality.
Megainvertebrate	Very large invertebrate, e.g. giant weta, kauri snail.

Monitoring	Measuring change over time in an ecosystem, e.g. flowering and fruiting levels, seedling numbers, bird numbers, browse levels.
Mustelid	Member of the carnivorous family Mustellidae, including the ferret, stoat and weasel introduced to New Zealand.
Omnivorous	Feeding on plant and animal matter.
Photopoint	Reference point from which photos are taken at regular intervals to measure changes in canopy density, flowering.
PNA	Protected Natural Areas programme involving survey and documentation of private habitats and recommendations for protection.
Podocarp forest	A forest dominated by one or more podocarp species. In these species the seeds have a stalk or foot, e.g. totara, kahikatea, miro, matai, rimu, tanekaha.
Predator	An animal that eats other animals.
Pulse poison	A short period of time in which poisoning is carried out, e.g. rat poisoning in spring at the start of the bird breeding season.
Radio-telemetry	Remote detection of animal by attaching a known-frequency radio transmitter and monitoring periodically.
Regeneration	Natural recovery of a habitat, e.g. forest following disruption from burning, logging, etc.
Rehabilitation	The reconstruction of a habitat type through planting.
Residual trap catch	A measure of the number of pest animals (e.g. possums) present in an area usually expressed as a % and based on animals caught divided by number of traps multiplied by nights of trapping. (See also tracking index).
Riparian	Occurring along the edges of rivers, wetlands and seashore.
Ripple effect	A type of side-effect in a management regime where the reduction of one or more pest species could become an advantage to other potentially problematical pest species, e.g. rabbits increasing after sustained cat/mustelid control.
Rodent	Mouse or rat.
Shrubland/scrub	Woody shrubs and small trees usually representing an early stage of forest regeneration.
Succession	The natural progression over time of a site recovering from habitat disturbance, e.g. burnt forest recovering through grassland, herbfield, shrubland, secondary forest, etc.
Terrestrial	On land.
Territory	The defended area of an animal, usually much smaller than its home range.
Threatened	A plant or animal considered to be at risk of extinction. Threatened species are now ranked according to threat of extinction (Hitchmough 2002).

Tracking index	A measure of the number of pest animals (usually rodents) present in an area usually expressed as a % and based on animals detected using sensitive tracking paper in a tunnel.
Translocate	To shift a plant or animal species to a new or former site. If the species formerly occurred at the site (which is normally the case) then the translocation can be referred to as a reintroduction.
Understorey	A general term to include shrubs etc below a forest canopy.
Ungulate	A hoofed mammal.
Wetland	An area of standing water, e.g. lake, pond, swamp, and seasonally wet margins.

The Department of Conservation and Northland Regional Council have a wide selection of fact sheets on weeds and species for use. The following brochures and books are among those available –

- A Planters Handbook for Northland Natives
- Is that a pest in my pond?
- A guide to Grasscarp and Koi
- Project Crimson
- Kukupa Survival Guide
- Garden Escapes – garden plants invading our bush
- Whitebait
- The Good Plant Guide
- Voluntary Protection of Nature on Private Property
- Join Forest and Bird
- Your Land, Our Support
- Trees for the Land
- Are you a dog owner?
- Kiwi survival guide
- Beginners Guide to Wetland Restoration
- Clean Streams: Riparian Management in Northland
- Septic Tank Brochure
- Coastal Erosion (Series of 4)
- Land beside water (Series of 6)

