

**KOWHAI NGUTUKAKA
RECOVERY PLAN
(*Clianthus puniceus*)**

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for the Threatened Species Unit

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ABSTRACT

A recovery plan has been prepared for kowhai ngutukaka or kaka beak (*Clianthus puniceus*). Kowhai ngutukaka is a member of the Leguminosae (= Fabaceae) - Papilionaceae family, commonly known as the pea family. It is cultivated widely but wild populations are classed as endangered; only about 200 individuals remain in the wild, with most in Te Urewera National Park. Active management is now required to maintain existing populations and to increase the numbers of wild plants. The recovery plan includes basic management objectives, information on distribution, ecology and research, an outline of management options and a work plan. The work plan prescribes specific tasks and the relevant personnel responsible for these tasks for the Urewera, East Coast and Kaipara Harbour populations.

Frontispiece: *Clianthus puniceus*. Photo: W.B. Shaw

INDICATIVE PLAN OF MAJOR WORK

For details see pages 13 to 22

KAIPARA

Year 1 Year 2 Year 3 Year 4 Year 5 Year 6

Collect seeds/foilage	■	■	■	■	■	
Manage sites	■	■	■	■	■	■
Monitoring		■	■	■	■	

EAST COAST

Year 1 Year 2 Year 3 Year 4 Year 5 Year 6

Collect seeds/foilage	■	■	■	■	■	■
Survey/site select	■	■				
Planting	■	■	■	■	■	
Manage sites	■	■	■	■	■	
Monitoring	■	■	■	■	■	■
Advocacy	■	■	■	■	■	

TE UREWERA

Year 1 Year 2 Year 3 Year 4 Year 5 Year 6

Collect seeds/foilage	■	■	■	■	■	■
Planting	■	■	■	■		
Manage sites	■		■		■	
Monitoring		■	■	■	■	■

CONTENTS

	Page
INTRODUCTION	1
TAXONOMY	1
CURRENT DISTRIBUTION	2
ECOLOGY AND BIOLOGY	2
REASONS FOR DECLINE	6
WHY THE SPECIES IS CURRENTLY THREATENED	6
RECOVERY POTENTIAL	7
MANAGEMENT GOAL	7
KEY OBJECTIVES	7
JUSTIFICATION OF OBJECTIVES	8
MANAGEMENT PRIORITIES	9
MANAGEMENT OPTIONS	9
RECOVERY STRATEGY	11
WORK PLAN	13
1. Kaipara	13
2. East Coast	13
3. Te Urewera	13
4. East Coast and Auckland Conservancies	14
5. Seed/Propagating Material	14
6. Research	14
7. Advocacy	14
8. Recovery Plan	15
ACKNOWLEDGEMENTS	23
REFERENCES	23
APPENDICES	
1. Taxonomy	25
2. Past Distribution	27
3. Research	29
4. Collection and Planting Guidelines	32
5. Key Contacts	33

INTRODUCTION

Kowhai ngutukaka or kaka beak (*Clianthus puniceus*) is a plant of special significance to New Zealand. It is widely known and commonly used as an image of New Zealand character on tourist souvenirs and the like. With its showy red or white flowers it is also an outstanding horticultural subject. Colenso (1885) records that it was cultivated widely by the Maori (presumably because of its beauty), that it was cultivated in European colonists gardens as early as 1834 and that it was taken back and successfully grown in England. It is still cultivated widely, and is a common garden plant in New Zealand.

There are only about 200 plants known to remain in wild populations. Most of these are in a few substantial populations at Lake Waikaremoana though it does occur at about 12 sites in total in the southern sector of Te Urewera National Park. There are only a few wild plants remaining on the East Coast, north of Gisborne, at very few sites. There is also a small population on an island in the Kaipara harbour.

The wild populations are classified as "endangered", a classification applied to a taxon "in danger of extinction and whose survival is unlikely if the causal factors continue operating" (Given, 1981). This situation has arisen due to the combined effects of habitat destruction, browsing animals (possibly including introduced common snails) and the requirement of the species for permanently open or early successional sites and communities. The cultivated population is not under threat, but appears to contain very limited genetic diversity.

This recovery plan has been prepared to outline the action needed to reverse the downward trend of wild kowhai ngutukaka. Key management goals and objectives are outlined and information on distribution, ecology, biology, research and management options are presented. A work plan is also presented, as it is now only by active management that wild populations of kowhai ngutukaka will be retained.

The key management goal embodied in this plan is "to ensure the perpetuation of kowhai ngutukaka in the wild and the maintenance of its genetic diversity". The duration of the plan is five years.

TAXONOMY

Wild kowhai ngutukaka is a variable plant and there is ongoing discussion of whether this variation includes one or several taxa (Appendix 1). Two approaches are currently being used that will probably lead to resolution of the issue:

- (1) a provenance trial being carried out by Manaaki Whenua (Landcare Research New Zealand Ltd) at Lincoln;
- (2) examination of genetic variation of relationships by gel electrophoresis of seed proteins. Refer also to the section on Genetics and Research.

It is important from a conservation perspective that this issue is resolved. Resolution of nomenclature/typification problems mentioned in Appendix 1 will also assist.

CURRENT DISTRIBUTION

Present localities can be divided into three geographic units; Kaipara, East Coast and Te Urewera. Very few plants are present in Kaipara and East Coast, with more than 180 in Te Urewera.

Apart from the Kaipara Harbour location, all other recent records are confined to the East Coast and the southern Urewera region. These locations are: Te Araroa, inland from Tolaga Bay (Mangatokerau), Waipare Highlands (Daniel, 1985), Ruakituri River, Lake Waikaremoana and in the Waiau River catchment. Extant natural colonies range in size from one to more than 80 plants, with most colonies containing fewer than ten plants. Some of the current occurrences have only been discovered in the last few years (see Shaw in press), and it is likely that other sites will be discovered in the future.

The present distribution is a significant contraction of the range indicated by old records (Figure 1; Appendix 2). Recent (1991) searches for kowhai ngutukaka at Te Araroa and Waipare Highlands have failed to relocate plants but three new plants were discovered in 1992 in the Mangatokerau Valley, inland of Tolaga Bay.

ECOLOGY AND BIOLOGY

Kowhai ngutukaka is a light-demanding nitrogen-fixing plant of either open, partially open, or seral sites. These characteristics mean that the plant is found on the following types of site; bluffs and cliffs, lake margins, road margins, landslide scars, river margins, and seral communities that have developed following burning. The margin of Lake Waikaremoana where plants occur has only been exposed since the lake was artificially lowered in 1946, and hence is seral in nature. Although much of this exposed surface will eventually be forested and unavailable as habitat for kowhai ngutukaka there will be on-going disturbance by fluctuating lake levels, which will provide shifting of short-term habitat opportunities. This type of site would also have existed prior to manipulation of the lake level. One plant occurs on a road margin, which is a feature similar to a lake margin; i.e. a permanent forest margin. Landslide scars are seral sites that will eventually be covered, in the medium term, with taller vegetation. River margin sites are very vulnerable to damage, with three of these sites destroyed in Cyclone Bola (1988).

Most kowhai ngutukaka now occur in seral communities at Waikaremoana that have developed following burning. These sites will all undergo considerable alteration in the medium to long-term and kowhai ngutukaka will be eliminated from most places, although a few plants may persist on the edges of rock outcrops.

These seral communities are dominated by wharariki (*Phormium cookianum*), kohuhu (*Pittosporum tenuifolium* subsp. *tenuifolium*), karamu (*Coprosma robusta*), mapou (*Myrsine australis*), tutu (*Coriaria arborea*) and mingimingi (*Leucopogon fasciculatus*). Wharariki is dominant in the early stages of succession but is eventually replaced by woody species.

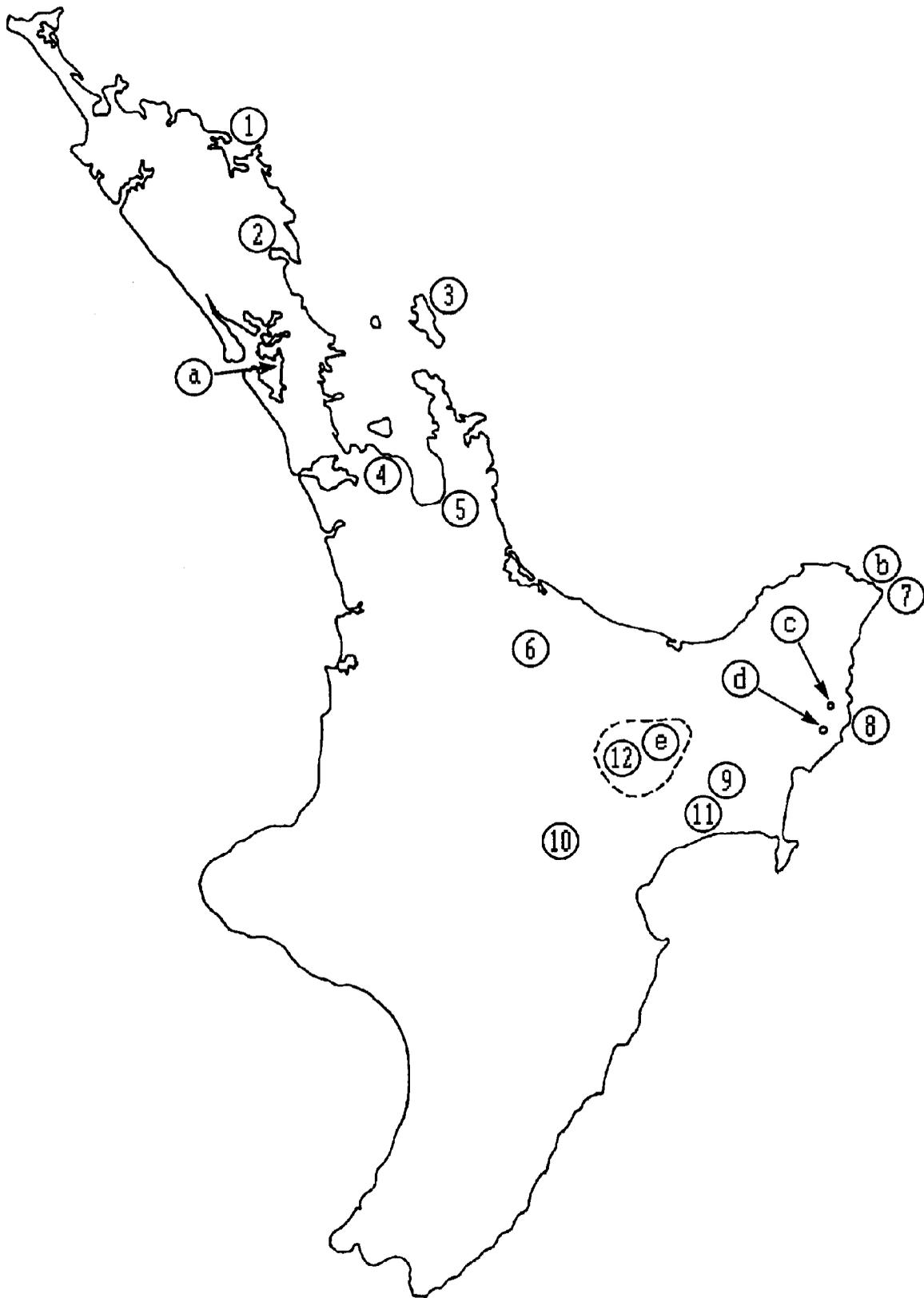


Figure 1: Current and previous wild *Clianthus* locations.

Key: Current Populations: a. Kaipara/Moturemu Is; b. Te Araroa(2); c. Waipare;
d. Tolaga; e. Southern Urewera.
Previous Populations: 1. Bay of Islands; 2. Whangarei; 3. Great Barrier Is;
4. Howick; 5. Thames; 6. Rotorua; 7. Whangaokeno Is; 8. Anaura
Bay/Motuoroi Is; 9. Tiniroto; 10. Maungaharuru Range; 11. Northern
Hawke's Bay; 12. Lake Waikaremoana.

Therefore, the essential character of many kowhai ngutukaka populations is that they will only persist on any particular site for the short to medium term, due to the seral nature of these sites. In the past, when the area of habitat was much greater, the population was probably quite dynamic with periodic loss and establishment of local plants/populations. Bluffs and cliffs are perhaps the only long-term habitat for kowhai ngutukaka.

The geographic separation of known patches of wild kowhai ngutukaka and the genetic work to date indicate support for the suggestion (D.R. Given, pers. comm.) that the wild kowhai ngutukaka population is comprised of a number of 'meta-populations'. The meta-population concept can be applied to a species that is made up of geographically isolated subpopulations, interconnected through patterns of gene flow, extinction, and recolonization (Lande and Barrowclough 1987 in Given 1990b). There are three primary factors to consider when managing 'meta-populations':

- (1) While particular populations become extinct and new ones are formed elsewhere, the whole meta-population persists as long as extinction and colonization rates remain in equilibrium. Population sizes in various 'patches' can be manipulated to achieve this;
- (2) Not all habitat for a species is likely to be occupied at any particular point in time. Failure to protect vacant habitat patches can reduce metapopulation size and viability as surely as destruction of an existing population. There is a need to protect suitable but vacant habitat for future colonisation as well as habitat where the species currently occurs;
- (3) The job of preserving a species with a meta-population structure will never be finished with the protection of a single population or patch.

Kowhai ngutukaka reproduces sexually (flowers are functionally male and female) and asexually. Asexual reproduction is carried out by natural layering of branches. Some ecotypes, with a spreading habit, seem to be much more capable of layering than others with a more upright growth habit. Layering enables plants to keep moving into and establishing on the more open parts of seral sites, enabling them to persist at these sites for longer than would otherwise be the case.

The main flowering period is September - December but flowering can occur all year round. Some plants have two or more flowering periods over a year. Seeds are present December - April, but may persist on the plant for much longer. Flowering and seed production varies markedly from year to year. Heavy flowering does not always mean good pod or seed production as prolonged wet weather during or immediately following the heavy flowering period can lead to the flowers rotting and falling off the plant. This may be due to a poor level of pollination.

The pollination systems of kowhai ngutukaka are not well understood. Godley (1979) records that they are mainly self-fertilized. Flowers are also bird-pollinated, as would be expected with a showy flower that produces copious nectar. McCann (1952) (in Godley, 1979) considered that kowhai ngutukaka was predominantly bird-pollinated in the past, but is now more readily self-pollinated. Tui and bellbird have been observed using the flowers in gardens at Waikaremoana and in Rotorua, and are thought to be important pollination agents.

Silvereyes also visit flowers (R. Grubner, pers. comm.). Godley (1979) also records examples of birds visiting flowers. Heavy flowering will draw birds from a considerable distance. Insects visit the flowers, including honey bees, bumble bees and native bees (M. Smith, pers. comm.), though honey bees may be pollen-robbers rather than pollinators (A. Stewart, pers. comm.). It is not known whether any cross-compatibility blocks are operating.

Seeds are dispersed in a number of ways. They are strongly attached to the pods by a mat of dense white hairs but eventually either fall from the pods, or the pods fall from the plant with seeds attached. Seedlings often establish beneath wild plants but most do not survive over summer dry periods. Those that do survive require a suitable combination of low shelter and direct light. Seeds and pods will float, and may be water-dispersed in rivers or on lakes. It is unlikely that wind carries individual seeds very far because of their small size and relative weight. It is, however, quite likely that pods with seeds attached could be carried a considerable distance by wind. When the pods dry out they often open out into a sail-like structure which can easily be carried by even a moderate wind.

Effective germination appears to require warm, moist soil conditions, judging by experience with nursery propagation.

As gardeners are well aware, kowhai ngutukaka is prone to attack from a range of insects and fungi. This also occurs in the wild populations, and it is very common for wild plants to have evidence of insect attack and local dead foliage or mould on dead stems. A relatively high turnover of stems occurs on wild plants in monitored populations (Appendix 3). As old stems lose their vigour and are attacked by a range of organisms, there is ongoing production of young shoots at the base of the plants. If there is sufficient space and light these young shoots will quickly grow up into the canopy; if not they die. The same applies to entire plants. If they are heavily shaded they die quickly, and this has happened with some Waikaremoana plants. Conversely they respond well to pruning of competitors to maintain high light levels and kowhai ngutukaka itself also responds well to heavy pruning.

Kowhai ngutukaka is browsed by deer, goats and domestic stock. There is no evidence, as yet, that they are browsed by possums. They are highly vulnerable to attack by introduced slugs (*Deroceias* spp.) and brown snails (*Helix aspersa*) with seedlings being especially vulnerable. Garden snails are present in low numbers around some of the wild Waikaremoana populations, and they are also present in the Poverty Bay - Hawke's Bay lowlands. They may have contributed to the decline of kowhai ngutukaka, especially by defoliating and killing seedlings. They also eat adult foliage, and can cause major stem damage. *Armillaria* fungus is known to kill cultivated seedlings. There is no information on the effect(s) of rodents, viruses or other micro-organisms on kowhai ngutukaka.

Kowhai ngutukaka is an outstanding horticultural plant, which is widely cultivated in New Zealand and in other countries. There are many thousands of horticultural plants in New Zealand. Analyses have been carried out on cultivated plants to determine genetic relationships, and all plants tested to date have indicated a very narrow range of genotypes in the cultivated population. Most of the wild types are not represented in the cultivated population (Shaw and Gardiner, in prep).

REASONS FOR DECLINE

The decline of kowhai ngutukaka can probably be attributed to the combined effects of habitat destruction and modification, and browsing animals. A vast area of former habitat in the northern Hawke's Bay and Poverty Bay lowlands and coastal strip has been completely altered and devastated by the development of pastoral farming. It no longer provides suitable natural habitat. The loss of such a large area of actual and potential habitat has serious implications for a relatively short-lived plant that is dependent on open sites and margins, and predominantly inhabits early-successional communities. Combined with this have been the probable depredations of domestic browsing animals, feral goats, deer and introduced brown snail (goats occur widely in the north-eastern North Island, throughout most of the current range of kowhai ngutukaka). Collectors may also have reduced some small populations.

WHY THE SPECIES IS CURRENTLY THREATENED

The current threats to kowhai ngutukaka can be considered at two scales; those common to all areas, and those specific to each site or geographic unit.

1. Common Threats

All sites where wild kowhai ngutukaka occur are vulnerable to loss due to:

- (a) Stochastic catastrophic disturbance such as fires, landslides, and climatic extremes (drought, flood).
- (b) Natural succession resulting in kowhai ngutukaka being overtopped by taller woody competitors. This is the greatest threat to more than 80 percent of plants at Waikaremoana.
- (c) Browsing by introduced mammals and perhaps snails, slugs and rodents.

2. Kaipara

Only one site is known north of Auckland, Moturemu Island in Kaipara harbour. A small number of seedlings occur on Moturemu, all growing beneath a taller canopy. They are germinating from a seed bank as no mature plants have been found recently. Active management will be required to maintain these seedlings, which are under a high level of threat from shade suppression.

3. East Coast

The East Coast populations are under a very high level of threat. Three separate stream margin plants were destroyed in the floods associated with tropical cyclone Bola in 1988. All remaining populations are under threat because they occur on precarious unstable sites with goats or other browsing animals almost always present.

4. Te Urewera

Lake margin plants occur on sites which are usually above the human-regulated upper lake level limit. Occasionally, however, lake level can exceed the upper limit. Heavy rainfall in 1988 associated with cyclone Bola caused this to happen, and two plants were flooded, with one killed and one partially killed.

Deer browse some plants but this has not been known to result in plant death.

RECOVERY POTENTIAL

Current indications are that the species will continue to decline if causal mechanisms continue operating. Without active management it is likely that the number of sites, and its current geographic range will diminish significantly over the next five to ten years.

The potential for recovery depends largely on the type and degree of active management to be applied to existing individual populations, and on the establishment of new individuals and populations in the wild.

Kowhai ngutukaka does, however, produce an adequate amount of seed (seed production varies from year to year) and is easily propagated vegetatively which, in conjunction with manipulation of the habitat, provides the opportunity to counter causal mechanisms of decline.

MANAGEMENT GOAL

To ensure the perpetuation of kowhai ngutukaka in the wild and the maintenance of its genetic diversity.

KEY OBJECTIVES

Management objectives for each of the three management units are different, due to their different characteristics:

Kaipara

To implement protection measures appropriate to maintain existing genetic material until it is established what the relationships are, if any, with other kowhai ngutukaka populations.

To review the management objective once these relationships are established.

East Coast

To perpetuate the genetic diversity of the East Coast population by securing present sites, increasing numbers of plants at these sites, and establishing new self-sustaining populations.

Te Urewera

To maintain the populations at all known sites until the overall genetic structure/variation of the population is better understood and establishment techniques are adequately refined.

To establish kowhai ngutukaka in sufficient numbers and at enough sites to allow continuing biological evolution in concert with physical processes, and to provide a buffer against natural catastrophe.

Ex-Situ Conservation

To maintain and promote ex-situ plantings of a wide range of genetic material, of known and documented provenance.

JUSTIFICATION OF OBJECTIVES

General

Management of kowhai ngutukaka should aim to replicate natural habitats and processes. Most colonies occur in secondary shrubland, where succession will result in replacement with other common indigenous woody plants. Some colonies are on permanently open sites.

For the five year term of this recovery plan it will be necessary to work with short term objectives with the primary aim of increasing the number of individuals and colonies. In the longer term it may be possible to consider allowing local extinction by natural processes if sufficient genetic diversity is retained overall.

Kaipara

Currently the Kaipara plants are in the most precarious state of any of the populations. The only source plants that can be used for potential recovery are the few on Moturemu Island.

The strategy used will ultimately depend on the likely genetic relationships and/or origins of the Moturemu plants. If they are distinct, they become a very high priority for recovery management. Prospects for recovery of a self-sustaining wild population are not good, but an approach similar to the East Coast population could be used.

East Coast

The fragmented and insecure nature of the East Coast population means that the highest priority is to secure known sites, and to establish new sites by a planting programme.

Te Urewera

There are relatively large numbers of plants in Te Urewera, although at scattered sites. These will be maintained while establishment techniques are refined, and more is learnt about the genetic makeup of the wild population. In the longer term more sites will be established to

provide a buffer if some sites are lost and to allow ongoing evolution of kowhai ngutukaka in its natural habitat.

Horticulture

Seed and/or cuttings will be provided to bona fide commercial horticulturalists, at the Department's discretion, for the following reasons:

- (a) initial indications are that the range of diversity in cultivated stock is low, yet this material, in a worst case scenario, may one day have to be used as a source for conservation plantings;
- (b) there is a demand for material, and the Department will manage this situation in a positive manner rather than inadvertently promote illegal collection;
- (c) there is sufficient wild material available from some sources to allow this type of distribution.

Ex-Situ Conservation

Ex-situ plantings will be maintained to provide a buffer against the loss of wild plants. These plantings could also be used to supply seed to horticulturalists, and to provide seed for plants to be re-established in wild sites.

MANAGEMENT PRIORITIES

The three geographic units have been ranked in priority order for active management, as follows:

1. Kaipara
2. East Coast
3. Te Urewera.

MANAGEMENT OPTIONS

For each existing or potential individual population, the following options have been considered:

- (a) Do nothing and let some populations evolve naturally. This may mean local extinctions. This is not a tenable option in the short to medium term but may be a viable long term option if sufficient individual populations are sustainable.
- (b) Ongoing monitoring. This can range from basic field inspections noting numbers and general health of plants through to detailed measurements and recording carried out every 6 - 12 months. See the section on Research. Monitoring will not in itself achieve the management goal.
- (c) Browsing animal control by hunting and/or exclusion by fencing. These actions alone may not attain the management goal, but may be appropriate for some sites.
- (d) Control of introduced brown snail (*Helix aspersa*).

- (e) Pruning or removal of woody competitors.
- (f) Creation of new habitat. These techniques have not been fully developed yet; e.g. it could involve burning, which could pose a risk to other nearby populations of kowhai ngutukaka, or to other communities or special plants. Habitat creation can also include planting of other suitable associates such as wharariki (*Phormium cookianum*).
- (g) Collection of propagation material. This allows propagation for planting in wild habitats, the establishment of ex-situ plantings, and the provision of material to horticulturalists.
- (h) Planting. This provides the opportunity to manipulate population size, to either retain it at present levels, or to attempt to increase numbers. Planting may be used to augment existing populations, or to establish new sites and habitats.
- (i) Rat eradication. This is contingent on research indicating that rodents pose a threat.

The following are some specific management options for each of the "geographic units";

Kaipara

If existing wild plants are to be retained, some active site management is required. This could include selective pruning of competitors. Plants will also need to be taken into cultivation. Rat control is being carried out on Moturemu and this will provide an opportunity to assess the effects of rat removal on kowhai ngutukaka.

East Coast

Recovery is possible through the combined approaches of protection and active management of existing populations, and establishing by planting further self-sustaining wild populations. This may entail legal protection, fencing, animal control and perhaps augmentation by planting of existing populations. Finding suitable sites for planting artificial populations will require considerable effort (Appendix 4). Several approaches can be utilised:

- (a) attempt to find appropriate natural sites on the conservation estate;
- (b) as for (a) but extend site selection to lands of any tenure and attempt to negotiate with landowners when a suitable site is found;
- (c) find a site that has the right basic landform and aspect characteristics and establish appropriate indigenous vegetation associations and fence to exclude browsing animals, if necessary. This could be on either conservation estate or private land.

Attempts will be made to establish 3 - 5 new wild colonies comprising a total of around 100 plants. As wide a range of East Coast seed and/or cuttings stock as possible will be used for this planting.

An ex-situ collection of East Coast plants will be established and maintained at the Department of Conservation Matawhero nursery, Gisborne. Records will be kept of the origins of these plants.

Te Urewera

Existing individuals and colonies should be retained where possible. This will entail some active management, including pruning of woody competitors. Establishment of new individuals and colonies will be attempted, to make the population larger and more secure, and to refine establishment techniques. There is limited available habitat, and much of this is seral. Creation of new habitat will need to be considered in the future.

RECOVERY STRATEGY

The strategy is the fundamental approach of the Department and other involved groups to the implementation of recovery work. The strategy is the level where the various management disciplines (field management, planning, research, advocacy) are integrated, along with other plans and strategies.

The objectives for each "geographic unit" (Kaipara, East Coast, Te Urewera) reflect the different characteristics of the kowhai ngutukaka population in each unit. However, it is important to note that all "geographic units" require active management to retain kowhai ngutukaka.

The Kaipara population is currently a very high priority for management action, to maintain the current genetic resource until it is resolved whether this population is related to either the Urewera or East Coast populations. An appropriate outcome in the short-term is to get some plants into cultivation, maintain and protect the existing genetic resource on Moturemu Island, and to carry out appropriate analyses of genetic material.

East Coast is also a very high priority. There is only a small number of wild plants, growing in a few precarious sites. The following actions are required: protection of existing sites; selection of suitable planting sites; collection of propagation material; ongoing nursery propagation; establishment of ex-situ plantings; a planting programme to establish new populations. Most sites are on private land, so attempts will be made to have sites legally protected and managed to promote the survival of kowhai ngutukaka. A minimum outcome of any management would be the retention of all existing populations and genetic material. This is not adequate. A more appropriate outcome would be the establishment of at least five separate populations, containing more than 100 individuals in total.

The Urewera population is the largest and most secure, and hence is currently the lowest priority for active management. Nevertheless, the opportunity exists to protect existing plants and to establish a larger even more secure population. These actions should be carried out while sufficient individuals and colonies exist to do this relatively easily.

A minimum outcome of any management would be: the retention of existing population numbers and individual numbers; with a preferable outcome being a doubling of present numbers of individuals and populations. Ex-situ plantings of local kowhai ngutukaka can be established at Aniwaniwa visitor centre, at the motor camp and around departmental housing.

The recovery plan will need to be integrated with existing or proposed plans or strategies. These include the following:

- (a) Te Urewera National Park Management Plan (1989 - 1999); The National Park management plan contains policies relevant to the management of kowhai ngutukaka in section 2.3 (page 59).
- (b) the business plans for East Coast and Auckland conservancies;
- (c) proposed conservation management strategies for East Coast and Auckland conservancies.

The relevant conservation boards need to be kept up-to-date with management proposals for kowhai ngutukaka.

Kowhai ngutukaka has a very high public profile among members of the public that live around or visit the Waikaremoana area and an essential part of any recovery planning on the East Coast north of Gisborne will involve private lands. The Department recognises the important potential role of private landowners, and also the importance of keeping the public informed of recovery management activities.

The tangata whenua of East Coast and southern Te Urewera have a strong interest in kowhai ngutukaka and, locally, have already had some involvement by granting permission for planting trials on Maori land. This positive relationship needs to be fostered, and these groups should be involved in planting programmes. Tangata whenua need to be involved at an early stage in the recovery programme, and to be involved in the programme as it develops.

Active public involvement in the programme can be fostered by involvement in planting programmes, plant cultivation by private individuals, involvement of school groups, and using kowhai ngutukaka as a theme plant for special days (e.g. Arbour day, departmental summer programmes), and the East Coast/southern Te Urewera in general.

The high public awareness of kowhai ngutukaka exists primarily because of its wide use in cultivation. Horticulturalists will have access to stock, at the Department's discretion, via conservancy managers and departmental nurseries.

A public advocacy package needs to be developed and disseminated. This can involve press releases, an information leaflet, and a video. This could be put together by departmental advocacy staff, with appropriate specialist input. Media input will be initiated by relevant managers, or researchers, in liaison with advocacy staff, or by advocacy staff.

There are various ongoing research requirements with kowhai ngutukaka (Appendix 3).

WORK PLAN

The work programme is detailed in Tables 1 - 7. The following actions will be carried out to ensure the survival of wild populations of kowhai ngutukaka:

1. Kaipara

Existing plants on Moturemu will be maintained and protected. This will require some local manipulation (i.e. pruning) of secondary canopy trees to allow adequate light to reach seedlings currently on the island. If this is not done, most of these will die, and a significant number have already done so.

Ongoing monitoring of Moturemu plants is required.

Material from the island must be taken into cultivation to ensure that this genetic resource is not lost.

Personnel involved: Auckland Conservancy, Bay of Plenty Advisory Scientist.

Work Programme - Tables 1 - 7

If the Moturemu plants are distinct from other wild populations then a similar approach to the East Coast programme below will need to be undertaken, involving ex-situ cultivation; ongoing maintenance of the existing population; possible establishment of new populations; make material available to nurseries, if supplies of material exist.

2. East Coast

Existing wild populations need to be visited, and brief prescriptions drawn up for each population. Propagating material needs to be collected from as many East Coast plants as possible to provide plants for planting operations. Suitable planting sites need to be selected. Some ongoing survey is required to relocate known sites, or to assess areas of potential habitat.

Work Programme - Tables 1 - 7

3. Te Urewera

Existing wild populations at Waikaremoana will be maintained through active management, including manipulation of existing plants and competitors.

Ex-situ plantings will be established adjacent to National Park headquarters, staff residences and the motor camp, with records kept of plant origins.

Some wild planting will be carried out at Waikaremoana, to maintain or extend existing populations, and to establish new populations. Waikaremoana seed and/or cuttings stock from equivalent sites will be used.

Some active management has been carried out as part of a research programme. Sites will need to be selected for possible planting sites. There are adequate numbers of seedlings currently in cultivation for a planting programme.

Seed should be collected each year and if not necessary for a planting operation, it will be used for a seed storage trial.

Personnel involved: East Coast Conservancy.

4. East Coast and Auckland Conservancies

1992

Establish site report recording system in conservancy office (copies to be supplied to DOC Science and Research Wellington and Manaaki Whenua - Lincoln) as part of a larger rare plant recording system.

5. Seed/Propagating Material

Seed and/or vegetative material from wild plants will be made available to departmental and other nurseries, at the Department's discretion.

The commercial cultivation and sale of kowhai ngutukaka will be encouraged. Refer to Appendix 4 for collection guidelines.

Personnel involved: East Coast Conservancy, Auckland Conservancy.

6. Research

Further information is required in the following subject areas; taxonomy and nomenclature, genetics, population structure, sexual reproduction (including pollination), seed dispersal, seed viability/planting techniques, site selection and site creation.

Depending on the results of the seed storage trials, a seed bank will be established comprising a range of wild and cultivated seed material. Existing research at Waikaremoana involving intensive monitoring of selected individual plants will be continued (to Appendix 3).

Personnel involved:

Advisory Scientist, Bay of Plenty
Horticulture Research Institute, Palmerston North
East Coast Conservancy, Auckland Conservancy

7. Advocacy

Advocacy of the conservation of kowhai ngutukaka will need to be addressed at various levels. Protection of wild populations on private lands is a high priority and there will

need to be continued advocacy in the public arena. A systematic programme of media publicity will be drawn up, involving press releases, information packages and possible television coverage. Refer to Tables 1 - 7 (work programmes for East Coast and Te Urewera). There will need to be advocacy for management funds from Vote Conservation and sponsorship should also be discussed with relevant business and/or conservation interests.

Personnel involved:

East Coast Conservancy
Auckland Conservancy
Threatened Species Unit
Bay of Plenty Advisory Scientist

8. Recovery Plan

This plan will be revised every five years, with the next revision in the 1997/98 financial year.

Personnel involved:

East Coast Conservancy
Auckland Conservancy
Recovery Team
Threatened Species Unit

TABLE 1: WORK PROGRAMME 1993

Date	Kaipara	East Coast	Te Urewera	Research
February			Seed collection. Site selection	DNA fingerprints of foliage samples for comparison with electrophoresis analysis of seed proteins
March		Seed collection, monitor existing plantings.		
April				
May				
June		Planting		
July	Get more plants in cultivation. Prune competitors.			
August			Survey all sites. Management prescriptions for each site.	Remeasure tagged plants
September		Site/habitat survey. Select ex-situ planting sites. Prepare public advocacy package.	Site maintenance if required. Ex situ-planting. Wild planting.	
October		Start protection measures for private land sites. Write management prescriptions for each site.		
November				
December		Monitor plantings.	Monitor new plantings	

TABLE 2: WORK PROGRAMME 1994

Date	Kaipara	East Coast	Te Urewera	Research
February			Seed collection Monitor plantings	Establish seed storage trial
March	Check for seeds. Collect seeds. Monitor plants.	Seed collection. Monitor plantings Planting site selection	Site selection Establish seed bank.	
April		Establish seed bank.		Monitor tagged plants
May				
June		Planting		
July	Pruning if required.			
August			Planting - ex situ Planting - wild	
September		Fence new sites	Check earlier plantings.	
October		Fence existing sites Monitor plantings		
November		Media release on work programme Continue protection measures for private land sites		
December				

TABLE 3: WORK PROGRAMME 1995

Date	Kaipara	East Coast	Te Urewera	Research
February			Seed collection	Monitor tagged plants
March	Check for seeds Monitor plants.	Seed collection Monitor plantings	Monitor plantings Site selection	
April				
May				
June		Planting		
July		Site maintenance if required.		
August			Survey all sites. Maintenance if required.	
September		Check all known sites Fencing if required.	Planting - ex situ. Planting - wild.	
October		Other site maintenance. Media release.		
November				
December				