



Northern Rata (*Metrosideros robusta*) in Wellington Conservancy

Current Status and Future Management

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Northern rata (*Metrosideros robusta*) in Wellington Conservancy

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Cover image: Northern rata typically has wide spreading branches with billowy layers of foliage.
Photo: Lisette Collins.

Executive summary

The status of northern rata (*Metrosideros robusta* A. Cunn) in the Wellington Conservancy (in the wild and in cultivation) is described in this report. The current and former range of the species is mapped. Objectives for conservation of northern rata in the Wellington Conservancy are to ensure the continued survival of the species throughout its current range and to restore it to sites where it was formerly known to occur.

Northern rata is widely distributed throughout the Tararua and Rimutaka Ranges as well as in Wellington and Cook Strait Ecological Districts. It is very uncommon in the Eastern Wairarapa hill country and in Aorangi Forest Park. There are 329 records of occurrences of the species in Wellington Conservancy (128 in the last ten years) and a database of those records is included in this report. That baseline information will be used to monitor future changes in the distribution of the species.

Current and potential projects for protection and restoration of northern rata in the conservancy are described. A northern rata field guide information sheet is provided. Plant nurseries are listed from which it is possible to purchase locally sourced northern rata.

Some recommended actions for protection and species recovery of Northern rata are described and include:

- Legal and physical protection of sites supporting northern rata (such as potential seed sources) throughout the species' range.
- Carry out site visits to confirm continued presence of northern rata at places where the species was recorded more than ten years ago.
- Undertake regular surveys in Wellington Conservancy to determine the condition of northern rata populations and the extent of impacts of possums and other threats.
- Record new occurrences of northern rata using a standard species record sheet.
- Carry out research to determine more accurately the former distribution of northern rata.
- Continue with projects to restore northern rata to islands in Wellington Conservancy and develop more restoration projects at other sites and, where possible, involve the public in those projects.
- Collect information about the structure and species composition of forest communities that support northern rata in order to characterise its associated plant and animal community.
- Raise public awareness of Project Crimson in Wellington Conservancy with a focus on northern rata protection and species recovery.

It is intended that this report be used by applicants to the Project Crimson Trust as a guide to priorities for northern rata conservation in Wellington Conservancy. Production of this report was made possible with funding by Project Crimson Trust.

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1. Introduction

1.1 OBJECTIVES

The objectives of northern rata (*Metrosideros robusta* A. Cunn)¹ conservation in the Wellington Conservancy are to:

- ensure the continued survival of the species throughout its current range.
- restore it to sites where it is known to have formerly occurred .

This report will enable people to gain a greater understanding of the status and distribution of the species in the Wellington Conservancy and will be used in the protection and recovery of the species.

1.2 AIM OF THE INVESTIGATION

The principle aim of this investigation was to complete an assessment of the status and management requirements of northern rata in Wellington Conservancy to determine what actions are required to ensure its continued existence throughout its natural range. To achieve that goal the following objectives will be met:

- The former and current range of the species in the Wellington Conservancy will be mapped (using database information, plant lists, forest plot data);
- The extent to which individuals and populations of the plant are protected (legally and/or physically) will be determined;
- Priority areas for protection and restoration efforts of northern rata will be identified;
- The habitat and associated plant and animal communities of northern rata will be described;
- Actions required to protect northern rata in the Wellington Conservancy will be identified;

This report will provide directions for future northern rata protection and restoration initiatives in Wellington Conservancy.

1.3 NORTHERN RATA

Northern rata in New Zealand is distributed in forests from North Cape southwards to Marlborough, Nelson and Westland. In Wellington Conservancy (see Figure 1), it is an important component of the flora. It grows in mixed coastal, lowland and montane forest communities, at altitudes of up to 700 metres (Allan 1961, Knightbridge pers. comm.) and typically grows in hardwood, podocarp and beech forests and in association with indigenous plants such as rimu, totara, tawa, hinau, rewarewa, kamahi and mahoe. Zotov described northern rata as “the killer” (Zotov 1948) and Dawson classified the plant as a “strangling epiphyte” (Dawson 1967). According to Zotov *et al* (1938), rata is the dominant of the climax plant associations in the wetter areas of the Tararua ranges. Indigenous animals often

¹ '*Metrosideros robusta* A. Cunn' hereafter referred to as northern rata.

found in association with rata communities include invertebrates, lizards, native bats and nectivorous birds such as tui, bellbird, and kaka.

Northern rata trees grow up to 25 metres or more tall with a trunk of up to 2 metres in diameter (Allan, 1961). The tree typically begins as an epiphyte in the high light environment of the forest canopy, but also terrestrially following a disturbance (Knightbridge, 1993). It will not grow in conditions that are too dry for epiphytes (Zotov *et al* 1938). The epiphyte establishes itself in a host tree and sends down roots which grow a supporting trunk (see Figure 2). Hence the trunk is not a true stem but is composed of a number of more or less fused roots (Zotov *et al.*1938). Epiphytic rata rarely grow larger once they have grown to the same size as their host (Beaven, 1998). The host can be anyone of a number of different species although the foster tree of epiphytic rata is commonly rimu. Zotov (1948) stated that "On the Tararuas, the foster tree is usually rimu." An uncommon host of

FIGURE 1. LOCATION AND SPATIAL EXTENT OF WELLINGTON CONSERVANCY IN THE LOWER NORTH ISLAND, NEW ZEALAND.

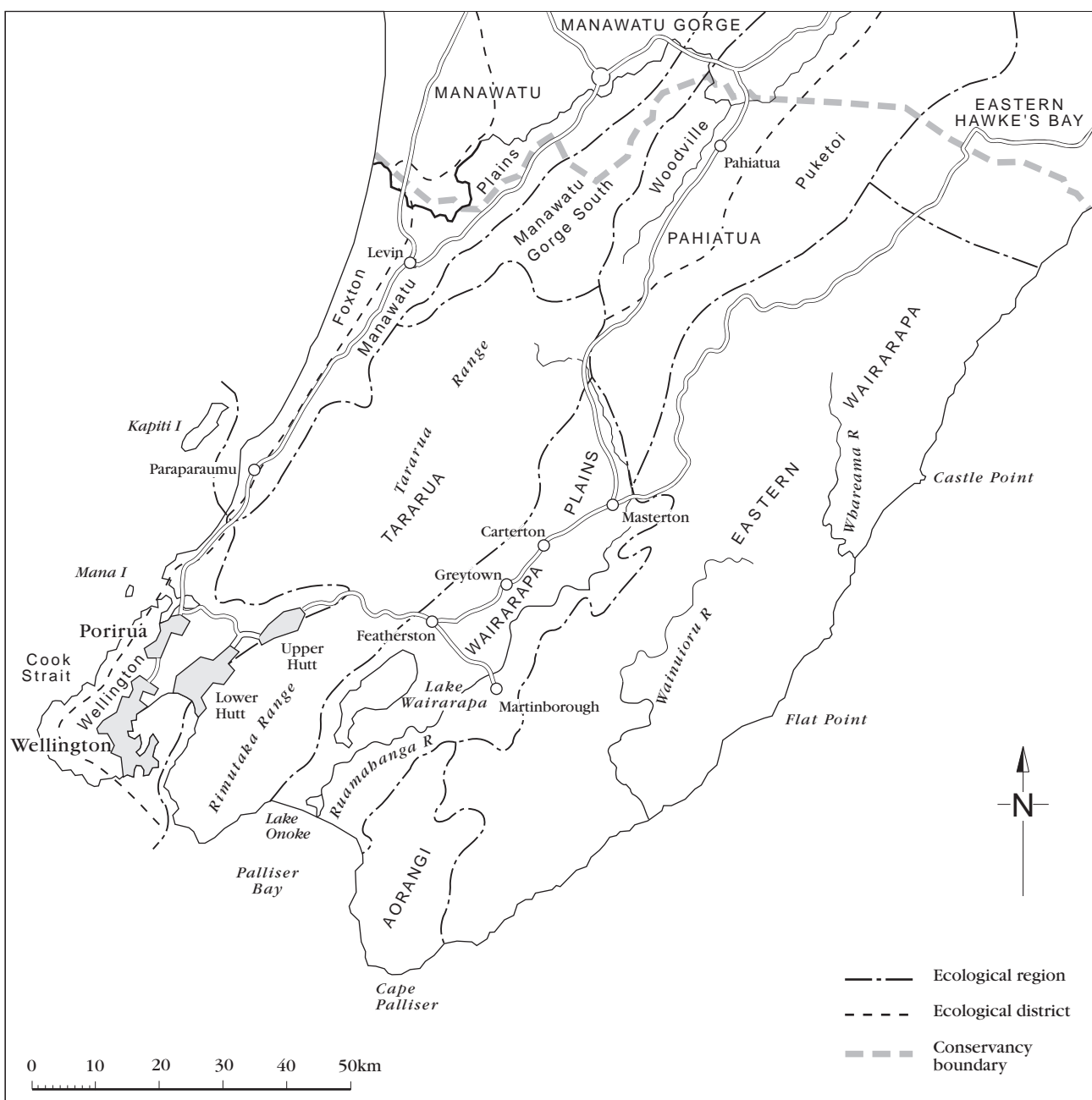


Figure 2: Northern rata (right) establishes itself around the rimu host tree. Note the reddish, peeling bark. Photo Phil Knightbridge.



Figure 3: The indented tips of the leaves are a characteristic of northern rata. Photo John E. Braggins.

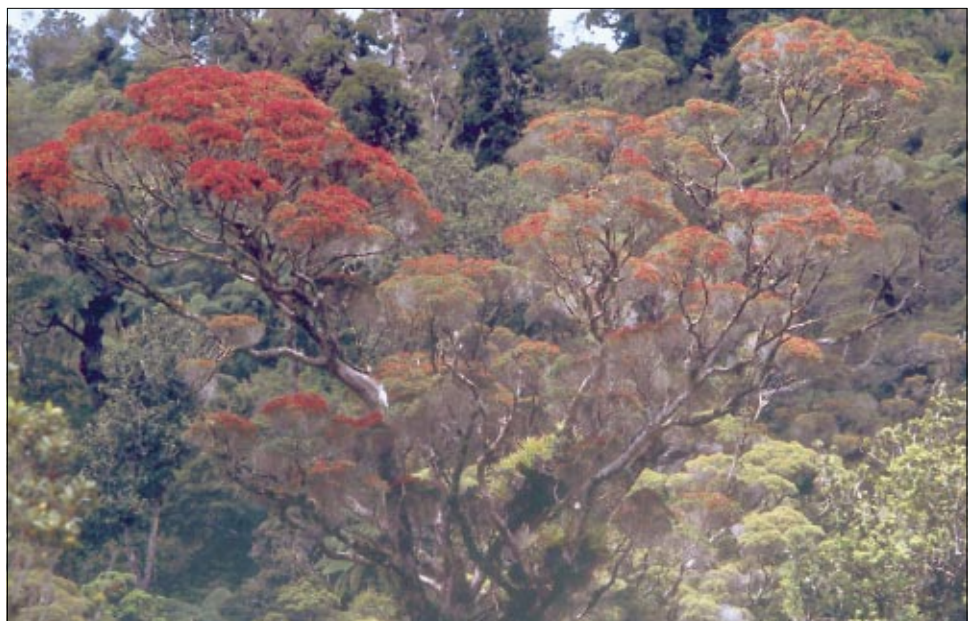


northern rata in the Wellington Conservancy is *Cordyline australis* (cabbage tree) which supports epiphytic rata at one site in the Wairarapa (Philip Simpson pers. comm.)

The wood of northern rata is a reddish brown (Figure 2) with a peeling, papery bark and a twisted grain due to the nature of its growth (Newhook & Power, 1982). The small leaves are dark green and leathery. They have an indented tip, a feature which distinguishes them from the leaves of southern rata (see Figure 3). Northern rata produces small wind-dispersed seed in Autumn (Knightbridge, 1993).

Northern rata, with its high nectar output, is important in forest ecosystems as a food source for indigenous honey-eating birds and insects. In parts of New Zealand, it is a major component of the forest canopy, protects understorey vegetation from exposure, and provides a supportive role as host to a range of epiphytes. It has also been suggested that the water holding capacity of the plant ensures a stable forest hydrology (Simpson, 1996b). As one of New Zealand's tallest flowering trees it is widely valued for its aesthetic beauty, with its brilliant scarlet display in the canopy of the native forest (Figure 4). Rata also has cultural significance to tangata whenua and has various traditional uses. For example the inner bark has been steeped in hot water and the liquid rubbed into rheumatic joints.

Figure 4: Northern rata typically has wide spreading branches with billowy layers of foliage. Photo Lisette Collins.

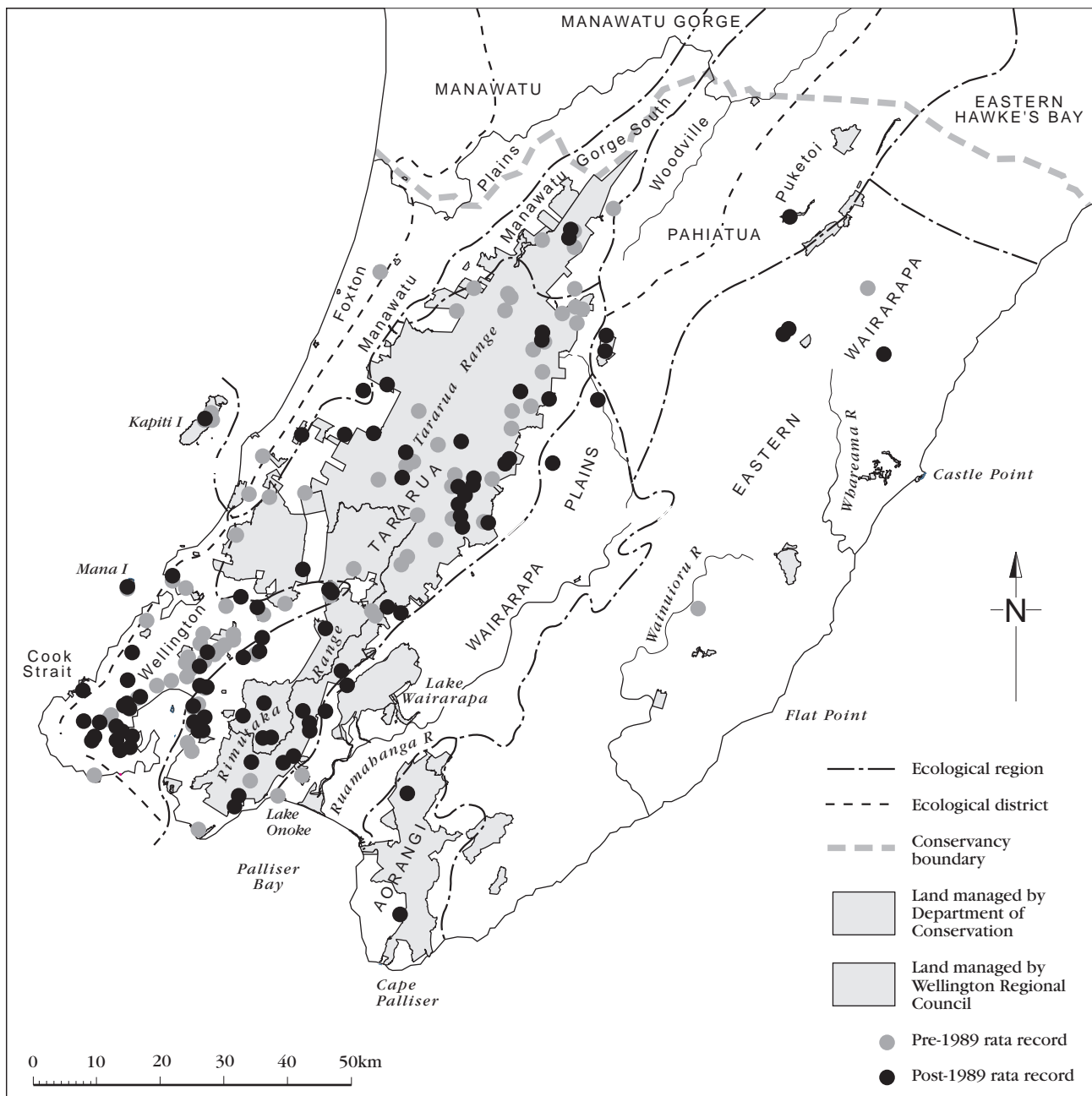


1.4 CONSERVATION STATUS OF NORTHERN RATA

1.4.1 Status of plant in the wild

Northern rata is still a major component of some forest types in Wellington Conservancy. There are 329 occurrence records of the species in the conservancy, of which 128 were made within the last 10 years (see Appendix 3). Some of those records are repeat occurrence records for the same site at different times. For example, there are seven repeat records of northern rata occurrences on Kapiti Island, the first being made by Leonard Cockayne in 1907. The species is widely distributed throughout the Tararua and Rimutaka ranges as well as in the Wellington and Cook Strait Ecological Districts (see Figure 5). In contrast, the species is very uncommon in the Eastern Wairarapa hill country and in Aorangi Forest Park. On Kapiti Island, there has been major regeneration of northern rata since the eradication of possums.

FIGURE 5. CURRENT AND FORMER DISTRIBUTION OF NORTHERN RATA IN WELLINGTON CONSERVANCY.



In the lower North Island, northern rata is thought to have undergone a large contraction in its natural distribution. There are now areas where the plant can no longer be found where it is known to have formerly occurred. Elsewhere, it is thought that the abundance of northern rata has been considerably reduced during the past two hundred years due to its susceptibility to pests and other threats. Possums are a threat to northern rata survival in Wellington Conservancy as they eat leaves, buds, flowers and young shoots of the tree. They can kill a mature tree within two years and in certain areas, such as the Orongorongo Valley and in parts of the Eastbourne hills, have been a contributing factor in dieback of northern rata populations (see Figure 6). Other factors may also play a role in the local decline of northern rata populations such as: severe drought; and synchronous senescence



Figure 6: Possum damage is probably a contributing factor to the dieback of northern rata in Eastbourne hills. Photo Phil Knightbridge.

of cohorts of the species. Severe browsing by possums and consumption of seedlings by feral ungulates or stock prevents regeneration which results in an ageing population. Rata hybridises freely with the related terrestrial coastal species pohutukawa (*Metrosideros excelsa*) which could threaten populations of northern rata (Knightbridge, 1993). The decline in abundance and distribution of native pollinators of northern rata, such as lizards and nectar-feeding birds, may also threaten the survival of the species in some places (Burns, 1996). Other potential threats include forest clearance for roads, building construction, fire, cutting for firewood, and natural disturbances such as landslides, flooding and windthrow.

Northern rata is not listed as a nationally threatened species by the New Zealand Threatened Plant Committee (see Cameron *et al.* 1995). The Department of Conservation does not consider northern rata a high conservation priority (see Empson & Sawyer 1996, Sawyer *et al.* 1998). Nonetheless, it is regarded as a valuable component of the forest ecosystem and is an integral representative of the regional flora. Throughout Wellington Conservancy there are places where the Department of Conservation considers that northern rata is threatened and conservation measures are required to ensure its survival.

1.4.2 Status of the plant *ex-situ*

There are some plant nurseries in Wellington Conservancy and elsewhere in New Zealand that grow northern rata of local provenance (see Table 1). Further information about plant nurseries that grow northern rata from a variety of sources is provided in Appendix 2.

TABLE 1: *EX-SITU* STATUS OF NORTHERN RATA SOURCED FROM WELLINGTON CONSERVANCY (SEE ALSO APPENDIX 2)

NURSERY	PROVENANCE	AVAILABLE FOR SALE
Terra Firma Ltd, Taupo Native Plant Nursery	Wainuiomata, Manawatu, Tararua Ranges (large quantities available)	Yes
Plantwise Nursery	Tararua Ranges	Yes
Wairarapa Nature Nursery	Tararua Ranges	Yes
Karori Wildlife Sanctuary	Scattered trees in Otari and Karori, Wellington City	No
Mana Island	Mana Island	No

1.5 CURRENT PROJECTS FOR NORTHERN RATA PROTECTION AND RESTORATION IN WELLINGTON CONSERVANCY

This is a preliminary list of projects for northern rata conservation. Other projects may be underway or are being developed.

1. **Native Forest Restoration Trust**

Protection of the Brandon Block (between the Rimutaka and Tararua ranges) which supports northern rata.

2. **Forest and Bird (Lower Hutt) 'Matiu/Somes Island Working Party'**

The objective of this project is to restore northern rata to where it is known to have originally occurred on Matiu/Somes Island. Planting is to be undertaken on the eastern side of the island, in order to prevent hybridisation with the existing pohutukawa (*Metrosideros excelsa*) which grows on the western side. Twelve people are currently involved in the cultivation of seedlings sourced from three trees in the Catchpool area. The first batch of seeds were planted in Autumn and took 17 days to germinate. Seeds sourced from one tree were consistently superior in germination and growth. The second batch of seeds were refrigerated and planted in September. These germinated very well and the seedlings demonstrated a much quicker growth rate at this time of year. Cuttings (230) were also taken from the Wainuiomata Ridge. They had a very low strike rate. However of those 25-30 plants that grew, all have flourished.

3. **Karori Wildlife Sanctuary Trust**

Northern rata is on the priority list for restoration and protection at the sanctuary and in the Wellington area itself. The sanctuary is currently protecting a large terrestrial northern rata (circa 1850), using traps and bait stations. Three juvenile epiphytic rata are also being protected against possum browsing. Potential projects for the Karori Sanctuary include experiments on how to cultivate seedlings such as: the creation of light gaps; use of artificial epiphytes; hollowing out of pine trees to plant epiphytes; and the placement of sphagnum and peat in the canopy to encourage epiphytes. The Trust plans to eradicate mammalian pests, including possums, which will provide better protection for existing trees and improve potential for restoration of a self-sustaining population in the sanctuary.

Between 500-1000 seedlings, which were originally sourced from trees in Wellington city, are currently being cultivated at the Karori Sanctuary. These are intended to be grown within the sanctuary and will be ready for planting out in 2001.

4. **Mana Island: Department of Conservation**

Currently, 40-50 two-year-old northern rata plants are being grown on Mana Island as part of a long term re-vegetation project. It is intended that the same number of plants will be planted each year from now onwards. The seeds have been sourced from an existing tree on Mana and propagated by Terra Firma Nursey in Taupo. Cuttings were partly successful. Those grown at Kaitoke Prison have not proved to be as vigorous as seed from the parent tree.

5. Otari Native Botanic Garden

The Otari garden currently has 15 or more mature northern rata trees. Active possum control is undertaken to protect these trees. This involves regular monitoring and surveys to assess possum numbers, together with the successful use of bait stations.

2. Methods

Information about the former and current distribution of northern rata in Wellington Conservancy was collated into one computer database.

The Department of Conservation in Wellington Conservancy has established a database on which is stored information about the distribution in the lower North Island of occurrences of many indigenous plant species including northern rata. That information has been obtained from:

- Herbaria nation-wide (AK, WELT, WELTU, NZFRI and CHR);
- Plant checklists (see Sawyer 1998);
- Completed species record sheets (see Appendix 4) for northern rata occurrences;
- Forest plot data (see Department of Conservation 1975, 1985);
- Reports and publications such as the bulletin of the Wellington Botanical Society;
- Other databases holding distribution information about northern rata (e.g., local authority heritage tree databases)

Meetings were then held with various people to discuss conservation of northern rata. Department of Conservation staff, members of the Royal Forest and Bird Protection Society and the Wellington Botanical Society were also consulted.

Pictures of northern rata were obtained from a variety of sources (see Figures 2, 3, 4 and 6). A field guide sheet was prepared using information stored on the Wellington Conservancy plant database (see Appendix 1). A map was prepared of the former and current distribution of northern rata in Wellington Conservancy (see Figure 5).

3. Results

A map which illustrates the current and former distribution of northern rata (see Figure 5) was prepared. A lack of records for some areas and the fact that some potential sources of information have not been used (such as pollen) may mean that the accuracy of the maps can be improved. Further research may improve our knowledge of the former distribution of the plant in the conservancy.

Five current projects for the species in Wellington Conservancy were identified (see Section 1.4). Three hundred and twenty nine occurrences of northern rata were recorded and stored on the Department of Conservation database (see Appendix 3). Some of those are repeat occurrence records for the same site at different times so the actual number of sites where northern rata has been recorded is less than three hundred. A regional network of individuals and agencies involved in the conservation of northern rata was identified (see Appendix 2). Five nurseries with plant stock available for sale were identified and listed (see Appendix 2). A field guide information sheet about northern rata was produced for distribution to the public (see Appendix 1).

4. Discussion

Northern rata is subject to varying degrees of legal and physical protection throughout Wellington Conservancy. The following is a description of the degree to which northern rata is found in Protected Natural Areas administered by the Department of Conservation or other agencies within each of the 12 Ecological Districts in Wellington Conservancy.

Aorangi

There are 2 - 4 known records of the species, all of which are legally protected on lands administered by the Department of Conservation. No management is undertaken at those sites to protect the trees from possum browse or other threats.

Cook Strait

Northern rata populations on Kapiti Island (Nature Reserve) and Mana Island (Scientific Reserve) are legally and physically protected by the Department of Conservation. It is not known whether the one known mainland record of the species is protected.

Eastern Wairarapa

Two sites are known to be legally protected (Rocky Hills Taipos and in the vicinity of Mount Rewa and Mount Meridith). The degree of protection for the remaining 4 sites is unknown.

Eastern Hawkes Bay

No records of the species.

Foxton

Northern rata occurs naturally at one site (Papaitonga Scenic Reserve) which is legally protected by the Department of Conservation.

Manawatu Gorge South

The majority of northern rata in this district are legally protected in Tararua Forest Park.

Manawatu Plains

No records of the species.

Puketoi

The trees in Mount Bruce Scenic Reserve are legally protected. Physical protection of the species at this site is limited to some wild animal control. Northern rata are also legally protected at Waewaepa Scenic Reserve.

Tararua

The majority of northern rata are legally protected in Tararua Forest Park. Much of that area is subject to wild animal control (possum and goats) but none of the trees are banded. Northern rata is also protected in the Rimutaka Forest Park. On lands administered by Hutt City Council in the Eastbourne Hills northern rata is legally protected and some individual trees are banded and there is some possum control. Populations of northern rata are also legally protected on lands administered by the Wellington Regional Council in the upper catchments of the Wainuiomata River and the Orongorongo River.

Wairarapa Plains

The species is uncommon. The trees in the Western Lake Shore Scenic Reserve are legally protected but no physical protection work is undertaken. Small pockets of northern rata are found in the privately owned Dunvegan Forest Remnants and in the Waingawa River Bush. Neither of those sites are legally protected and there is no fencing or banding of the rata populations.

Wellington

Northern rata are both legally and physically protected in Otari Native Botanic Garden, Wellington Botanic Garden, Karori Wildlife Sanctuary, Belmont Regional Park and those cited on the Wellington City Council proposed heritage tree list. Elsewhere the species is poorly protected.

Woodville

Northern rata is legally protected at Mount Bruce National Wildlife Centre.

5. Management recommendations for northern rata

Some general management actions recommended for northern rata in Wellington Conservancy include: protection of the plant at sites where it occurs; restoration of the plant to sites where it formerly occurred; and enhancement planting at sites where it occurs.

5.1 PROTECTION OF NORTHERN RATA

Protection of the species may involve the following:

- protection of forest remnants that support northern rata;
- protection of forests that formerly contained northern rata to which it can be restored;
- protection of individual trees as:
 - seed sources;
 - historically significant remnants of the former forest cover.

Protection to prevent damage to or loss of northern rata trees may be achieved by legal measures (such as covenants) and/or by physical intervention (such as fences or wild animal control operations).

5.1.1 Legal Protection

There are a number of mechanisms by which legal protection of northern rata can be achieved. The following description of some means of protection available to private landowners, is taken from the Department of Conservation brochure *Voluntary Protection of Nature on Private Property* (Department of Conservation, 1998) prepared in collaboration with Local Government New Zealand, Nature Heritage Fund, Nga Whenua Rahui, Federated Farmers of New Zealand (Inc) and the Queen Elizabeth the Second National Trust.

1. *Territorial Authorities*

Sites of significant vegetation can be registered in schedules of district plans and accorded appropriate protection. Sites can be leased or purchased by the local authorities and financial incentives such as rates relief are sometimes available for voluntary protection measures.

2. *Covenants*

A covenant is a legal agreement which is either registered against the title of the land or to the owner. They are among the most common forms of land protection used by private landowners. Normally, covenants are in perpetuity but may also be for specific periods. The four main ways of covenanting are: conservation covenants with the Department of Conservation or other authorised bodies such as local government; open space covenants with the Queen Elizabeth the Second National Trust (QEII); Nga Whenua Rahui Kawenata between the Minister of Conservation and the Maori landowners; heritage covenants with the NZ Historic Places Trust.

3. *Protected private land agreements*
These are organised by the Department of Conservation to protect land under the Reserves Act, and are registered on the title of the property. They provide a similar level of protection as covenants.
4. *Management Agreements*
These are legal agreements between the Department of Conservation and landowners, to manage an area according to an agreed set of conservation objectives. They are not registered against the title.

5.1.2 **Physical Protection**

The chosen method of physical protection for northern rata will depend on the particular threat identified for the site. Threats from feral ungulates and stock browsing can be minimised by fencing forests that support northern rata. There are a variety of methods to minimise possum damage to northern rata and these are set out as follows:

1. *Banding*
This is a useful method for isolated trees and in built up areas and is relatively low maintenance. In areas with surrounding canopy trees, all must be banded or pruned to prevent possums from jumping between the trees. The banding technique involves a sheet of foil being secured around the trunk of the tree to prevent access to possums. The bands must be tight enough to prevent the animals crawling underneath and must be flat without a lip to prevent the creation of a step for the possum (Jones, 1993). There are strong advantages to using rivets to secure the bands as they cannot be used for footholds and can be adjusted to cater for growth in the young tree (ibid.).
2. *Ground control*
Methods of ground control are useful where the size of the area and the nature of the terrain are suitable, because of the need for ease of access. Quick and humane methods of possum trapping include 'soft catch' leg-hold traps, and 'Timms' traps which are safe to use in urban areas. Alternatively, poison can be placed in 'bait stations' which are plastic containers attached to tree-trunks above ground level, into which poison bait is placed and maintained (Simpson, 1996a). Poisons such as Talon, or Feratox (encapsulated cyanide) can be used successfully, although possums have been known to detect cyanide and become 'bait shy'. Current 'best practice' recommends that a sequence of baits and toxins be used to avoid problems such as bait shyness, and the potential build up of toxins in the environment (Knightbridge, 1996). For more information on best practice see Thomas *et al.* (1996).
3. *Aerial poisoning*
This is the best known method for large scale possum control, particularly in difficult terrain and in dense forest. Currently, aerial poisoning relies on 1080 (sodium monofluoroacetate) applied with a bait such as carrots or cereal pellets. Extensive research has shown that 1080 breaks down easily into the receiving environment and thus places little threat of pollution or damage to wildlife populations (Haydock & Eason, 1997). Birds and most insects are less susceptible than mammals but potential risks can be reduced if the chemical is used correctly. However, livestock and domestic animals are at threat to 1080, and proper precautions should be taken.

5.2 RESTORATION OF NORTHERN RATA

The management goal of a restoration project for northern rata must be clear from the outset and will depend on the specific needs of the site.

A typical goal for a northern rata restoration project is to restore northern rata to a particular site (where it was previously known to occur), to a similar state as existed before the introduction of pests or other threats (Knightbridge, 1993). This would require the collation of information about the former structure and species composition of the forest to characterise the forest community.

Prior to commencing any restoration project the threats to northern rata survival must be addressed. For example, possum control may have to be undertaken. An integrated approach to restoration is necessary in areas where possum browsing is a concern. Natural regeneration together with protection controls may be suitable, although the rate of replacement can be slow. For instance, it could take a minimum of 45 years, for a descending root of a northern rata seedling 20m up in the canopy, to reach the forest floor (Knightbridge, 1993). Due to the time constraints of most restoration projects, a more active, interventionist approach may be better suited. Options such as scattering seed in appropriate sites, or a planned replanting programme to replace dead or dying trees may be a much quicker way of restoring northern rata to a site. Restoration projects may seek to restore northern rata habitat and/or its associated plant and animal community, in which case that would involve planting associated species and introduction of fauna.

5.2.1 Source of plants for restoration

Growing seedlings is preferable to cuttings because of their genetic variability and ease of propagation (Knightbridge, 1993). Local sources of northern rata seedlings were identified in Table 1. Alternatively, seedlings from roadside banks can be useful for immediate planting in restoration work but their use should only be considered if their survival is threatened by road maintenance and thus will not survive there (Knightbridge, 1993). Phillip Simpson (1993) recommends the following guidelines for rata seed collection.

- Choose accessible and naturally growing trees which have flowered very well, or are reliably known for their flowering potential, to ensure a high rate of seed production.
- Collect fresh, healthy seed in ripe or slightly unripe, unopened capsules. This reduces the capacity for dormancy and maximises the opportunity for good germination. Seeds must be collected before the capsules open, which occurs between April and June. Collect seed from several branch systems of each tree to avoid genetic peculiarities and to maximise fertility.
- If possible, seeds should be collected from several different trees in each location, to cover the range of natural variation. These trees should be chosen from a range of habitats within a single geographical population to cover the range of ecological potential.

5.2.2 Propagation and Cultivation

- Plant seeds close to the surface in containers so that they are visible, and keep in the shade.
- Seedlings can be transplanted after 1-2 years when they are approximately 50cm tall. This should be done in Autumn or Winter to give them time to prepare for the growing season.

- Establishment times could be reduced if seedlings grown in nurseries are encouraged to establish descending roots. This has been achieved in glasshouse trials, but has not been field tested by removing the plastic tubes and planting the seedlings (Knightbridge, 1993).
- Seedlings can be planted in the ground or on logs, in 'light gaps' in the forest. Seeds can also be scattered in large disturbed areas (Knightbridge 1993). Alternatively, seedlings can be grafted as epiphytes on existing trees. This latter technique can be achieved by placing the plant in a wire mesh basket lined with a well draining substrate such as scoria and strapping it to the primary branch forks or horizontal branches of a host tree (Knightbridge 1993). Sphagnum is not recommended as a lining for the basket as it was found to inhibit root growth (Phil Knightbridge pers. comm.). This basket technique may not be necessary if the seedling has well established descending roots. It is important to know the typical host trees for northern rata in the area before transplanting, and not to graft onto species which are not known to be hosts (Knightbridge, 1993). The host tree should be in a high light environment and relatively close to the ground to minimise establishment times (Knightbridge, 1993).
- Grafted epiphytes need regular inspections until they are established. Terrestrially planted seedlings need little to no aftercare. Weeding will be necessary only if planted in grasslands areas.
- Seedlings are easily grown and can therefore be produced cheaply. The major cost of a revegetation project would be the transportation of plants to restoration sites (Knightbridge, 1993).

6. Recommendations for Project Crimson in Wellington Conservancy

The following recommendations are priority actions which are required for the protection and species recovery of northern rata in Wellington Conservancy.

- Legal and physical protection of specific sites supporting northern rata in all Ecological Districts.
- Identification and protection of potential seed sources of northern rata throughout the range of the species.
- Carry out site visits to confirm presence of northern rata at places where the species was recorded more than ten years ago.
- Continue to record occurrences of northern rata using standard species record sheets (see Appendix 4) and encourage other people to make known their observations of the plant. Records of the plant should be stored on the Department of Conservation's plant database in Wellington Conservancy.
- Undertake surveys to determine the condition of northern rata populations and the extent of the impact of possums and other threats. A good example of such a survey is included in the Department of Conservation publication, *Northern Te Urewera Ecosystem Restoration Project* (Beaven, 1998). Such a survey should involve site inspections of a numbers of northern rata populations throughout its range using a standard survey methodology.
- Develop a standard survey methodology for inspecting northern rata populations.
- Research to determine more accurately the former distribution of northern rata (by studying pollen deposits and locating more records of current and historic occurrences the plant). Information about the distribution of the plant should be stored on the Department of Conservation's plant database in Wellington Conservancy.
- Continue with projects to restore northern rata to Matiu/Somes Island and Mana Island and develop new restoration projects throughout the species' range.
- Collect information about the structure and species composition of forest communities that support northern rata in order to characterise its associated plant and animal community. Also collect information about tree species that are host to northern rata.
- Promote northern rata protection and species recovery in local authority District Plans. The use of northern rata of local provenance should be encouraged in planting schemes of local authorities, schools and other organisations involved in conservation of the species.
- Raise public awareness of Project Crimson with a focus on northern rata protection and species recovery. This will be achieved by dissemination of the field guide sheet (Appendix 1) and this report.

- Involve the public in conservation of northern rata by establishing restoration projects in highly visible and accessible areas such as roadside reserves and parks regularly visited by the public or by introducing northern rata to urban areas.
- Establish a northern rata work programme in each ecological district which includes:
 1. Protection of at least one site that supports northern rata;
 2. Creation of at least one restoration project for northern rata and its associated community of plants and animals;
 3. Regular inspections to be undertaken to assess the condition of the species at a site or series of sites.

The following are recommendations for each ecological district.

Aorangi

1. Collect and propagate seed from two trees at Paharakeke and Kawakawa streams. Plant resulting trees at various locations in Aorangi such as at the Te Kopi Field Centre, and the Putangirua Pinnacles campsite.
2. Evaluate whether existing trees require physical protection in the form of possum control or wild ungulate or stock protection, and if so take the necessary actions.
3. Evaluate whether the establishment of 'farm shelter conservation plans' would be beneficial for conservation of northern rata. This would involve the creation of ecological corridors linking Aorangi to the Rimutaka Ranges, in the form of shelter belts planted with northern rata and associated species.
4. Undertake research to determine the place of northern rata in the plant communities of the Aorangi Forest Park.

Cook Strait

1. Kapiti Island: Regularly inspect a select number of sites on the island to assess overall northern rata health.
2. Mana Island: Continue to take cuttings and propagate seedlings from the Mana population for use on the island's restoration programme. Introduce plants cultivated from a mainland source. Monitor the success of plantings on the island.
3. Determine presence of species at single mainland occurrence on Wellington South Coast, between Owhiro Bay and Sinclair Head (see Appendix) and protect from possums (if found).

Eastern Wairarapa

1. Ensure legal and physical protection of at least one site.
2. Undertake inspections to monitor the condition of the rata trees once every 3 years, at at least 2 sites.
3. Collect and propagate seeds from 1-2 sites and use in local planting programmes and in supplementary planting projects at sites that already support northern rata.
4. Establish an Eastern Wairarapa sourced tree at one secure *ex-situ* location, for example outside a school.

5. Undertake research to determine the place of northern rata in the plant communities of the Eastern Wairarapa hill country.

Eastern Hawkes Bay

1. No projects identified.
2. Low priority.

Foxton

1. Inspect site at Papaitonga Scenic Reserve.
2. Protect population and collect and propagate seeds and use resulting plants to enhance the existing population and in amenity plantings around the reserve.

Manawatu Gorge South

1. Inspect plants in Tararua Forest Park.
2. Department of Conservation staff and volunteers should record new occurrences of northern rata in the area.
3. Raise awareness of trampers and hunters to northern rata. Ensure they know what to do when they find the plant, such as report sightings to Department of Conservation staff or complete species record sheets. Distribution of the field guide sheet will help educate the public about the conservation of the species.

Manawatu Plains

1. No projects identified.
2. Low priority.

Puketoi

1. Collect and propagate seed from trees at Mount Bruce Scenic Reserve or from small shrubs at Makuri River. Plant resulting trees at various locations in Puketoi such as Waewaepa Scenic Reserve.
2. Determine the degree of physical protection of northern rata at Mount Bruce Scenic Reserve. Undertake possum and wild animal control if necessary.
3. Monitor changes in status of northern rata at Mount Bruce Scenic Reserve in response to increased levels of wild animal control.

Tararua

1. Record new occurrences of the plant using a species record sheet (see Appendix 4).
2. Raise awareness of trampers and hunters to northern rata, and ensure they know what to do when they find the plant, such as report sightings, or complete species record sheets. Distribution of the field guide sheet will help educate the public about the conservation of the species.
3. Determine and monitor the condition of the northern rata populations in the Tararua Forest Park by selecting and regularly inspecting a number of sites (e.g. 10) throughout the range of the plant as part of a standard monitoring programme. Assess any improvements in the canopy density of those trees in response to large scale wild animal control.

4. Determine the factors that may have led to the decline in northern rata populations at sites where before it was found in abundance. For example, northern rata appears to have nearly died out in the Hemi Matenga Memorial Scenic Reserve and in Paraparaumu Scenic Reserve.
5. Protect some larger and more accessible trees as seed sources by banding and/or wild animal control.
6. Use northern rata grown from seed sources (e.g. from the Lowry Trig area in Eastbourne – an easily accessible source) in restoration projects. Restore plants grown from this provenance back into existing pockets of dieback in this area.
7. Introduce northern rata back into sites from which it has practically disappeared (e.g. Hemi Matenga Memorial Scenic Reserve) or supplementary plant depleted populations. Follow this work with wild animal control work.

Wairarapa Plains

1. Limited number of projects
2. Pursue legal and/or physical protection of northern rata in the Dunvegan Forest Remnants and the Waingawa River Bush.
3. Advocate the wider horticultural use of the plant.
4. Advocate the use of northern rata and associated species in farm shelter belts.

Wellington

1. Advocate the use of northern rata in city plantings, especially in the greenbelt area.
2. Collect seeds from local provenance and propagate for local use in restoration projects. Suitable seed sources include (with permission): Wellington Botanic Garden, and Otari Native Botanic Garden.
3. Support eradication of mammalian pests from Karori Wildlife Sanctuary.

Woodville

1. Seed sourced from the Mount Bruce National Wildlife Centre can be used to cultivate plants for use in local programmes in and around Mount Bruce (see also Puketoi).
2. Advocate the use of northern rata for horticultural use.

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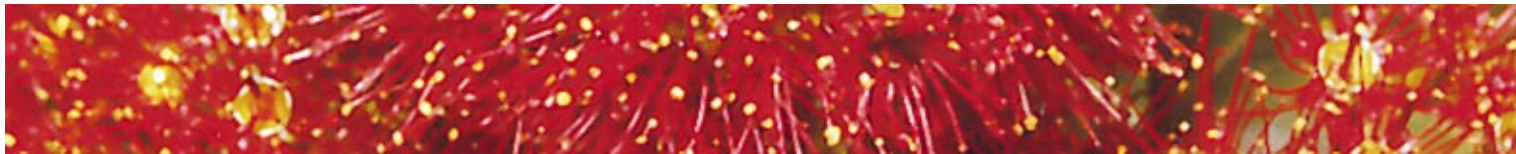
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Appendix 1:
Northern rata (*Metrosideros
robusta*) fact sheet



March 1999

Northern Rata

Metrosideros robusta

Below: The indented tips of the leaves, a characteristic feature of northern rata.

Photo: John E. Braggins.



The Northern rata tree can grow up to 30 metres tall with a massive trunk of up to 2 metres or more in diameter. If established as an epiphyte, the trunk is not a true stem but is comprised of a number of fused roots. The epiphyte sends down roots which grow a supporting trunk around the host tree.

The leaves are small and leathery in texture with indented tips unlike Southern rata. The wood is reddish brown with a twisted grain due to the nature of its growth. The flowers are a mass of dark scarlet stamens borne in sprays on the tips of branches.

Flowering and fruiting

Flowers: November - January

Fruits: December - January

Similar species

Metrosideros umbellata (southern rata)

Metrosideros excelsa (pohutukawa)

Habitat

Northern rata is found in coastal to lower montane forest. It grows either as an epiphyte, (in the canopy of a suitable host tree), or on the ground. The plant requires plenty of light and will not become established if conditions are too dry for epiphytes.



Associated plants

The foster tree of epiphytic rata is usually rimu. Rata is usually found in hardwood, podocarp and beech forests. It is associated with such species as rewarewa, tawa, hinau, kanuka, kahikatea, kamahi, kohekohe, pukatea and mahoe.

Left: Northern rata typically has wide spreading branches with billowy layers of foliage. Photo: Lisette Collins.



Department of Conservation
Te Papa Atawhai

Distribution

Northern rata is abundant in forests from North Cape southwards to Marlborough, Nelson and Westland. Within the Wellington region it is predominantly found in the Tararua and Rimutaka Ranges and also in the Mt Bruce Forest. Northern rata thrives in the regenerated forest of Kapiti island due to the absence of predators.

Traditional/ cultural use

The inner bark can be steeped in hot water and the liquid rubbed into rheumatic joints. It has also been used to cure ringworm in children by rubbing the infusion into their scalps.

Propagation and Cultivation

Rata are easily grown, requiring little or no aftercare.

If you intend to propagate rata from seed, you should use only seed that has been gathered from trees occurring naturally in the area. The small wind-dispersed seeds are shed from April to June, and these should be collected from trees that have flowered earlier in the year.

Several nurseries stock northern rata which has been propagated from seed collected in the southern North Island. They include:

- Terra Firma Ltd, Taupo Native Plant Nursery, 155 Centennial Drive, PO Box 437, TAUPO. Tel (07) 378 5450.
Seedlings propagated from Wainuiomata, Manawatu, Tararua Ranges
- Plantwise Nursery, 1 Summit Rd, LOWER HUTT. Tel (04) 567 1732.
Seedlings propagated mostly from Tararua Ranges.
- Wairarapa Nature Nursery, Norfolk Rd, RD1, CARTERTON. Tel (06) 378 8969.
Seedlings propagated from Tararua Ranges.

To propagate, scatter seeds on trays ensuring they are visible, and keep in the shade. They can take up to 20 days to germinate and have been found to grow well from September onwards, although Autumn is also suitable. Growing rata from seed is preferable to cuttings, because it is easier and it ensures that genetic variation is maintained.

Transplanting should be undertaken in Autumn or Winter, after plants have reached approximately 50cm tall. Seedlings should be planted in the ground in well lit areas, or as epiphytes in baskets in established trees, with well draining scoria.

Threats

The greatest threat to northern rata is from possums which eat the leaves, buds,



flowers and young shoots of the tree. Possums can kill a mature rata within two years, and in some areas they have contributed to the dieback of extensive areas of rata. Other threats include cutting for firewood, hybridisation with pohutu-kawa, forest clearance for road and building construction, and natural disturbances.

This fact sheet was compiled from information in McKessar, K. and Sawyer, J. 1999: Northern rata (Metrosideros robusta) in Wellington Conservancy. It was published with funding from Project Crimson, sponsored by Carter Holt Harvey Ltd.

Possums can kill a mature rata tree within two years.
Photo: Phil Knightsbridge.

Appendix 2: The Northern Rata Network

PEOPLE AND AGENCIES INVOLVED IN CONSERVATION OF *METROSIDEROS ROBUSTA* IN WELLINGTON CONSERVANCY

INDIVIDUALS AND AGENCIES	CURRENT OR POTENTIAL INVOLVEMENT IN PROJECT CRIMSON
<p>Forest & Bird – Wellington Contact Person: Gary James Address: 311b Karori Road, Karori, Wellington Telephone: (04) 476 4292</p>	<p>Involved in the 'Home nursery scheme' which includes the cultivation of northern rata seedlings for Karori Sanctuary and other community projects. Also involved in the Manawa Karioi urban marae project for restoration of coastal forest.</p>
<p>Forest & Bird – Lower Hutt Contact Person: Jack Cox Address: 12 Cleary Street, Lower Hutt Telephone: (04) 5695 691</p>	<p>Involved in 'Matiu/ Somes Island Working Party' for northern rata restoration on Matiu/Somes Island.</p>
<p>Department of Conservation – West Coast Conservancy Contact Person: Phil Knightbridge Address: Sewell St, Private Bag 701, Hokitika Telephone: (03) 755 8301 Fax: (03) 755 8425</p>	<p>Has expertise in the cultivation and restoration of northern rata and in possum control methods.</p>
<p>Uruwhenua Botanicals (Ecological Advisory Service) Contact Person: Philip Simpson Address: 28 Roblyn Place, Lincoln, Canterbury Telephone: (03) 325 2541 and 025 2300 617</p>	<p>Has expertise in the restoration of northern rata. Involved with Project Crimson Trust.</p>
<p>Department of Conservation – Mana Island Contact Person: Jason Christenson Address: PO Box 54005 Telephone: (04) 296 1112 Fax: (04) 236 7032</p>	<p>Involved in revegetation project for Mana Island including the restoration of northern rata.</p>
<p>Wellington Botanic Garden Contact Person: Mike Oates (director) Address: P.O Box 2199, Wellington Telephone: (04) 801 3072</p>	<p>Protecting mature northern rata in botanic gardens. Interested in being involved in projects for propagation and/or restoration.</p>
<p>Wellington Botanical Society Contact Person: Barbara Mitcalfe Address: 15 Boundary Road, Kelburn Telephone: (04) 475 7149</p>	
<p>Otari Native Botanic Garden Contact Person: Anita Benbrook Telephone: (04) 475 3245</p>	<p>Currently protecting mature northern rata trees in Reserve. Permission may be sought for seed collection for restoration projects.</p>
<p>Karori Wildlife Sanctuary Contact Person: Raewyn Empson/Stephen Fuller Address: PO Box 28-107, Wellington Telephone: (04) 475 9300 Email: kwst@mail.netlink.co.nz</p>	<p>Protecting northern rata within the Sanctuary. Interested in potential projects involving cultivation experiments and transplanting.</p>

NURSERIES	STOCK AVAILABLE
<p>Terra Firma Ltd, Taupo Native Plant Nursery Contact Person: Phillip Smith Address: 155 Centennial Drive, PO Box 437, Taupo Telephone: (07) 378 5450</p>	<p>Large supply of seedlings propagated from stock sourced in Wainuiomata, Manawatu and the Tararua ranges. Mail Order available.</p>
<p>Plantwise Address: 1 Summit Rd, Lower Hutt Telephone/Fax: (04) 5671732</p>	<p>Propagates in average sized quantities from seed sourced locally, mostly the Tararua Ranges.</p>
<p>Talisman Nursery Ltd Contact Person: Alistair and Margaret Turnbull Address: Ringawhati Rd, RD, Otaki Telephone: (06) 364 5893</p>	<p>Propagates from seed and cuttings taken from 12-year-old tree grown on property which was originally sourced from the Auckland region. Mail Order available.</p>
<p>Wairarapa Nature Nursery Contact Person: Peter Nichol Address: Norfolk Road, RD1, Carterton Telephone: (06) 3788969</p>	<p>Propagates from seed sourced from the Tararua Ranges. Currently grows small quantities of northern rata but grows larger quantities when required.</p>
<p>Matatoa Nursery Address: Engles Road, Shannon Telephone: (06) 362 7477 Fax: (06) 362 7472</p>	<p>Sells seedlings in small quantities. Sourced from seed company, provenance unknown. Mail Order available.</p>

Appendix 3: Distribution information database for northern rata in Wellington Conservancy

(329 occurrence records of the species - 128 since 1989)

EXPLANATION OF TERMS USED IN DATABASE OF OCCURRENCE RECORDS

The database of occurrence records of northern rata is taken from the Department of Conservation's Indigenous Plant Database held by Wellington Conservancy. The following are some of the terms used in the database of occurrences.

Field survey map	information taken from maps held by the Department of Conservation that indicate northern rata occurrences.
Forest plot sheet data	information taken from Department of Conservation forest plot survey data.
pers. comm.	information provided as a personal communication
Species record sheet	information taken from completed copies of species record sheets (see Appendix 4)
WELT	information taken from herbarium specimens held at the Museum of New Zealand • Te Papa Tongarewa.
WELTU	information taken from herbarium specimens held at the School of Biological Sciences, Victoria University of Wellington.

Full references to each occurrence record are provided in the references section of the main document.

Appendix 4: Species record sheet