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POHUTUKAWA AND BIODIVERSITY

(Short Answers in Conservation Science)

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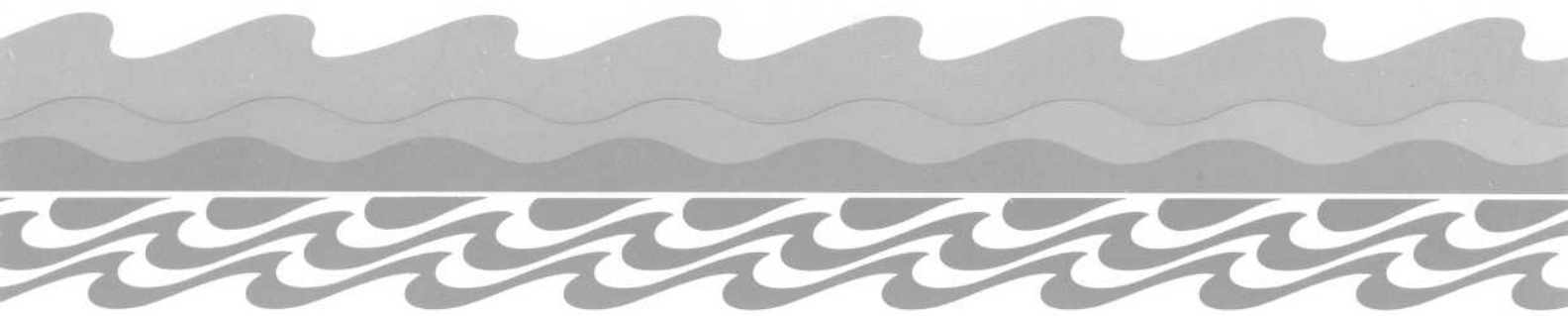

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POHUTUKAWA AND BIODIVERSITY

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1. INTRODUCTION

The objectives of the Convention on Biological Diversity are:

> *"the conservation of biological diversity;*
> *the sustainable use of biological resources; and*
> *the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources ... " (Article 1 IUCN 1993).*

> *"Biological Diversity means the variability among living organisms from all sources including, inter alia, terrestrial marine and other aquatic ecosystems and the ecological complexes of which they are part, this includes diversity within species, between species and of ecosystems"; and "Biological resources includes genetic resources, organisms or parts thereof, populations, or any other biotic component of ecosystems with actual or potential use or value for humanity"; and "Sustainable use means the use of components of biological diversity in a way, and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations" (Article 2 IUCN, 1993).*

The value of the concept of biodiversity is that the many aspects of conservation are brought under a single canopy. Biodiversity includes understanding a species in all regards - its uniqueness, biogeography, structural characteristics and its ecological and cultural attributes. Biodiversity also deals with the ecosystem to which a species belongs and the processes operating within the ecosystem that facilitate interactions and ecological health. Finally, biodiversity includes the relationship of a species to people, the particular values or uses as individuals, as an ecosystem or a landscape; and, of course, management based on the problems the species is facing.

The holistic concept of biodiversity can obviously be used to understand and manage pohutukawa. This famous New Zealand tree has become known for its character as an individual more than for its role in the coastal forest ecosystem, and this probably underlies the urgent need to improve our management of it. Project Crimson, a sponsorship programme for conserving pohutukawa, is a reflection of this need, and one of its objectives is to increase public awareness of pohutukawa. The concept of

biodiversity is valuable as a means of education too. The concept can be applied to the conservation of pohutukawa and help build on the awareness that Project Crimson is fostering.

2. THE SIGNIFICANCE OF POHUTUKAWA

Pohutukawa belongs to a large and important family, the Myrtaceae. This family consists of about 3000 species of tropical and warm temperate trees, shrubs and occasionally vines. The family is named for the mediterranean myrtle, but the family is far more characteristic of, and reaches its greatest diversity in, the Southern Hemisphere, particularly South America and Australia. Eucalyptus, guava, clove, and bottlebrush are members of the Myrtaceae that provide timber, fruit, spice, oils and garden plants. In New Zealand the family is represented by some of our best known plants like rata, kanuka, manuka, and some lesser well known, but nevertheless significant, plants like swamp maire and ramarama. By having both fleshy and dry-fruited Myrtaceae, New Zealand demonstrates ancient links to both Australia and tropical Asia. Pohutukawa adds a further biogeographical link with the south-west Pacific.

Pohutukawa belongs to the genus *Metrosideros* or "iron-hearted myrtles". John Dawson, a specialist in the genus, suggests that there are two subgenera - the trees, and vines (Table 1), that together number nearly 50 species in the Pacific Islands (the trees), and the continental rim lands of the western Pacific (the vines). New Zealand and New Caledonia are centres of diversity for both groups (Dawson, pers. comm.; Dawson, 1988). The ancestor probably occupied the mobile islands of the SW Pacific in early Tertiary time (the Paleocene, 65-55 million years ago) perhaps colonising the volcanic or sedimentary rocks as they emerged from the sea. This ability is still common to the Pacific species like Hawaii's ohia lehua, New Zealand's Kermadec Island "pohutukawa", and pohutukawa itself. But the ancestor has given rise also to modern species that have gone beyond the coastlines and entered the great forests of Aotearoa, creating towering trees and forest lianes. "New Zealand" has been important, therefore, in both the origin and diversification of *Metrosideros.*

One of the unique characteristics of the *Metrosideros,* that helped it colonize bare rock, is the ability to form roots from the branches. The Kermadec Island species forms great clonal masses as collapsing trees root and regrow. Pohutukawa itself forms large aerial root masses, and the branches of trees can root when they bend down to touch the ground. The same ability has been specialised in rata to form "clasping" or "girdling" roots that attach the epiphytic seedling to the trunk of an existing tree, and eventually grow so huge as to coalesce around and "strangle" the host tree and creating a pseudo-trunk of its own. More delicately the stems of climbing species send out roots that cling to other plants and eventually enable the vine to form large lianes with stems descending from the forest canopy to the forest floor. So, using the ability of the ancestor to form roots into bare rock, the iron-hearted myrtles of New Zealand have

radiated through the forests of Tane from the subtropical to the subantarctic, from the coast to bushline (Table 1).

The various species of *Metrosideros* trees achieve some notable distinctions in the New Zealand flora:

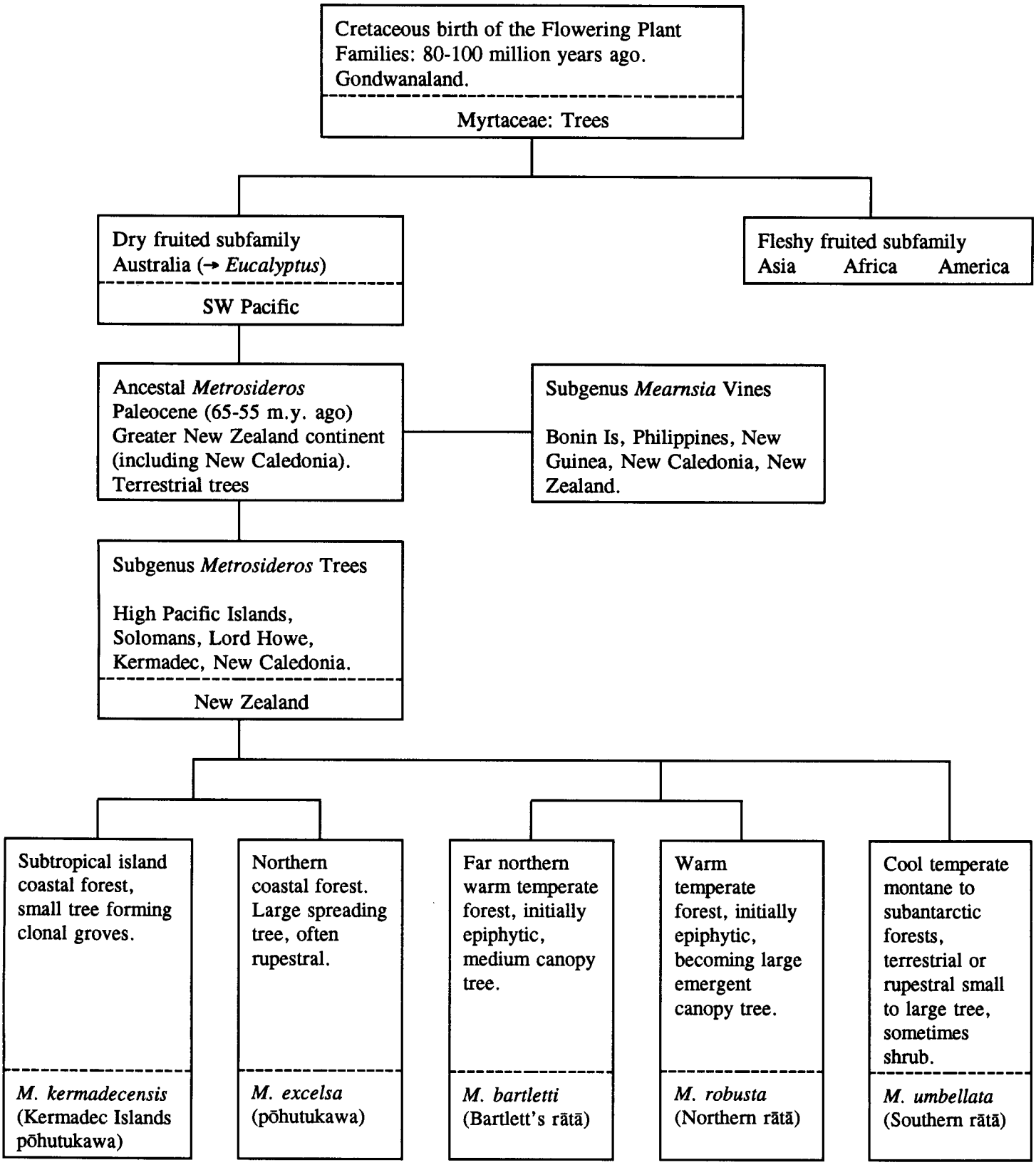
- pohutukawa is the only tree capable of colonising bare lava.
- Bartletts rata from Te Paki is the most recently discovered tree in New Zealand, being also one of the rarest (discovered 20 years ago, and only about 20 remain).
- the epiphytic tree-rata are the best examples of "strangling" trees in New Zealand.
- southern rata forms the southernmost forests in New Zealand (Auckland Islands), and on mountain rocks can flower when only a few centimetres tall.
- pohutukawa and rata create the most spectacular flower displays of any New Zealand forest tree.

2.1 New Zealand's Christmas Tree

It is this last feature, the spectacular flower, that has earned pohutukawa its fame as New Zealand's Christmas Tree, flowering across the whole canopy at once, in early summer, at a time when many New Zealanders focus their attention on enjoying the New Zealand coast. Pohutukawa is one of New Zealand's most loved trees and has been taken far from its natural range because of its value as a landscape tree.

Pohutukawa is one of New Zealand's "Latitude 38" plants. This means that it is more-or-less restricted to north of this line, as are many other plants - kauri, puriri, taraire, toatoa, manawa (mangrove), tawari. The absolute southern limit is Tolaga Bay on the east coast, and Urenui on the west. The latter site is no longer present, and there is uncertainty just where the southernmost natural trees are found because pohutukawa have now been planted much further south. Because the southernmost trees are likely to be genetically adapted to more extreme conditions, the planting of correct stock is important. Project Crimson has taken on board the principle of maintaining "genetic integrity" so that the "genetic landscape" is not damaged by "genetic pollution". Pohutukawa vary throughout their range by forming several "regional provenances", although the boundaries between them need to to be more precisely located. (Project Crimson is funding a DNA study to determine provenance variation.) As a general rule, one should collect seed only from trees known to be natural, and seedlings should be planted back within the same district. Pohutukawa also hybridises with the Kermadec Island species (that people have brought to New Zealand) and with Northern rata. It is important that hybrids are not grown by mistake because they are not as likely to be as healthy as "pure" pohutukawa and may not flower as readily. Hybridization between pohutukawa and rata indicates that evolution, perhaps into new species, is still occurring.

TABLE 1. The Origin and Relationships of Pōhutukawa



In his book "Vegetation of New Zealand", Peter Wardle writes: *"Pohutukawa is superbly adapted to northern coastal cliffs ... The light seed can blow into any crevice, and the roots spread widely over rock faces, seeking fissures and pockets of soil. The canopy moulds to the wind and tolerates salt spray, and aerial roots descend from the trunks to provide further anchorage".* Wardle has also studied frost damage and found that pohutukawa cannot tolerate temperatures below zero. This accounts for the more northern and coastal distribution. On the other hand, the leaves are well protected against drought. When young, the leaves are coated with soft hairs. As the leaves age, the upper surface forms a tough, shiny coat of wax and the hairs rub off. The underside of the leaf, however, retains a thin coat of felt, as protection against excessive water loss. A former name for pohutukawa was *M. "tomentosa",* a reference to the hairy leaves.

The wood of pohutukawa is a dark-red-brown, and is hard and heavy. Its strength has enabled the spreading habit of the branches to evolve as a means of protection against the damaging effect of coastal wind and to spread the weight of the crown when growing over unstable rocky slopes. Graeme Platt (1991) describes the tall, upright growth of some pohutukawa at Rotorua Lakes, and perhaps these could represent the evolution of a new adaptive non-coastal form. Unlike its Pacific relatives, pohutukawa trees can be very old, perhaps even up to 1000 years old. To survive for this period of time in the rugged landscape of the New Zealand coast, every feature of the anatomy and physiology has to be extremely well adapted (Table 2).

2.2 The Pohutukawa Forest

The longevity of pohutukawa is surprising given its ecology as a coloniser of bare, coastal rock. Not only do few other trees grow in such places, but constant erosion, storms and regular drought create an unstable environment. This suggests that pohutukawa serves an ecological "purpose" on the front line. Pohutukawa establishes in a crevice and grows to dominate the physical environment for hundreds of years. Beneath it and behind it, the pohutukawa create a more gentle environment able to be colonised by a broader range of species. This quality is also a feature of some of its close relatives like the ohia lehua *(M. polymorpha)* of Hawaii: they colonise bare lava too, but they are relatively short-lived and die out to reveal an understorey of tree ferns and numerous other types of tree that they have enabled to grow by creating a soil on bare rock. Pohutukawa forest is New Zealand's most distinctive coastal forest type because it is often dominated by a single tree species. The spreading canopy forms a dense continuous layer that few other trees can penetrate. Rangitoto Island is a good example, where only a few rewarewa emerge. Pohutukawa forest is extremely rare nowadays; estimates by Gordon Hosking of the Forest Research Institute suggest that over 95% has been destroyed by farming, roading and urban development. It is seen at its best on offshore islands like the Poor Knights, the surface of which can be a "carpet" of crimson when all the trees are in flower together.

TABLE 2. Structural features which adapt Pōhutukawa to its environment

(1)	Habit	- massive spreading crown, wider than tall, to mould to coastal wind and slope and spread weight over unstable ground; canopy provides shelter to root systems on bare rock.
(2)	Root system	- roots arise from trunks and branches, capable of growing in air over surfaces, in search of crevices, pockets of soil and moisture (bad for drains).
(3)	Bark	- bark is rough and somewhat stringy, forming a medium-thick, dry covering capable of protecting the tree from drought, excellent for attachment of aerial roots of the same tree, or roots of epiphytes (epiphytes store water for both the epiphyte and the host).
(4)	Wood	- Dense and strong, as needed to withstand wind damage and drought; slow growing.
(5)	Leaves and shoots	- Dormant leaf and floral buds protected by bud scales against damage from cold, salt, abrasion. Leaves live for two years: can be replaced quickly if lost in a wind storm, but both young and mature can occur together in case of mishap to one or other. - Shoots bifurcate from opposite, upper buds, so that shoot systems spread widely. - Leaves tomentose (hairy) when young, but when mature, with a tough, shiny, cuticle on upper surface (against drought, salt, glare) and dense appressed felt remains underneath to minimise water loss from stomatal pores.
(6)	Flowers	- spectacular crimson colour and abundant nectar attract nectar-feeding birds; flowerbuds terminal (beyond leaves) so that flowers are conspicuous. - flowering more or less uniform on a single tree, but flowering time staggered over a population, ensuring through pollination, the maintenance of genetic diversity, needed in a colonising species.
(7)	Fruit and seed	- Capsule opens to enable wind dispersal of seed; seed small for easy dispersal and entrance into rock crevices; an ideal strategy for rock colonising, coastal plant.
(8)	Seedling	- Primary root supplemented by adventitious roots arising from the stems to facilitate creeping over and attachment to surfaces and entering crevices.

A canopy of pohutukawa creates a home for an understorey of shrubs and herbs. Typical plants associated with pohutukawa are houpara *(Pseudopanax lessonii),* kawakawa *(Macropiper excelsum),* hangehange *(Geniostoma rupestre),* karo *(Pittosporum crassifolium).* Often a dense growth of ground lilies occur (kakaha, *Astelia banksii),* some of which can be epiphytic on the pohutukawa branches themselves, especially kahakaha *(Collospermum hastatum).* In some places, ground species occur such as ferns (e.g. *Doodia media, Adiantum cunninghamii)* and native grasses *(Poa anceps* and in very dry places *Rhytidospermum* spp.). In general the flora associated with pohutukawa is not diverse, because the sites are usually very harsh, especially through dryness induced by rockiness and salt-laden wind. Pohutukawa often reaches further inland along coastal valleys. Here, and elsewhere where soil and moisture conditions allow, pohutukawa is associated with a range of coastal trees such as tawapou, kohekoke, purid, ngaio, karaka and titoki.

The pohutukawa also has an association with animals in the coastal forest ecosystem. One of the best mainland stands of pohutukawa forest is at Homunga Bay, near Waihi. When standing on the hillside overlooking the canopy I could hear the cries of the many kaka that had flown in from Tuhua (Mayor Island) offshore: they had come for the nectar from the pohutukawa flowers. On the Poor Knights Islands, geckos (Common, Pacific and Duvaucel's) are common among the flowers, high in the trees. The demise of mainland birds and lizards obscure a major ecological pattern: tui, bellbird (gone from Northland) and stitchbird (gone from mainland) have influenced pohutukawa ecology by encouraging flowering over a long time period (thus extending the nectar flow) and this variability has been maintained in many aspects of the tree, ensuring genetic forms capable of colonising new places. Shags and White-faced herons are particularly keen on nesting or roosting in pohutukawa because of the close relationship between these trees and the birds' feeding grounds - the sea and estuaries. Holes in pohutukawa trunks provide nesting sites for birds such as the tieke (saddleback), and the flakey bark provides excellent habitat for insects and spiders for this insectivore.

The species of *Metrosideros* are a major nectar source for pekapeka (short-tailed bats), as judged from the presence of pollen in the guano beneath their roosts (Daniel 1976). Brian Lloyd, a research worker on bats for the Department of Conservation, informed me that a number of pohutukawa trees are occupied by bat colonies on Little Barrier Island, where the large branches have split open or crevices are created by the growth of aerial roots. Although there is no record of bats being seen drinking nectar from pohutukawa, it seems highly likely that they do, and artificial, cage experiments confirm an interest (Lloyd, pers. comm.).

John Hutcheson from the Forest Research Institute has described the insects of pohutukawa, as follows: "There is a large community of insects associated with this distinctive coastal tree. Most of the species are endemic and many have evolved an exceedingly close relationship with their host. " Insects live on all plant parts - feeding on foliage (moths, weevils, beetles, flies and scale insects), the fruit, the bark and wood, and dead leaves and twigs that form the litter on the ground beneath (Hutcheson and Hosking 1991). The Little Barrier Island giant weta *(Deinacrida heterocantha)*

lives in crevices in the trunk of large pohutukawa by day, and climbs into the branches and canopy at night to feed (Alan Saunders, pers. comm.).

Frank Climo (a notable expert on forest litter snails) explains that the litter of pohutukawa is populated by hardy snails adapted to life just above the strand line (extreme high water mark): the rough mulch generates the first level of diversity that reaches higher levels further inland (Climo, pers. comm.).

3. POHUTUKAWA AND PEOPLE

It is not surprising that Maori regarded pohutukawa as one of the chiefly trees - rakaurangatira. It was the first tree to be seen along the coast, and the last to be farewelled upon departure. It provided wood for weapons, boat building and tools. Birds were attracted to its flowers and were snared. Canoes were tied up to its trunks at the water's edge. Bodies of the departed were laid to rest among its ancient boughs and roots. Its great age and gnarled form bespoke wisdom. Its tenacity on the northern cliffs fostered a sense of spiritual strength. Legends were borne from its flowers that link earth and sky, and the image common to many of the islands of Polynesia made Aotearoa feel like home.

Thus, there are pohutukawa that are venerated: "Te Reinga" at the northern cape is the leaving place for spirits departing for Hawaiki. "Tangi to korowhiti" was the mooring tree of the Tainui canoe and another tree at Kawhai "had under its arching roots a shallow cave where the tohunga used to sit" (Orbell, 1985) to conduct ceremonies related to warfare. "Nga-uri-apo" is a tapu burial tree on Tuhua (Mayor Island). One of the largest of all pohutukawa trees grows in the school grounds at Te Araroa, and is named "Te Waha-o-Rerekohu", being the name of a renowned pataka (food storehouse) that once existed near the tree, built by the chief Rerekohu (Burstall and Sale, 1984).

3.1 Pohutukawa in mythology and legend

The name "pohutukawa", comes mainly from the word "hutukawa" which is a head-dress of red feathers, an obvious reference to the crimson flowers covering the canopy. "Po-" has many meanings but can refer to the night, and in a related sense, to a place of departed spirits: the underworld. Pohutukawa is therefore a reference to the tree with the red adornment growing near the sea "Ko to hutukawa e to ana i to taha o to wai" (Grey 1928). The most famous example is Te Reinga, the tree at Muriwhenua (Lands End).

An interesting story of Arawa tradition, is that the chief, Tauninihi, upon approaching the land and seeing the red canopy of pohutukawa flowers, cast aside his own red feather head-dress thinking that better plumage would soon be available. The mistake was then discovered (Conly and Conly 1988). This story could be interpreted to mean that the new land, Aotearoa, had just as meaningful "adornments" as the homeland, and

thus pohutukawa can be seen as representing the process of identifying with a new home, while the old is left behind.

Whatever the explanation, the red flowers became part of the mythological origin of the new homeland, representing the blood of Tawhaki when he was killed and fell from the sky (Orbell 1985). Tawhaki is one of the mythical heros of Hawaiki who, by climbing to the sky (in some versions on a rata vine, which must therefore be a New Zealand version of the story because rata vines don't occur elsewhere in Polynesia) in search of certain of his ancestors established some of the key human principles of conduct (Orbell 1991). Fundamental was the very ability of humans to go from the earth to the sky (the physical to the spiritual), an ability which underlies all of Maori religion. Any event, place or thing associated with Tawhaki is thus very prestigious, and this no doubt underlies the great importance attached to pohutukawa, and its identification as one of the chiefly trees, rakaurangatira.

The incredible strength of the branches and beautiful form, along with the lovely flowers are inspirational to Pakeha too. They are grown throughout New Zealand along streets, in parks, and sometimes in gardens. They seed prolifically in Wellington, some hundreds of kilometres south of their natural range, and colonise footpaths, brick walls, road cuttings and the cracks and gutters of old buildings. They will destroy a wall, but protect a bank. The title "pohutukawa coast", at Coromandel, records the importance of this tree to people living on this scenic peninsula, or relaxing there for their holidays. It is a logo on products and for businesses. Pohutukawa honey is a significant industry. Countless artists and photographers have used the trees as subjects that capture the essense of the relationship of land and sea. Horticulturalists have selected forms and colours for landscaping use.

Graeme Platt, a native plant grower, has studied thousands of pohutukawa from horticultural perspectives - tree form, bark structure, branching density and pattern, leaf shape, size and colour, and flower density, colour, size, flowering season and duration. Graeme says "I look forward to the day when every pohutukawa offered for sale is a cutting grown from selected material." Of Project Crimson, Graeme adds "I believe this is one of the most worthwhile projects in New Zealand. I would like to see good selections planted, rather than more seedlings, and the coastline of New Zealand revegetated with quality material. " Of course the ecological consequences of planting stock predominantly selected from a narrow genetic base (creating an artificial "bottleneck") needs to be considered as well (Simpson 1993).

Pohutukawa wood is so hard that it is protected from the tunnelling of the teredo worm (a bivalve mollusc). This feature, and the natural shapes of pohutukawa branches led to an important use of the timber in ship building. Great demand was placed on the availability of pohutukawa timber for boat building in the late 19th Century in Auckland. It is not impossible to imagine that dense groves of pohutukawa, managed to form straight trunks, could be grown to serve as a future timber resource.

3.2 Conserving pohutukawa

In spite of all this reverence, pohutukawa is in severe trouble. While trees are numerous, naturally occurring groves are long gone or in decline. The pohutukawa forest is an ecosystem that very few people will ever see. Why is this?

Perhaps the fundamental reason is that pohutukawa is an island plant, unused to sharing its space with large animals. While it has great strength to withstand natural forces, it succumbs easily to animals and people. Its leaves are highly palatable to introduced possums, which have been expanding their numbers across the pohutukawa habitat. Its bark and leaves are easily burnt by fire, a characteristic of the family Myrtaceae which yields so many aromatic substances. The roots are readily disturbed by trampling whether by stock, people or cars. Most New Zealand trees are sensitive in this way, but pohutukawa is especially so, because the roots are adapted to spreading over the surface of rocky ground.

Pbhutukawa grows along the coastal fringe - the very place that New Zealanders and tourists like to be. Much of the coastline and many of the near-shore islands have been occupied for hundreds of years, for Maori gardens and Pakeha farms. The trees have been extensively cleared and the remaining trees prevented from regenerating by domestic and wild animals. Goats and coastal cliffs go hand in hand throughout New Zealand, at least in former times. Furthermore, the seed is tiny and lacks sufficient food reserve to create a seed bank in the soil, or to be able to push the young seedling up through the sward of pasture grasses (Wotherspoon 1992). For the most part the ecological processes that have operated for millions of years, crafting a finely adapted living edge to the land, have been disrupted. A prison of geriatric trees has replaced a dynamic ecosystem.

It was awareness of the plight of pohutukawa, and the great affection for them too, that led Gerry Brackenbury, of the Department of Conservation's Northland office and staff of New Zealand Forest Products (now Carter Holt Harvey) to the idea of sponsoring a community programme of conservation actions to help pohutukawa. "Project Crimson", now in its fourth year, was the result. More has been carried out over this time, in terms of planting, protecting, publicity and research, than ever before. Major possum poisoning and trapping campaigns have been undertaken, numerous zones of pohutukawa have been fenced, and many young trees planted. The detailed requirements of restoration ecology for pohutukawa are gradually being identified. Schools, local councils, conservation groups, government agencies, farmers, service organisations, and even prisons, have been involved. Project Crimson has been a wonderful example of community support for conservation and has been a particularly good example of the range of actions needed to save a plant species. It is also a good example of the value of sponsorship to conservation generally and the creation of a community-based programme, in particular.

4. CONCLUSION

The biodiversity approach identifies and brings together the many strands of action required to save a species and its ecosystem. It identifies the processes that underlie daily life, processes that started long ago in the biogeographical "Hawaiki" that became New Zealand. These processes have been encapsulated by human reverence, yet disrupted by lack of awareness. Biodiversity conservation translates basically into a community action to restore the feeling of belonging to the land, to restore health in the landscape, its spirit, its mauri, its ecology. Pohutukawa is its ecology, and our management of it, the mauri.

5. ACKNOWLEDGEMENTS

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For their assistance with the production of the Appendix "How Pohutukawa Help Others" I would also like to thank Pam Crisp, Sonia Frimmel and Raewyn Kilford, Head Office, DoC.

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The ancestors of pohutukawa and its relatives, rata, came from the tropical islands of the Pacific. Pohutukawa once formed forests around our northern coast. Today the forests are mostly gone and scattered old trees struggle to survive.

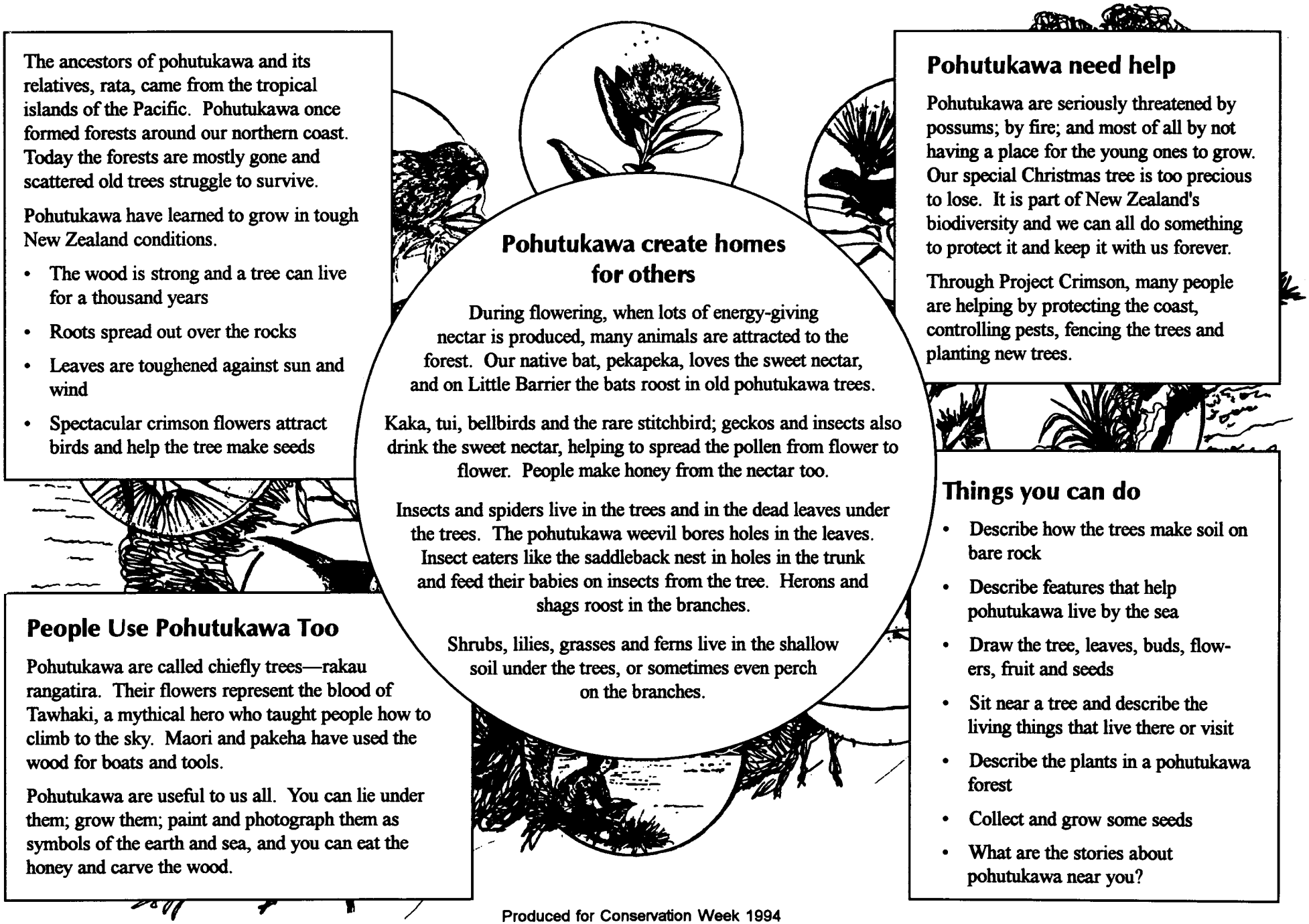
Pohutukawa have learned to grow in tough New Zealand conditions.

- The wood is strong and a tree can live for a thousand years
- Roots spread out over the rocks
- Leaves are toughened against sun and wind
- Spectacular crimson flowers attract birds and help the tree make seeds

People Use Pohutukawa Too

Pohutukawa are called chiefly trees—rakau rangatira. Their flowers represent the blood of Tawhaki, a mythical hero who taught people how to climb to the sky. Maori and pakeha have used the wood for boats and tools.

Pohutukawa are useful to us all. You can lie under them; grow them; paint and photograph them as symbols of the earth and sea, and you can eat the honey and carve the wood.



Pohutukawa create homes for others

During flowering, when lots of energy-giving nectar is produced, many animals are attracted to the forest. Our native bat, pekapeka, loves the sweet nectar, and on Little Barrier the bats roost in old pohutukawa trees.

Kaka, tui, bellbirds and the rare stitchbird; geckos and insects also drink the sweet nectar, helping to spread the pollen from flower to flower. People make honey from the nectar too.

Insects and spiders live in the trees and in the dead leaves under the trees. The pohutukawa weevil bores holes in the leaves. Insect eaters like the saddleback nest in holes in the trunk and feed their babies on insects from the tree. Herons and shags roost in the branches.

Shrubs, lilies, grasses and ferns live in the shallow soil under the trees, or sometimes even perch on the branches.

Pohutukawa need help

Pohutukawa are seriously threatened by possums; by fire; and most of all by not having a place for the young ones to grow. Our special Christmas tree is too precious to lose. It is part of New Zealand's biodiversity and we can all do something to protect it and keep it with us forever.

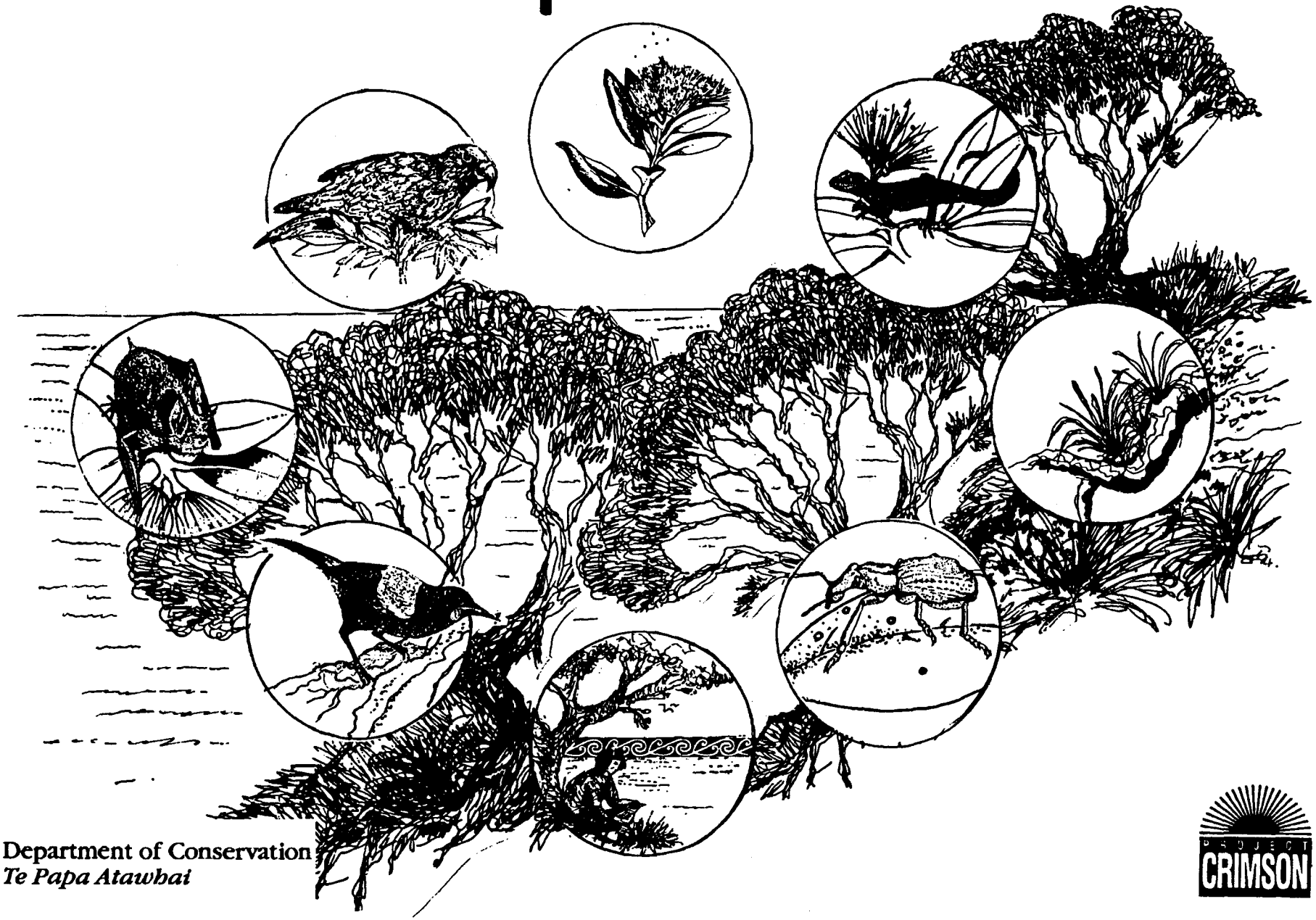
Through Project Crimson, many people are helping by protecting the coast, controlling pests, fencing the trees and planting new trees.

Things you can do

- Describe how the trees make soil on bare rock
- Describe features that help pohutukawa live by the sea
- Draw the tree, leaves, buds, flowers, fruit and seeds
- Sit near a tree and describe the living things that live there or visit
- Describe the plants in a pohutukawa forest
- Collect and grow some seeds
- What are the stories about pohutukawa near you?

Produced for Conservation Week 1994

How Pohutukawa Help Others



Department of Conservation
Te Papa Atawhai

PROJECT CRIMSON