

Cook Islands Biodiversity

Strategy and Action Plan

Approved by the Cabinet of the Cook Islands Government
on 11 April 2002 [CM (02A) 234]

Supervised by the National Steering Committee on behalf of the Government
of the Cook Islands.

Written by the Chief Technical Advisor Gerald McCormack
to reflect the conclusions of the community meetings
and the National Biodiversity Workshop,
representing more than 80% of the population.

Captions for the photographs on the cover are on page 80

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Cook Islands NBSAP 2002.

Kia orana

It gives me great pleasure to announce Cabinet's endorsement of this Strategy and Action Plan for the conservation and sustainable use of our biodiversity, and the equitable sharing of its benefits.

This plan has been developed through extensive consultation with the landowners, who are the primary owners of our biodiversity. This consultation process culminated in a National Biodiversity Workshop in June 2001, which I had the privilege to open on behalf of Government.

Although the landowners are the primary owners of our biodiversity, it is Government's intention to assist with national initiatives and coordination. Most endangered species and ecosystems involve more than one family or village and it is therefore appropriate for Government and Island Councils to initiate and coordinate conservation and usage programmes, to ensure an equitable sharing of responsibility and benefits.

Government recognises that biodiversity is of fundamental importance to subsistence living and to many commercial activities, including tourism. Biodiversity is a primary component of our prosperity and quality of life.

Development programmes, including those of Government, often impact heavily on biodiversity and there is a need to predict and reduce adverse impacts. One complex threat to our biodiversity (and prosperity) is the continuous arrival of invasive species into the country, and their spread from island to island. The action plan has proposals concerning this matter and Government will be giving these careful consideration.

The action plan proposes a wide range of general actions for the conservation and use of our biodiversity, and Government will take a major role in initiating and supporting these actions and, when necessary, requesting overseas organisations to assist.

It is with great pleasure that I announce Government's support of this biodiversity strategy and action plan, and we will be forming appropriate committees to escalate biodiversity conservation in the Cook Islands.

Kia manuia

A handwritten signature in black ink that reads "Norman George". The signature is written in a cursive, flowing style.

Hon. Norman George,

Minister for the Environment

Executive Summary

The Cook Islands signed the Convention on Biological Diversity at the Earth Summit in 1992. As a Party to the Convention, the Cook Islands Government committed itself and its people to conserve its biodiversity, to use it in a sustainable manner, and to share its benefits in an equitable manner. It also committed itself to control invasive species (the weeds and pest animals in natural ecosystems and agricultural systems), and to reduce the likelihood of future invasions.

The National Biodiversity Strategy and Action Plan (NBSAP) is the way the Cook Islands people and the Government intend to conserve important plants and animals by positive action and sustainable use; and to reduce negative effects of invasive species. Although this process of “saving Cook Islands biodiversity” has been accelerated by the signing of the Convention on Biological Diversity, it is a process that has been underway for many years. The Cook Islands is pleased to have this opportunity to increase its efforts to ensure that future generations of Cook Islanders inherit a diverse range of plants and animals for their enjoyment and use.

A major workshop was held on each of the Southern Group islands, except for Rarotonga where smaller workshops were held in each of the three main districts (vaka). In each case the participants elected representatives to participate in the National Biodiversity Workshop, upon which this NBSAP is based. The NBSAP therefore closely reflects what the landowners would like to see happen and, within the context of Cook Islands biodiversity, these people are the key stakeholders. Some of the Northern Group islands were represented, although only Penrhyn had a community workshop and this was held after the National Biodiversity Workshop.

Now that the landowners have expressed their views on how to conserve Cook Islands biodiversity, the Government and its Agencies are committed to finding the ways and means to assist them to conserve this biodiversity for future generations.

The landowners, as represented at the Community Meetings and National Workshop, would like to see a variety of programmes to conserve endangered species and important habitats. They would like to see all relevant Government Agencies and NGOs involved in an integrated and supportive manner. Invasive weeds and animal pests were seen as a major problem and the Workshop proposed a special Bio-security Agency to handle all aspects of plant and animal movement into the country

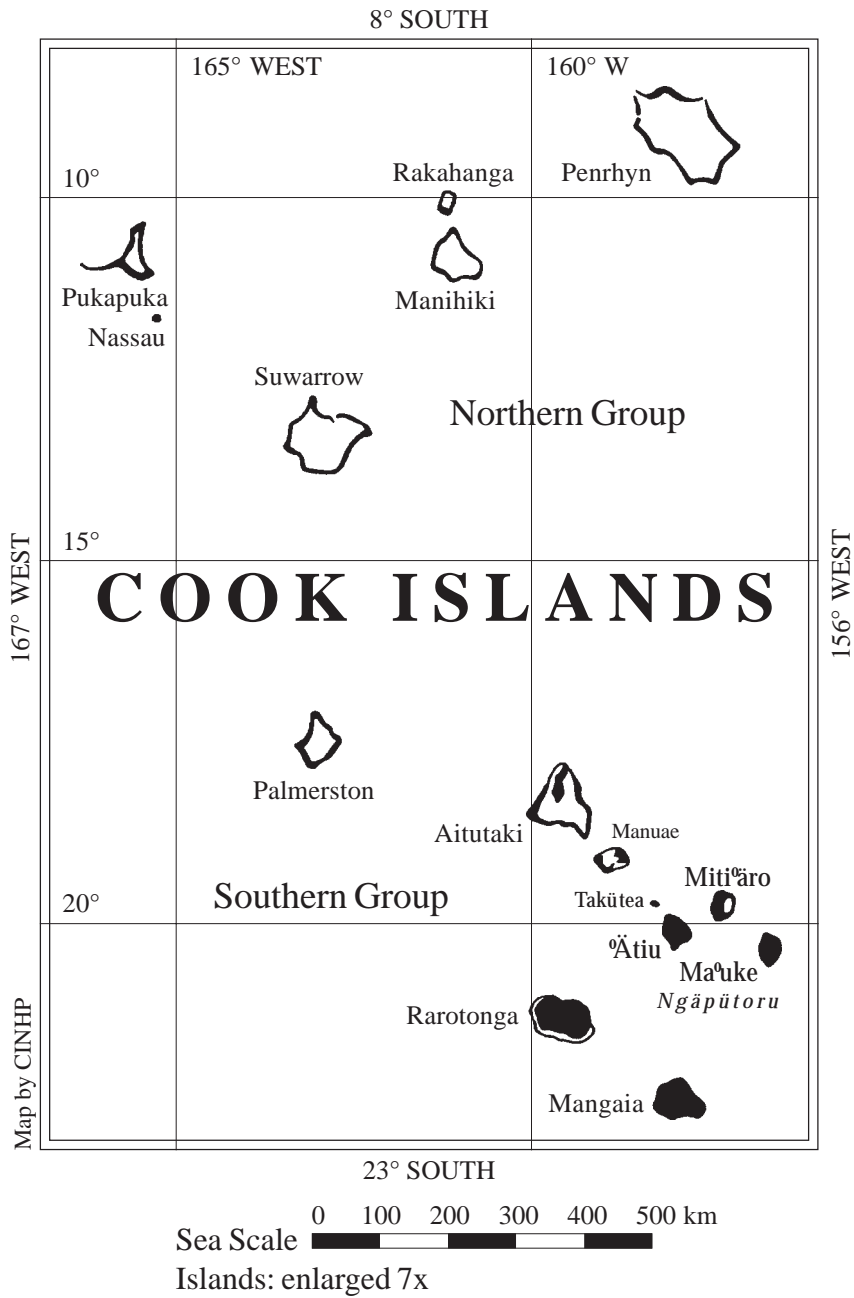
and between the islands, both terrestrial and marine. There was much concern about sharing in the benefits of the uses of local biodiversity, especially in the area of herbal medicine. It was therefore recommended that a special body be established to handle this aspect of biodiversity. It was proposed that the same committee, or another special committee, should coordinate research on biodiversity and its uses. It was recognised that there is a need for increased awareness and knowledge on Cook Islands plants and animals, and programmes of this kind should be encouraged. Biodiversity is a major direct and indirect source of income for the Government and it was thought that Government should initiate a fund to facilitate the conservation of biodiversity, and seek outside funding for the same purpose.

Kia Manuia

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Section 1: Introduction

The Cook Islands is a small country of 240km² spread over fifteen widely scattered islands, with an oceanic EEZ of about two million square kilometres. The islands are divided into two groups: a Northern Group and a Southern Group. Northern Group islands are mainly atolls with a very limited terrestrial flora and fauna, and an abundant and diverse marine fauna. The Southern Group has its richest terrestrial flora and fauna on the high island of Rarotonga, followed by the raised islands of Mangaia, ʻĀtiu, Maʻuke and Mitiʻāro. The lagoonal and nearshore marine biodiversity is greatest on the atolls of Palmerston and Manuae, and on the almost-atoll of Aitutaki.

In the Southern Group the coastal lowlands and low volcanic inlands are man-modified or disturbed ecosystems. The process of transformation began with the horticulture of the first settlers, the Polynesians, who arrived as early as 400 BC. The process accelerated, after the arrival of the London Missionary Society missionaries in the 1820s, with the introduction of new food plants and the growth of commercial horticulture. The rugged limestone makatea of the raised islands and the steep upper-inland of Rarotonga are the only essentially natural terrestrial ecosystems that remain. The Northern atolls have had their coastal forest replaced by coconut plantations, with the exception of one area on Motu Kotawa on Pukapuka.

Rarotonga has always had the largest population and its limited reef-flat lagoon has been subjected to generations of uncontrolled subsistence fishing, and to an inflow of pollutants from the land, such as red soil, sewage seepage, agricultural pesticides and agricultural fertilisers. The degradation of the Rarotonga lagoon has been highlighted in conservation reports since, at least, 1975. Aitutaki lagoon has also been stressed by uncontrolled fishing and, possibly, by terrestrial runoff. Since the late 1980s the shallow marine corals of Rarotonga and Aitutaki have been periodically devastated by episodes of raised sea temperatures (typically, El Niño related).

Despite degradation of various habitats in the Cook Islands, it is not the case that a great number of species have become extinct (=totally lost) or extirpated (=lost from an island). The Cook Islands is near the centre of the tropical South Pacific, which is well along the eastward decline in biodiversity as one moves from Indonesia and Papua New Guinea eastward through Fiji, Samoa and Tonga, to the Cook Islands and beyond.



Makatea forest on ʻĀtiu



Taro terraces on Rarotonga



Coconut on the beach on Manuae



Pacific Pigeon (Rupe)



Garland Berry (Poro'iti)



Coconut Crab (Unga Kaveu)



Mountain Banana (ʻŪtū)

Furthermore, the oceanic gap between Samoa and Tonga, about 1000 km, is a very significant barrier to the dispersal of plants and animals, both terrestrial and marine.

In the Cook Islands marine colonisers crossing the barrier have only a moderate chance of encountering one of the widely separated islands of the Cook Islands. However, should they encounter an island they would have a good chance of finding suitable reefal habitat to occupy. In contrast, for terrestrial plants and animals a chance encounter with an island would be unlikely to provide a diverse range of habitats, unless it was Rarotonga or one of the four raised islands. The variety of native flowering plants reflects the ecological diversity: Rarotonga has 170 species, the raised islands have about 100, Aitutaki has forty, and the atolls and coral-cays have one to two dozen.

Evolution into new species has also not been common in the Cook Islands because of the limited range of terrestrial habitats. For flowering plants, Rarotonga has 12 endemics, the raised islands vary from one to six, while Aitutaki and the low coral islands have none. In the marine environment there has also been relatively little development of new species.

While noting the relatively low level of native and endemic plants and animals, the biodiversity of the different islands is the plants and animals that generations of Cook Islanders have used to sustain their culture. It is this diversity of plants and animals that they would like to conserve for their children and grandchildren. It is for this reason that many residents are keen to see the National Biodiversity Strategy and Action Plan move beyond the bookshelf to become an ongoing process of conserving, and sometimes recovering, local plants and animals to share their benefits while using them in a sustainable manner.



Maxima Clam (Pa'ua)



Green Turtle (ʻOnu)

Conventions Signed by the Cook Islands

The Cook Islands is a party to the following conventions that have a direct bearing on the maintenance of biodiversity.

- 1971 Convention on Wetlands of International Importance especially as Waterfowl Habitat (**Ramsar Convention**); and amendments Paris 1982 and Regina 1987.
- 1976 Convention on the Conservation of Nature in the South Pacific (**Apia Convention**)
- 1986 Convention for the Protection of Natural Resources and Environment of the South Pacific Region and related Protocols (**SPREP or Noumea Convention**)
- 1989 Convention for the Prohibition of Fishing with Long Driftnets in the South Pacific
- 1992 Rio Declaration on Environment and Development
- 1992 Convention on the Conservation of Biological Diversity (**CBD or Biodiversity Convention**)
- 1993 Agreement establishing the South Pacific Region Environment Programme
- 1994 Barbados Programme of Action on the Sustainable Development of Small Island Developing States (**Barbados Programme of Action, BPoA**) (emerged under Agenda 21 of Rio Declaration)
- 1998 United Nations Convention to Combat Desertification
- 2000 Cartagena Protocol on Biosafety (to Biodiversity Convention)

Legislation Concerning Local Biodiversity

The Cook Islands has several Acts that have a direct bearing on the maintenance of biodiversity and related knowledge, and the control of invasive species.

** and *italics* denote legislation revoked by later legislation.

Date Legislation

1975	** <i>Conservation Act 1975</i>
1986-87	** <i>Conservation Act 1986-87</i>
1994-95	Rarotonga Environment Act 1994-95
1984	Ministry of Marine Resources Act 1984
1989	Marine Resources Act 1989
1973	Plants Act 1973
	** <i>Plant Introduction and Quarantine Regulations 1976, with Amendments 1980 and 1985</i>
	Plant Quarantine Regulations 1993
1975	Animals Act 1975
	Amendment 1981 (allowed the importation of rabbits)
	Animal Disease Regulations 1982
1984	International Departure Tax Amendment Act 1984 – established an environment fund
1999	Natural Heritage Trust Act 1999

Section 2a:

Strategy and Action Plan

Māori translation p.25

As a Party to the Convention on Biological Diversity the Cook Islands has committed itself to:

1. Conserve its endangered species
2. Develop a system of protected areas
3. Reduce the harmful effects of invasive species and prevent further invasions
4. Use biodiversity in a sustainable manner
5. Preserve knowledge related to biodiversity
6. Ensure an equitable sharing of the benefits of biodiversity

The following strategy and action plan was developed through extensive community consultation and it proposes the development of a series of programmes and mechanisms by which the Government could enable the country to meet its obligations as a Party to the Convention.

Theme A: Endangered Species Management

Strategic Goal A1: Conserve Cook Islands native and important naturalised plants and animals, and provide for their sustainable use.

Actions:

- a) Develop a programme to survey and conserve all endemic flowering plants and other endangered native flowering plants.
- b) Extend the flowering plant programme (above) to include other types of plants that are endemic or native and endangered.
- c) Develop a programme to survey and conserve the rarer plants used in herbal medicine (*vai rākau*).
- d) Develop a programme to survey and conserve endemic animals and rare native animals, covering mammals, birds, and other animals.
- e) Develop a programme to survey and conserve marine animals harvested for food or financial gain.

Strategic Goal A2: Conserve important agricultural and non-naturalised species and provide for their sustainable use (Agro-Biodiversity).

Actions:

- a) Develop a programme to survey and conserve the rarer varieties of Wetland Taro (*Taro*), Coconut Palm (*Nū*), and other traditional agro-varieties and agro-species.
- b) Develop a programme to survey and conserve the rarer animals of agriculture and home.

Background information:

The main groups of native plants are flowering plants, ferns, mosses, lichens, fungi and algae. Only the flowering plants and ferns have been well researched in terms of endemism and abundance.

The Cook Islands has about 20 endemic flowering plants and about four endemic ferns. In the last hundred years the Cook Islands has lost one endemic flowering plant, the Rarotonga Acalypha. Several endemics are rare or survive in restricted habitats, such as Rarotonga Garnotia-Grass, Te Manga Cyrtandra and the Mitiāro Fan-Palm (*Iniao*).



Mitiāro Fan-Palm (Iniao)

There are also native plants that have become locally rare, such as Pacific Mahogany (*Tamanu*), Portia Tree (*Miro*) and Pacific Rosewood (*Tou*).

The Cook Islands has six endemic landbirds, of which four are on the IUCN Red List of Endangered Species. The Rarotonga Flycatcher (*Kākerōri*) is listed as Endangered (and is conservation maintained), while the other four are listed as Vulnerable. The Blue Lorikeet (*Kurāmo*) is a Vulnerable species with a decreasing native range in French Polynesia - it is presently flourishing on Aitutaki. The endemics of other animal groups, such as insects, spiders and landsnails have been poorly researched. However, we do know that on Rarotonga 14 of 26 endemic landsnails, have become extinct in the last 130 years. There are also other native animals of concern. The Green Turtle (*Onu Kai*) is on the Red List and is becoming increasingly rare in the Cook Islands, and the Coconut Crab (*Unga Onu / Kaveu*), a favorite traditional food, is uncommon and small on some islands.

There is a need to develop programmes to identify all endemic plants and animals, to determine their abundance, to survey and map the location of the endangered endemics, and to develop recovery programmes. Initially the emphasis would be on the better known groups, and groups with wide public support, but such programme should eventually extend to include all endemics and significant native species that are endangered.

Cook Islands agriculture is based on Polynesian and recently introduced species and varieties of plants and animals. It is important that the rarer traditional varieties, especially those not presently the centre of interest, be surveyed and maintained because their genetic input may be useful in the future.

Herbal medicine (*vai rākau*) is an important aspect of community life. It utilises a wide variety of native and introduced plants, some of which are now rare, such as Medicine Daisy (*Takataka*), Lindernia (*Tūtae Tōrea*), and Adder's-tongue fern (*Tiāpito*).

The top endangered species identified in each category are listed in Section 5 (1. Community Identified Endangered Species, p. 63). In addition, Section 4 (Cook Islands Biodiversity, p.53) presents Natural Heritage Project data on Cook Islands endemic species, and on native species that are seriously nationally endangered.



Pacific Mahogany (Tamanu)



Portia Tree (Miro)



Pacific Rosewood (Tou)



Medicine Daisy (Takataka)



Lindernia (Tūtae Tōrea)

Theme B: Invasive Species Management

Strategic Goal B1: Reduce the adverse impacts of invasive species on indigenous species and ecosystems, and prevent new invasions.

Strategic Goal B2: Reduce the adverse impacts of invasive species on agricultural species and ecosystems, and prevent new invasions.

Actions:

- a) Develop a programme involving all islands to survey invasive species in natural ecosystems and in the agro-ecosystem.
- b) Develop a community-based programme to eradicate those invasive weeds and animal pests that are not yet widespread on particular islands.
- c) Develop national programmes to assist with the control of the more serious invasive weeds and animal pests in both natural and man-modified ecosystems.
- d) Undertake a multisectoral review of the control of transboundary and inter-island movement of terrestrial and marine plants and animals, and of LMOs/GMOs (Living Modified Organisms / Genetically Modified Organisms), with a view to establishing an independent Biosecurity Agency.

Background information:

The division of invasive species into (1) those damaging the natural or wild ecosystems and (2) those damaging the agro-ecosystem (man-modified ecosystems) is important although not very realistic on some islands, where the two systems merge. Although we maintain the two goals, related to natural ecosystems and agro-domestic ecosystems, we have merged the actions to cover aspects of both.

Invasive plants and animals are a major threat to local endemic and native plants and animals. The endemic Rarotonga Flycatcher (*Kākerōri*) is threatened by the Ship Rat (a type of *Kiore Toka*), the Mangaia Kingfisher (*Tangaʻeo*) is threatened by the Common Myna (*Manu Kavamani*), extinct endemic landsnails are thought to have been decimated by introduced ants, the extinct Rarotonga Acalypha and Polynesian Pilea (now only on Raivavae) probably lost their habitat to introduced vines and shrubs, and these are also threatening other mountain plants.



Ship Rat (Kiore Toka)

Island isolation has helped reduce the spread of some troublesome plants and animals. For example, the widespread invasive vine, Balloon Vine, has been on Rarotonga since at least the 1920s but has not been taken to other islands; the rapid-spreading Giant Sensitive-Weed (*Pikika'a Papa'a*) has been on Aitutaki since at least 1980 but has not been taken to other islands; the most troublesome weed on Ma'uke is the Sicklepod (*Pi 'Aungakino*) which arrived there about 40 years ago, but has not yet invaded any other island. The Ship Rat is presently on Rarotonga, Mangaia, Ma'uke, and Miti'aro, but is absent from Aitutaki and 'Ätiu – it is not known if it was never introduced (which seems unlikely) or if it was introduced but failed to establish. The troublesome “sandfly” of Aitutaki, the No-see-'em Sandfly (*Culicoides belkini*), arrived by aircraft in 1964 from Borabora, and within ten years it invaded Manuae and Miti'aro. A second dengue-spreading mosquito, *Aedes aegypti*, has established on Rarotonga, Manihiki and Penrhyn since at least the early 1990s but it is probably not on other islands yet. The Coconut Flat-Moth invaded Rarotonga in late 2000 causing widespread damage by mid-2001 – it is a major challenge to prevent it from reaching the other islands. The list goes on and on.

Other serious invasive weeds and animal pests have only recently obtained a foothold on some islands and could be eradicated by immediate community effort. For example, *Rākau Pikika'a* (Sensitive Weed) is known in only three small patches on Mangaia; Elephant Grass is in only one small clump on Mangaia; Dodder is known in only two or three small patches on Rarotonga; and Red Passionfruit is known only along the sides of one road on Ma'uke.

Biosecurity is undertaken by the Quarantine Division of the Ministry of Agriculture and they have been effective in stopping many new invasive species, but not others. For example, they have twice intercepted the Giant African Snail, a voracious consumer of vegetable crops and spreader of parasites. Naturally, Quarantine has emphasised invasives relevant to agriculture rather than those concerned with the native ecosystems, such as the inland forests and the reef.

The workshop participants concluded that it would be advantageous to make the Quarantine Division of Agriculture into a more independent Biosecurity Agency with a mandate to control the flow of marine and terrestrial plants and animals, and the parts of plants and animals, and LMOs, into and out of the Cook Islands, and between islands within the country.

The top invasive species identified in each category are listed in Section 5 (2. Community Identified Invasive Species, p.71).



Balloon Vine



*Giant Sensitive-Weed
(Pikika'a Papa'a)*



Dodder (Tiaea)



Giant African Snail

Theme C: Ecosystem Management

Strategic Goal C: Conserve important ecosystems through a system of protected areas with regulated and monitored activities.

Actions:

- a) Establish an independent Suvarrow National Park Authority to administer the Cook Islands' only national park on behalf of all the major stakeholders. A management group with the responsibility to conserve the atoll's wildlife, and to monitor and control revenue-generating activities.
- b) Develop a programme to select areas to establish a national system of community-based protected areas to protect important terrestrial ecosystems.
- c) Develop a programme to select areas to establish a national system of community-based protected areas to protect important reef and lagoon ecosystems.

Background information:

The islands of the Cook Islands are small and, with the exception of the mountain forest above mid-elevation on Rarotonga and the less accessible karrenfeld (makatea) of the raised islands, the terrestrial ecosystems have been heavily modified by people. This process started with the horticultural activities of the first settlers up to 2,400 years ago. The final transformation of the coastal coralline lowlands and the fertile volcanic lowlands awaited the arrival of Europeans and the establishment of new crops for food and sale.

Even the unpeopled islands of Suvarrow and Takütea have had their native forests impacted - by the planting of Coconut Palms for copra. Nevertheless, because these two islands remain unpeopled, they support very significant mixed colonies of breeding seabirds, and large Coconut Crabs (*Kaveu*). Both islands are protected: Takütea as a Wildlife Sanctuary since 1903, and Suvarrow as a National Park since 1978.

The inshore marine systems of atoll lagoons and reef-flat moats (lagoons) and reef-rim have been fished for generations. In recent times fishing pressure has increased such that some species have been seriously impacted, such as the Black-lipped Pearl-oyster (*Parau*) on Suvarrow and Manihiki, the Green Turtle (*Onu*) on Palmerston, the giant clam (*Pä'ua*) on Aitutaki, and the Milkfish (*Ava*) on Aitutaki.



Red-tailed Tropicbird (Tavake)



Young Great Frigatebird on Takütea

On Rarotonga subsistence fishing, probably assisted by other factors such as volcanic soil runoff, agricultural pesticides and agricultural fertilisers, has led to a seriously degraded reef system. This degradation was noted in the country's first conservation report, by Neville Gare, in 1975: "The major impact made on me by the marine environment of Rarotonga and Aitutaki was the scarceness of living resources in the lagoons." More detailed studies by Dahl (1980) came to the same conclusion. Both reports recommended the establishment of marine protected areas, yet it was not until 1996 that the Koutu Nui established a series of community-managed protected/ *rāʻui* areas.

Over the last thirty years there have also been numerous proposals to create various protected areas to conserve particular species and/or ecosystems, such as the inland Cloud Forest of Rarotonga, and the Rarotonga Flycatcher (*Kākerōri*). Since the declaration of Suvarrow as a National Park in 1978 only one other area has become a terrestrial protected area, the Tākitumu Conservation Area. This was established under an agreement between a committee of landowners and SPREP to conserve the habitat of the last surviving Rarotonga Flycatcher. Although Government initiated the arrangement, it had no continuing official role in implementation.

There is a need for the Government and groups of landowners to work together to develop a national system of protected areas on the land and in the sea to conserve important ecosystems.

See Section 5 (3. Community Proposed Protected Areas, p.78) for a summary of areas suggested by the representatives of each island at the National Biodiversity Workshop. There is a summary of the existing protected areas of the Cook Islands presented in Section 4 (7. Cook Islands Protected Areas, p.62).



Rāʻui area at Black Rock, Rarotonga



Cloud Forest on Rarotonga



Rarotonga Flycatcher (Kākerōri)



Sooty Tern (Tara) on Suvarrow



Bristle-thighed Curlew (Teue) on Manuae

Theme D: Equitable Sharing of Benefits and Access to Biodiversity

Strategic Goal D: Ensure that the uses of biodiversity, including genetic resources, bring equitable benefits to relevant stakeholders.

Action:

Establish an independent agency to encourage and manage research on biodiversity and its uses, and to ensure that there is an equitable sharing of benefits.

Background information:

Healthy ecosystems are a fundamental component of the main economic activities of the Cook Islands - tourism, pearl farming and agriculture. Some groups make very specific use of biodiversity, such as the subsistence fishers, the ecotourist guides, the makers of flower and shell garlands (*ʻei*), and the carvers of artefacts. It is also possible that some medicinally useful chemicals exist in some Cook Islands plants and animals and these could be financially beneficial to the country and to the particular stakeholders involved.

There is a need to encourage research into the uses of biodiversity and to ensure an equitable sharing of benefits. The National Workshop concluded that a special independent agency would be the best option to manage this aspect of biodiversity.



Fisherman in outrigger canoe on Mitiāro



Fishing on Maʻuke



Basket weaving on Mangaia



Tapa making on Ātiu

Theme E: Management of Knowledge Related to Biodiversity

Strategic Goal E: Record and maintain records of scientific and traditional knowledge related to biodiversity, with consideration of Intellectual Property Rights.

Actions:

- a) A body should be established to review access to, and the processing of, knowledge on biodiversity and its use, especially medicinal use. This body might be the same as that established to encourage, monitor and manage all research on biodiversity (see Theme D).
- b) The programme of the Natural Heritage Project to record all Cook Islands biodiversity with related scientific and traditional information should continue, and it should make such information available to the general public.

Background information:

The recording of biodiversity related knowledge in the Cook Islands is very incomplete. The Natural Heritage Project has records of more than 3,700 species and while some groups such as flowering plants, ferns, birds, marine shellfish and fishes are well represented, many other groups are poorly known.

In particular there is a need to document traditional knowledge related to biodiversity and its use. With respect to the knowledge about the uses of biodiversity, especially medicinal uses, there should be a regulatory body to ensure that any financial benefits are shared in an equitable manner, with particular consideration of the original provider of the knowledge. Intellectual Property Rights should be acknowledged at all times and in all benefit-sharing.

At the National Workshop the discussion initially emphasised protection of knowledge but gradually moved towards ways to benefit from knowledge. The change in emphasis came about mainly as it was recognised that much of Cook Islands herbal knowledge is similar to that of Tahiti and that in both countries much of the information is already in the public domain. It was concluded that there should be a programme to record the medicinal knowledge of those practitioners who wish to have their knowledge recorded, with full acknowledgement of the informant and the nature of the associated *mana*.

The workshop concluded that the best way to both protect and benefit from traditional knowledge was to have a specific and pro-active Biodiversity Research Committee with suitable legislated powers to manage the interests of both the knowledge owners and the researchers.

Theme F: Biodiversity Awareness and Education

Strategic Goal F: Make biodiversity information more readily available to all stakeholders and interested people.

Actions:

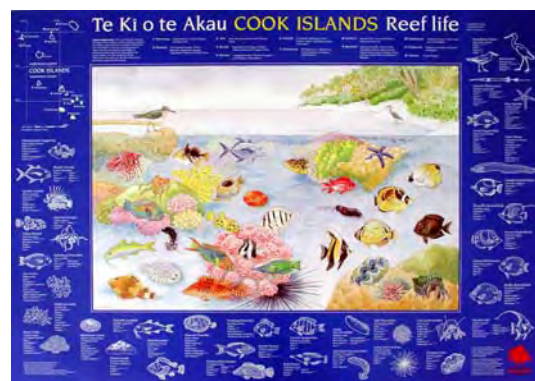
- a) A working group should be established to investigate ways to ensure that knowledge of biodiversity and its uses is adequately available to students and the general public.
- b) NGOs should be encouraged to include knowledge of biodiversity where relevant.

Background information:

Capacity building for environmental awareness and education were important aspects of the 1992 National Environment Management Strategy (NEMS), and the Environment Service has developed an Education and Awareness Unit. The Government's Environment Service and Natural Heritage Project, and the NGOs World Wide Fund for Nature (WWF) and Takitumu Conservation Area (TCA), periodically release information on aspects of biodiversity. There is a need for a more integrated approach, hence the Workshop proposal for action.

The Education Curriculum officers were unable to participate in this session of the National Workshop. However they had previously indicated that the various education curricula are already well developed and that additional biodiversity information would need to be integrated into the existing prescriptions. It was stressed that there is a need for outside organisations to consult with the education curriculum unit and schools before developing materials for use in schools and colleges.

Posters, books and other educational material published by the Natural Heritage Project:



Reef Life Poster

Poster on Cook Islands Birds

Theme G: Mainstreaming of Biodiversity

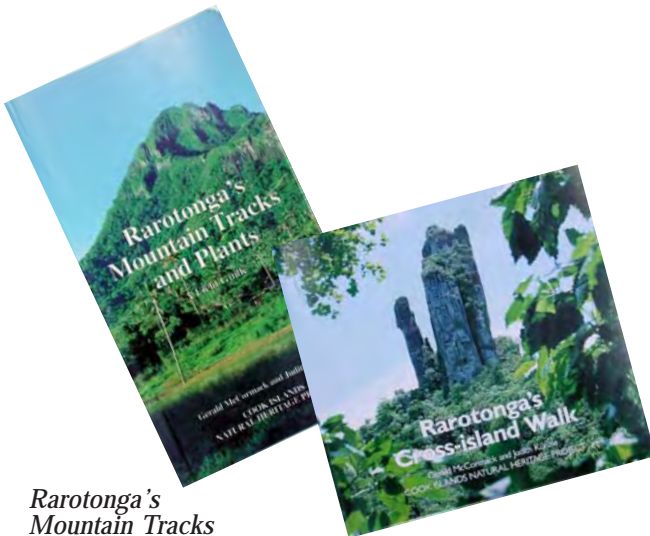
Strategic Goal G: Integrate biodiversity into national and sectoral legislation, policies, plans and programmes.

Action:

A multi-sectoral working group should be established to review the policies and activities of Government ministries and agencies to ensure that they are consistent with a shared responsibility to maintain Cook Islands biodiversity and related knowledge.

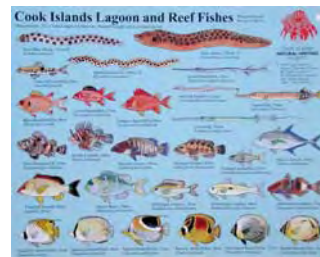
Background information:

It was recognised that everyone benefits, directly or indirectly, from biodiversity and that the maintenance of biodiversity was therefore a collective responsibility. For the Government to take up its share of that responsibility, it would be ideal to ensure that relevant Government bodies work in an integrated and supportive manner. To this end, it is necessary to ensure that the policies and programmes of the different agencies are actively maintaining Cook Islands biodiversity and related knowledge, and ensuring an equitable sharing of the benefits. To achieve shared responsibility it is important that policies, programmes, administrative and financial activities, at national, district and community levels include biodiversity concerns. This will be a continuous process leading to long-term sustainability.



Rarotonga's Mountain Tracks and Plants book

Rarotonga's Cross-island Walk book



Cook Islands Lagoon and Reef Fishes, a waterproof identification card

Theme H: Financial Resources and Mechanisms for Biodiversity

Strategic Goal H: Secure long-term financial sustainability for all biodiversity related activities and programmes.

Action:

Establish a Biodiversity Trust Fund to support the wide range of activities required to conserve Cook Islands biodiversity in an integrated and equitable manner.

Background information:

The National Workshop recognised that there is a wide range of activities required to maintain local biodiversity. It was concerned that there should be a financial mechanism to ensure equitable funding to facilitate the required programmes, especially those not having a high public profile.

The Workshop concluded that the Trust Fund would consist of a board representing the different communities, traditional leaders and the main Government bodies involved with biodiversity. Because the Government is one of the main beneficiaries of local biodiversity it was concluded that Government should provide the core funding for the Trust Fund, supported where possible by overseas donors.

The Trust would table annual reports with audited accounts to Parliament, and make these reports available for wider distribution. The secretariat for the Trust could be provided by the Environment Service, although the Trust would have the power to change this arrangement if it wished.

Tu^oanga 2b:

Au ravenga e te au Parani ta ‘anga‘anga

Uri^oia ki te reo Māori e Tuamotu Matamaki

I te mea e kua piri atu te Kuki Airani ki te putuputu^oanga CBD teia tana i papa^ou:

1. Taporoporo i tona au mea natura te ngaro atura.
2. Akatupu i tetai au nga^oi kia paruru^oia.
3. Akaiti mai i te kino a te au manumanu e te au nganga^oere kikino e akatupu nei ma te paruru atu kia kore tetai au mea kikino ou e tae mai.
4. Ta^oanga^oanga i te au ‘apinga natura na roto i tetai au ravenga kia kore e ngaro takiri te reira.
5. Taporoporo i te au marama e te kite pu‘apinga no runga i te ta^oanga^oanga i te au ‘apinga natura.
6. Akapapu e kia tau te tu^oatu^oa^oanga i te pu‘apinga te ka rauka mai mei roto i te au ‘apinga natura.

Te au ravenga e te au parani ta^oanga^oanga e akakite^oia nei mei roto mai te reira i te au uipa^oanga tei rave ia ki runga i te au enua i vao ake ia Rarotonga e pera i Rarotonga e te tamanako mai nei te reira i te au ravenga te ka tau i te Kavamani Kuki Airani kia rave ei ravenga i te akatupu i tana i papa^ou i runga nei.

Tumu Manako A: Akatanotano'anga i te akono'anga o te au 'apinga natura

Manakonako'anga A1: Taporoporo i te au 'apinga natura o te Kuki Airani ma te Akapapu e kare e ngaro to ratou ta'anga'anga ia 'anga.

Ka rave:

- a) 'Anga i tetai porokaramu kimi matatio i te au rākau enua pu'era o teia basileia e pera te au rākau pu'era te ngaro atura.
- e) 'Akamaata atu i te porokaramu o te au rākau pu'era kia piri mai tetai au rākau ke te ngaro atura.
- ng) 'Anga i tetai porokaramu no te kimikimi i te au rākau te ngaro atura te ka riro ei ma'ani vai rākau.
- i) 'Anga i tetai porokaramu kimi matatio i te au animara enua e kia kapiti ia mai te au manu aere, te manu rere e tetai au manu ke atu.
- k) 'Anga i tetai porokaramu kimi matatio i te au kai taitai e pera tetai au mea tai e riro nei ei kimi pu'apinga.

Manakonako'anga A2: Taporoporo i te au mea tanutanu e tetai au mea tau i te kai ma te akono meitaki kia kore e ngaro.

Ka rave:

- a) 'Anga i tetai porokaramu kimi matatio mate taporoporo i te au taro memeitaki penei e te ngaro atura e pera te nu e tetai atu au mea tau i te kai.
- e) 'Anga i tetai porokaramu kimi matatio mate taporoporo i te manu tau i te kai.

Au akamarama'anga:

Te au rākau tupuna o te Kuki Airani nei koia te au rākau pu'era, te ana'e (*ferns*), remuremu rākau, remuremu toka e pera te remuremu vai. Ko te au rākau pu'era e te ana'e nga mea i kimi matatio ia no te tu i te tupu'anga e te ma'ata o te reira.



Iniao

E 20 au räkau pu'era o te Kuki Airani e, e 4 tu 'ana'e (ferns). I roto i te 100 mataiti i topa kua ngaro mei te Kuki Airani nei e tai räkau pu'era ko'ia te *Rarotonga Acalypha*. Ko tetai au räkau kare e ma'ata akaou ana me kare okotai rai ngai e tupu ana mei te *Rarotonga Garnotia-Grass*, Te Manga *Cyrtandra* e te Iniao o Miti'äro. Te vai katoa nei tetai au räkau kare e ma'ata akore ana mei te Tamanu, Miro e te Tou.

E 6 au manu rere no te Kuki Airani nei rai ina e 4 i runga i te akapapa'anga a te IUCN o te au manu ka nagaro. Ko te Käkeröri kua akakite'ia e te ngaro atura (inara te taporoporo ia nei). Te Kurämo'o te ma'ata nei rai te reira i Aitutaki ina kua meangiti te reira i Tahiti. Te au manumanu rikiriki, te tukutukura'onui, te patito enua, kare oki i kimikimi matatio ia ana, inara kua papu e e 14 o te 26 patito enua o Rarotonga nei kua ngaro i roto i te 130 mata'iti i topa. Ko te Onu kua meangiti takiri te reira e pera oki te Kaveu.

E mea tau kia 'angaia tetai porokaramu akarakara'anga i te au räkau pera te au manu no konei rai ia tatou, e kia 'anga'ia tetai akapapu'anga i te au ngai e vai nei kia rauka tetai akapapu'anga i te ma'ata o te reira. E mea tau katoa kia akatupu'ia tetai porokaramu akama'ata mai i te au mea te ngaro atura. Ei akamata atu i teia porokaramu nei e mea tau kia akamata'ia ki runga i te au mea tei anoano'ia e te ma'ata'anga o te iti tangata, inara e mea tau katoa kia akama'ata ia atu teia porokaramu kia o mai te au mea katoatoa e ngaro atura.

Ko te au 'apinga tanu o te Kuki Airani nei kua akatumu ia te reira ki runga i te au 'apinga tanu o Porinetia e pera te au 'apinga tanu ou mai ki roto i te basileia. E mea pu'apinga kia 'anga'ia tetai au ravenga no te akarakara e te 'akatinamou i te au mea tanu pu'apinga, penei e ka riro mai te reira ei au mea pu'apinga i te au tuatau i mua.

Te vai räkau Mäori, te vai nei rai tona pu'apinga o roto i to tatou ora'anga. Teia au räkau e ta anga'anga ia ana e te taunga ma'ani vai räkau, kua vaitata i te ngaro tetai pae, mei te Tütäe Törea, Takataka'ä'ara, Ti'äpito.

Te mea nunui e ngaro atura kua akakite ia te reira ki roto i te tu'anga 5 o teia puka nei. Tu'anga 4 e au akakite'anga te reira te au 'apinga natura e vai nei ki runga i te au akapapa'anga a te Natural Heritage Project.



Tamanu



Miro



Tou



Takataka'ä'ara



Tütäe Törea

Tumu Manako E: Akatanotano'anga e te akono'anga i te au mea kikino

Manakonako'anga E1: Akaiti mai i te kino o te au mea kikino ki runga i te au 'apinga natura e te au nga'i akatupu'anga ma te paruru atu i te au mea kikino ou ka tae mai.

Manakonako'anga E2: Akaiti mai i te kino o te au mea kikino ki runga i te au mea tanutanu e te au nga'i akatupu'anga ma te paruru atu i te au mea kikino ou ka tae mai.

Ka rave:

- a) 'Anga i tetai porokaramu no te au enua katoatoa kia rauka i te akarakara i te au mea kikino i runga i te au enua te riro nei i te takinokino i te au mea tanu e pera te au enua vai ua.
- e) 'Anga i tetai porokaramu no te au enua tatakitai kia rauka ia ratou i te takore atu i teia au mea kikino kia kore e ma'ata mai.
- ng) 'Anga i tetai porokaramu no te basilea ei ravenga i te akatere ma te kimi ravenga i te akaiti mai i te kino ta teia au mea e rave nei ki runga i te au mea tanutanu e pera te au enua e vai ua nei.
- i) Rave i tetai kimikimi'anga tau na roto i te apai'anga mai i tetai au tangata te ka tau no te akara matatio i te apai'anga i tetai au mea mei tetai enua ki tetai, pouroa te rākau e te au mea i roto i te tai. Kapiti atu i teia nga mea nei te LMOs e te GMOs, penei e ka tau kia 'angaia tetai putuputu'anga takake ei ravenga i akameitaki e te akateretere i te au apai'anga 'apinga katoatoa mei vao mai i te basileia e pera mei tetai enua ki tetai.

Au akamarama'anga:

Te akatakake'anga o au 'apinga takinokino i te au ngai natura e te au ngai tanutanu e mea pu'apinga te reira inara i tetai au ngai kare te reira e taka meitaki ana no te mea kua kapiti nga tu'anga e rua. Noatu ra te reira kua 'anga'ia rai nga tu'anga e rua.

Te au mea takinokino te rākau e te manumanu e manamanata ma'ata te reira no te au ngai natura e te au ngai tanutanu. Te 'apinga no konei rai te Kākerōrite riro nei te Kiore Toka (*Ship rat*) ei enemi nona. Te Tanga'eo ko tona enemi e Manu Kavamani. Ko te patito enua tei ngaro kua manako'ia e na te ro i kai. Ko te *Rarotonga Acalypha* e te



Kiore Toka

Polynesian Pilea kua manako'ia e na tetai rākau taviri (*vine*) i tamate atu. Te mamao o te au enua tatakaitai kua riro te reira ei ngata no te au rākau e te manumanu kikino i te toto'a. Akara'anga te *Ballon Vine* no Rarotonga nei mei te mata'iti 1920 inara kare te reira i toto'a ake. Te Pikika'a Papa'a tei Aitutaki te reira mei te mata'iti 1980 ina kare te reira i toto'a ake. Te Pi 'Aungakino tei Ma'uke te reira e kare i toto'a ake ki tetai enua ke. Te Kiore Toka tei Rarotonga, Mangaia, Ma'uke, Miti'aro ina kare i Aitutaki e 'Ātiu. Kare i papu e me kare rai pa'a teia kiore nei i apai'ia ana ki teia nga enua nei, me kua apai'ia ana kare ra i 'uanga ana. Te *Sandfly* i Aitutaki kua manako'ia e kua apai'ia te reira i te mata'iti 1964 no Borabora mai. Ina tei Manuae e pera a Miti'aro. Te namu apai maki dengue kua rauka i te akapapu e tei Rarotonga, tei Manihiki e Tongareva. Te *Coconut Flat Moth* kua riro ei takinokino i te nu i Rarotonga i te mataiti 2000/2001. Kua timata oki te tipatimani o te pae tanu i te paruru kia kore teia manumanu e tae ki te pa enua i vao mai ia Rarotonga. Te ma'ata ua atu rai te au mea kikino.

Tetai au mea kikino koi akamata ua akera, mei te Rākau Pikika'a i kitea mai i Mangaia. Kare i ma'ata roa teia e ka rauka i te takore atu. Ko te Tiaea e 2 mekore e 3 rai nga'i i kite'ia ki Rarotonga e ko te *Red Passionfruit* e tai rai ngai i kite ia i Ma'uke.

Ko te *Biosecurity* na te tu'anga *Quarantine* o te Minitiri o te pae tanu te reira e aka'aere ana e te rave maroiroi nei ratou i ta ratou anga'anga. Kua rauka ia ratou te paruru atu i tetai au mea kikino i te tae mai kia tatou. Akara'anga kua rauka ia ratou i te kite mai i te Patito Mama'ata no Aperika i mua ake ka riro mai ei 'ei kino no tatou.

Ko ta te tu'anga tanutanu oki e umu'umu nei ko te au mea e riro nei e takinokino i te au mea tanutanu e kua tau rai oki te reira. Kare oki ratou e no te au ngai katoatoa i runga i te enua e pera ki roto i te tai.

Te *workshop* tei rave'ia na te katoatoa kua tamanako mai te reira e kia akatupu'ia tetai putupu'anga takake kia riro e na ratou e rave i te anga'anga ta te *quarantine* e rave nei i teia tuatau. Inara kia akama'ata'ia atu tona turanga e tona mana. Kia riro e na teia putupu'anga nei e akarakara e te akatika i te au 'apinga ka apai'ia mai ki roto i te basileia e pera mei tetai enua ki tetai i roto nei i te Kuki Airani.

Te au mea kikino kua akakite'ia ki roto i te tu'anga 5 o teia puka.



Balloon Vine



Pikika'a Papa'a



Tiaea



Patito Mama'ata no Aperika

Tumu manako NG: Rā'ui'anga

Manakonako'anga NG: Rā'ui i tetai au nga'i tau mate paruru meitaki auraka kia takinokino ia.

Ka rave:

- a) 'Anga i tetai 'Aponga ei akateretere i te turanga o Suwarrow. Ko teia aponga kia riro ei taporoporo i te au mea natura e pera te akarakara i te turanga kimikimi pu'apinga i Suwarrow.
- e) 'Anga i tetai porokaramu no te rā'ui i tetai au ngai te ka tau kia taporoporo ia ki runga i te enua.
- ng) 'Anga i tetai porokaramu no te rā'ui i tetai au ngai te ka tau kia taporoporo ia ki roto i te tai.

Au akamarama'anga:

E mearikiriki oki te au motu i roto i te Kuki Airani. Me akara'ia atu te ma'ata'anga o te enua kua tau'ia e te tangata mari 'ua ko te au ngai i uta i te maunga i Rarotonga e pera te au makatea i Ngaputoru e Mangaia. Ko teia tau'anga i te enua kua akamata takere te reira i te tuatau i aere mai ei te tangata ki runga i te enua mei te 2,400 mata'iti i topa ki muri. Ko te tau'anga openga kua rave'ia te reira i te tuatau i tae mai ei te Papa'a.

Nga enua kare e no'o tinamou ia ana e te tangata koia a Suwarrow e Takutea kua o rai ki roto i te akatuke'anga o te au rākau na roto i te tanu'anga i te nu ei ma'ani kopara. Inara noatu te reira te riro nei rai teia nga enua nei ei ngai akapu'anga no tetai au manu reva e pera te kaveu. Te paruru'ia nei teia nga enua nei, ko Takutea e ngai no'o'anga no te au manu reva mei te mata'iti 1903 mai e ko Suwarrow e pāka no te basilea mei te mata'iti 1978 mai.

Te au ngai i roto i te au roto o te tai te tautai nei te tangata mei po kerekere mai. I teia tuatau nei kua oroa pau tetai au mea i roto i te tai mei te Paua i Suwarrow e Manihiki, te Onu i Pamati, te Paua i Aitutaki e te Ava i Aitutaki. I Rarotonga te au ravenga tautai no te ngutuare penei e te tauturu nei te au mea e tae mai nei mei roto i te au kauvai. Ko te au vai rākau a te aronga tanutanu e pera te maniva te riro nei ei takinokino



Tāvake



E punua Kōta'a Niu i Takūtea

i te au kai i runga i te akau. Ko teia takinokino nei kua akakite ia te reira mea mua ki roto i te ripoti taporoporo a Neville Gare (1975) . Teia tana i akakite “Te manamanata ma'ata taku i kite atu i roto i te roto o Rarotonga e Aitutaki koia oki te meangiti o te au 'apinga ora i roto i te tai. Kua akakite katoa a Dahl (1980) mei ta Gare rai i akakite. Ko eia nga ripoti e rua kua tamanako mai te reira i te akatupuanga i tetai au ngai kia rau ia, inara kare teia i rave ia ana e tae ua mai ki te mata'iti 1996 i raro ake te akatumu'anga a te Koutu Nui.

I roto i nga mata'iti e 30 o topa ake nei e ma'ata te au tamanako'anga no te rä'ui i tetai au ngai, mei te tua maunga e pera tetai au 'apinga takake mei te Käkeröri ra te tu. Mei te akariro'ia'anga a Suwarrow ei päka no te katoatoa okotai rai nga'i i runga i te enua i akataka'ia kia taporoporo'ia koia te Takitumu Conservation Area. Kua akatumu'ia teia i rotopu i tetai kumiti o te au 'atu enua e pera te putuputu'anga SPREP ei ravenga i te taporoporo i te Käkeröri. Noatu oki e na te Kavamani i akamata e te tamanako'anga kare aia i o ki roto i te akateretere'anga.

E mea tau kia kimikimi marie te Kavamani e tetai au atu enua i te taporoporo au nga'i i runga i te enua e pera i roto i te tai ei ravenga kia taporoporo'ia no te mea kua tau te reira kia rave'ia.

Akara i te Tu'anga 5 no te au ngai tei tamanako'ia kia taporoporo'ia tei oronga'ia mai e te au mata o nga enua i tai mai i roto i te uipa'anga a te katoatoa (*National Biodiversity Workshop*). Kua akakite katoa ia te au ngai taporoporo'ia e vai nei i teia tuatau.



Ngai Rä'ui i Tüoro, Rarotonga



Vao räkau piri maunga i Rarotonga



Käkeröri



Tara i Suwarrow



Teue i Manuae

Tumu Manako I: Aka'aiteite'anga i te tu'a'anga i te pu'apinga e pera te ngatakore e rauka mai ei te au 'apinga natura

Manakonako'anga I: Akapapu e kia tau meitaki te ta'anga'anga e te tu'a'anga i te pu'apinga ki te au tangata tei tau kia akatu'anga'ia.

Ka rave:

'Anga i tetai putuputu'anga kia riro ei akateretere i te kimikimi matatio'anga i te au pu'apinga te ka rauka mai mei roto i te au 'apinga natura.

Au akamarama'anga:

Me matutu te tupu'anga o te au 'apinga natura ka pu'apinga rai te au ravenga akapu'apinga o te basileia-te anga'anga turoto, päma parau, tanutanu. Tetai au tangata te maroiroi nei ratou i te ta'anga'anga i te au 'apinga natura, mei te au ravakai kimi pu'apinga no te ngutuare, arataki i te turoto na roto i te au ngai tei anoano'ia, te aronga tui ei tiare e pera te ei pupu, poreo e te vai atura, te aronga to'ito'i. Penei e te vai nei tetai au mea pu'apinga i roto i to tatou au rau räkau e pera tetai uatu au 'apinga natura te ka riro mai ei ma'ani vai räkau. Ka riro mai oki te reira ei au mea kimi pu'apinga no te basileia e pera te au tangata tei tau kia pu'apinga'ia

E mea tau kia akamaroiroi'ia te kimikimi ravenga ki roto i te au mea te ka tau kia kimikimi'ia, penei e te vai ua nei tetai au mea tau i te ma'ani vai räkau i roto nei i te basileia. Kua akatinamou te uipa'anga a te katoatoa (*National Biodiversity Workshop*) e kia riro na tetai kopapa takake e akateretere i te au anga'anga te ka tau no te kimikimi'anga i te au pu'apinga mei roto mai i te au 'apinga natura.



Ravakai ki runga i te paiere i Miti'aro



Takiri ature i Ma'uke



Raranga kete i Mangaia



Amani tapa i 'Ätiu

Tumu Manako K: Akatanotano'anga i te au kite e te karape no runga i te au 'apinga natura

Manakonako'anga K: 'Akaputu ma te taporoporo marie i te au karape no runga i te au 'apinga natura ma te tamanako meitaki i te au mea te ka tau te *Intellectual Property Rights*.

Ka rave:

- a) Kia 'akatupu ia tetai kopapa takake ei akateretere i te anga'anga kimi karape no runga i te au 'apinga natura e te au ravenga ta'anga'anga te tua tikai o te vai rākau. Ko teia kopapa nei penei e koia rai tei akataka'ia ki roto i te tu'anga i mua ake.
- e) Te porokaramu ta te *Natural Heritage Project* e rave nei koia te akaputu'anga i te au karape no runga i te au 'apinga natura, kia aere uatu rai te reira e ko teia au karape nei kia tika'ia tetai uatu tangata kia akara i te reira.

Au Akamarama'anga:

Ko te 'akaputupu'anga i te au karape no runga i te au 'apinga natura o te Kuki Airani nei kare rai te reira i oti ake. Te vai nei ki roto i te 'akaputupu'anga a te *Natural Heritage Project* mei tetai 3, 700 au 'apinga ora. Noa atu oki e kua 'akaputu'ia te au ingoa o te au rākau, te manu, te ika, te vai nei rai tetai au 'apinga ora kare i tata'ia.

Te 'akapapu'ia nei e e mea pu'apinga kia taporoporo'ia to tatou kite karape tupuna no runga i te au 'apinga natura. Te vai nei tetai au kite tupuna ka riro ei pu'apinga no te iti tangata te tu'anga tikai o te vai rākau Māori. E mea tau kia iki'ia tetai kopapa ei akateretere i teia tu'anga nei e pera te au pu'apinga te ka rauka mai. Pouroa te au pu'apinga ka rauka mai kia ta'iku ia rai te aronga tei oronga mai i te reira i te tuatau o te tu'anga i te pu'apinga.

Kua ta'iku ia rai teia tumu manako nei i te tuatau o te *National Workshop* e kua akamata te manako'anga na runga i te taporoporo'anga i te karape e kua tae ria te uriuri'anga ki te au pu'apinga te ka rauka mai mei roto i teia kite karape nei. Kua rauka mai te reira manakomanako'anga na roto i te akatinamou'ia'anga e kua aiteite rai te kite karape o Tahiti ki to te Kuki Airani nei, inara kua kitea takere'ia te karape o te Tahiti e te katoatoa. Kua akatinamou'ia e kia akaputu'ia te kite karape o te au ta'unga vai rākau me ka anoano ake ratou e kia akakite'ia rai te tangata nana i oronga mai i te reira e pera te mana teka aru i te vai rākau.

Kua 'ariki te *Workshop* e ei ravenga i te paruru i te kite karape e rauka mai ei te pu'apinga mei roto mai i taua karape nei, kia iki'ia tetai kumiti anga'anga (*Biodiversity Research Committee*) e kia akamana'ia no te akateretere i teia kia tau meitaki no te aronga no ratou taua kite karape ra e pera te aronga na ratou e kimikimi nei te kite.

Tumu Manako M: Nakirokiro mate api'i no runga i te au 'apinga natura

Manakonako'anga M: Kia ngoie ua te marama o te au 'apinga natura ki te katoatoa o te iti tangata.

Ka rave:

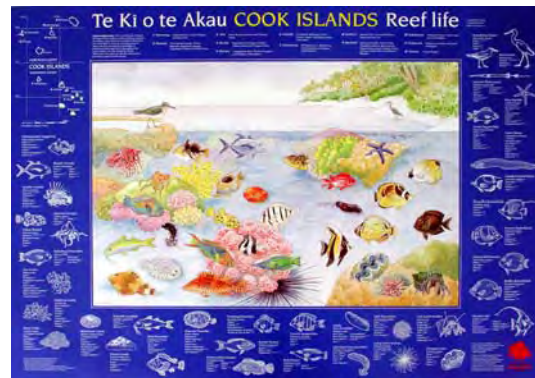
- a) Kia iki'ia tetai kumiti anga'anga ei akateretere i te au ravenga e tuku ia atu ei te au marama ki te au api'i e pera te kato'atoa.
- e) Kia akamaroiroi ia te au putuputu'anga kare i roto i te Kavamani kia kapiti atu i te au marama natura ki roto i ta ratou au anga'anga.

Au akamarama'anga:

Akamatumu'anga ma te marama i te akakoro'anga o te taporoporo kua akapapu'ia mai te reira e te *National Environment Management Strategy* (1992) . Kua akamata oki te tu'anga Taporoporo i tetai tu'anga no te api'i. Me tau te tuatau e tuku mai ana te tu'anga Taporoporo, te *Natural Heritage Project*, te *WWF*, te *TCA* i tetai au kite marama no runga i te au 'apinga natura. Ka anoano'ia oki kia akatanotano'ia te oronga'anga i te au kite marama ki te kato'atoa, ina ko ta te *Workshop* tamanako'anga ia.

Kare oki te au tangata tata api'i a te pae anga'anga api'i i piri mai ki teia tu'anga nei i te tuatau o te *Workshop* inara kua akapapu mai ratou e te rave nei ratou i teia ia ratou e teateamamao nei i te au api'i. Kua akakite'ia e kia aravei tetai uatu tangata mekore ra putuputu'anga i te au tangata o te pae api'i i mua ake ka tuku atu ei ratou i tetai au mea ki roto i te au api'i.

Au tutu, puka e tetai au 'apinga api'i tei oronga ia mai e te Natural Heritage Project:



Tutu no te ki o te akau

Au tutu no te au manu rere o te Kuki Airani

Tumu Manako N: Akariro'anga i au 'apinga natura ei anga'anga na te katoatoa

Manakonako'anga N: I roto i te au anga'anga katoatoa mei te ture, te au parani, te au porokaramu anga'anga e te vai atura, kia akao'ia atu te tuatua no te au 'apinga natura ki roto.

Ka rave:

Kia akatupu^oia tetai putuputu^oanga ei akara matatio i te au ture, te au parani e te au anga^oanga e rave^oia nei ki roto i te basileia kia tau meitaki te reira. E mea tau oki kia mata^oia te au putuputu^oanga kato^oatoa.

Au akamarama'anga:

Kua akapapu^oia e ka pu'apinga te iti tangata katoatoa e 'e akakoro^oanga pu'apinga teia no reira e mea tau kia taokotai te katoatoa i rave^oanga i te reira. E mea tau kia taokotai te au putuputu^oanga mei roto mai i te Kavamani e kia akamaroiroi^oia ratou kia taokotai i te rave^oanga i te anga^oanga mei runga mai i te anga^oanga a te basileia e tae uatu ki te au anga^oanga i roto i te au oire. Me rauka teia ka matutu meitaki te tupu^oanga o te akakoro^oanga o te au 'apinga natura.



Au matara ki uta ia Rarotonga e pera te au rākau tupu

Puka no te matara tikoti ia Rarotonga



Au ika o te roto e te akau, e kāti kare e ma'ū ei ravenga i te akapapū i te au ika.

Tumu Manako O: Te au moni akapu'apinga i te au akateretere'anga o te au 'apinga natura

Manakonako'anga O: Akapapu i te nga'i e rauka mai ei te moni kia riro ei ravenga i te akaroa i te porokaramu o te au 'apinga natura.

Ka rave:

Akatupu i tetai tu'anga moni (*Trust Fund*) ei ravenga i te turuturu i teia anga'anga pu'apinga ki roto i te basileia.

Au akamaramarama'anga:

E ma'ata te au mea ka anoano'ia kia akarakara'ia ei ravenga i te akapu'apinga i te turanga o te au 'apinga natura i te au nga'i katoatoa. E mea pu'apinga oki te moni ei turuturu i te au porokaramu o te au 'apinga natura, ko te au porokaramu tikai kare te ma'ata'anga o te iti tangata i kite. Kua 'akaoti te *Workshop* e ko teia *Trust Fund* nei kia mata ia te au putuputu'anga ravarai e tu'anga ta ratou i roto i te taporoporo'anga i te au 'apinga natura. I te mea oki e ko te Kavamani te ka pu'apinga ma'ata i teia ka akatupu'ia, e mea tau rai kia riro e na te Kavamani e oronga mai i te moni ei akatumu mekore akamata i teia anga'anga nei. Penei e ka rauka mai tetai tu'anga moni no vao mai i te basileia.

Ka oronga oki teia *Trust* nei i tana ripoti mata'iti ma te akapapa moni i te au mata'iti rava rai ki te Paramani. Ko teia ripoti nana ka tu'a ia te reira ki te au tangata tei tau kia tu i teia ripoti nei. Penei e na te tu'anga taporoporo e oronga mai i te au aronga anga'anga tata i te ripoti inara kare te reira i akatimou'ia.

Section 3: NBSAP Development Process

A. Background and Introduction

Negotiations to undertake the Cook Islands NBSAP were commenced by Wayne King of the Environment Service in February 1996. The original proposal was for USD51,000 to produce an NBSAP and an accompanying book on local biodiversity, based on extensive community participation. Over the four years of negotiation the Conference of the Parties (COP), and hence the Global Environment Facility (GEF), increasingly standardised the procedure and output format of NBSAPs and the Cook Islands gave up the book proposal but maintained the idea of an NBSAP based on extensive community participation - recognising that these communities are the primary stakeholders of Cook Islands biodiversity.

The funding negotiation was also interesting. Cook Islands requested 51,000 (2/96) and UNDP offered 145,000 (11/96); Cook Islands restructured the proposal and requested 133,000 (1/97). The negotiation thread was lost for ten months. UNDP offered 197,000 (1/98), and Cook Islands restructured and requested 162,000 (2/98). UNDP maintained their offer and the Cook Islands restructured and requested 194,000 (7/98).

The main Cook Islands negotiator of the proposal, Gerald McCormack, attended the National Biodiversity Strategy and Action Plan Workshop, 8-13 February 1999, in Fiji sponsored by WWF and SPREP. Government started the formation of a Steering Committee but this process was prolonged by a general election in July 1999 leading to a change of Government. There was a coalition Government that lasted only four months before the present coalition Government was established.

On 14 January 2000 (CM (00) 394) Cabinet appointed Gerald McCormack as the Chief Technical Consultant (CTC), and defined the composition of the Steering Committee. The CEO to the Minister of the Environment, Vaine Teokotai, was appointed Chairman of the Steering Committee. The members were: Mataora Harry and Tapuni Henry (Southern Group representatives), Willie John (Northern Group representative), I'oa Takeu-Lindsay (Environment Service representative), and Taata Tangatakino (Mayoral Forum representative).

Tuamotu Matamaki was appointed as the Chief Consultative and Administrative Consultant (CCC). The CCC was funded from the Enabling Activity funding, while the CTC continued as Director of the Natural Heritage Project and was a Government contribution to NBSAP. The Steering Committee elected to have travel and accommodation costs but not a sitting fee.

On 12 April 2000 (CM (00) 56), Cabinet approved the Project Document for submission to UNDP Samoa. The Project Document was signed on 30 June 2000 by the Hon. Norman George, DPM and Minister for the Environment, and Tom Twining-Ward for UNDP. The project duration was for 12 months. On 24 July 2001 UNDP agreed to a project extension of six months "on an exceptional basis, ... in light of the current status of the remaining activities yet to be implemented, and the scope of the island consultations". This was primarily to enable workshops in the remote Northern Group islands. Unfortunately, because of limited travel options it was possible to hold workshops in the two villages of Penrhyn only.

Vaine Teokotai attended two workshops: (1) Economic Valuation of Biological Diversity, Nadi, Fiji, 14-18 February 2000; and (2) Regional Workshop on Financial Mechanisms for Implementing National Biodiversity Strategies and Action Plans, Suva, Fiji, 30 October to 3 November 2000.

Tuamotu Matamaki and Mataora Harry attended the Regional Workshop on Mainstreaming National Biodiversity Strategies and Action Plans, Nadi, Fiji, 28th May to 1st June 2001. This was an important workshop and our participants led the discussion at the National Biodiversity Workshop on Mainstreaming.

The proposal allowed for the funding of Short-term National Consultants with special expertise. Under this provision Poona Samuel (Agriculture, Quarantine), Sonny Tatuava and Ian Bertram (Marine Resources) and Mataora Harry (Maori language specialist) were able to contribute their expertise. In addition, five overseas specialists were able to contribute to aspects of the technical reports of the NBSAP: Stephen Innes (bibliography), Malcolm Francis (marine fishes), Sonja Miller (marine invertebrates), Rob Blakemore (earthworms), and Joe Beatty (spiders).

B. Community Workshops - Conservation Meetings

Despite the amalgamation of the mainly isolated islands of the Cook Islands into a nation starting with the London Missionary Society missionaries and teachers in the 1820s and its formalisation around 1900, most islands have maintained strong elements of their separate socio-political and cultural traditions. Furthermore the ownership of the land and hence its biodiversity remains firmly in the hands of each community.

In formulating a national plan for the separate communities to conserve their biodiversity through species management programmes and protected areas, and the control of invasive species, it is unrealistic to assemble expert groups in Rarotonga for a top-down approach or to represent the communities through a few representatives without initial widespread community consultation. The Cook islands NBSAP therefore took a strong bottom-up approach to enable extensive participation by the members of the larger communities, thereby being a major awareness and capacity building programme. Each community workshop elected four participants to represent them at the National Biodiversity Workshop, where they were joined by representatives of the main government agencies concerned with the maintenance or use of biodiversity, and interested NGOs.

In the future it will be necessary to create “expert” national groups to coordinate the recommendations of the National Biodiversity Workshop to maintain biodiversity and control invasives.

Typically the community workshops were about eight days with two distinct components. The first component, the one relevant here, was the Conservation Meeting, usually of two or three days duration. The second component was the Knowledge Meeting, which was an essential part of building capacity and awareness of biodiversity. Its information was of a technical nature and related to the technical output of the NBSAP process – an output not known to have been undertaken by any other country.

Conservation Meetings were held on the Southern Outer Islands, in the three vaka (districts) of Rarotonga and on the remote atoll of Penrhyn. Because of staff and time limitations workshops were not held on Manihiki, Rakahanga, Palmerston, Pukapuka or Nassau. It is therefore important that these islands have workshops to build awareness and capacity in the near future.

Conservation Meetings enabled the community to focus on their endangered and invasive species in both their natural and agrodomestic ecosystems.

Endangered Plants/Animals Sessions

There was an introductory presentation on biodiversity and the concept of endangered species with Cook Islands examples. The idea was to encourage the community to give a balanced consideration to endangered plants and animals in natural or wild ecosystems as distinct from the more familiar species in the agricultural and domestic ecosystems. The workshop was organised to develop separate lists for the four categories of the matrix: plants and animals in the natural ecosystem (namely P1 and A1), and plants and animals in the agricultural and domestic ecosystems (namely P2 and A2). Although data was collected on these four categories, the methodology varied, and sometimes the ecosystem categories were unclear. For example, on Rarotonga the species of the inland mountains form a distinct group from those of the horticultural belt and coastal lowland, while on Aitutaki there are no unutilised forestlands and the distinction was irrelevant. On the makatea islands the division was moderately useful.

Endangered Plants/Animals Submissions

The participants were divided into work-groups to develop a list of species for each category of the matrix. The information for each species was standardised to a simple four-point system, as shown in the table. The information was typically provided in Māori, and translated into English later. Plants and animals of interest were identified by the Chief Technical Consultant during the meetings, although in a few cases samples were taken for later identification.

The top endangered species identified in each category are listed in Section 5 (1. Community Identified Endangered Species, p.63). In addition, Section 4 (parts 5 and 6, pages 58 to 61), presents Natural Heritage Project data on Cook Islands endemic species, and on native species that are seriously nationally endangered.

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There was an introductory presentation on the concepts of habitat and ecosystems and how these might be managed or conserved by a system of protected areas. The participants were asked to recommend one terrestrial area and one marine area of special attention as a protected area or rāhui.

This section of the meetings did a lot of awareness building but produced few concrete recommendations. The information was carried to the National Biodiversity Workshop where the main proposed areas were listed. There is a need for a national approach to the development of protected areas.

See Section 5 (3. Community proposed protected areas, p.78) for a summary of areas suggested by the representatives of each island at the National Biodiversity Workshop. There is a summary of the existing protected areas of the Cook Islands presented in Section 4 (7. Cook Islands protected areas, p.62).

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There was an introductory presentation on invasive species which we divided into weeds (plant invasives) and animal pests (animal invasives). Again we encouraged a separation of those that are invasives in the natural ecosystems and those that are invasives in the agricultural and domestic ecosystems.

Weeds and animal pests are concepts open to different interpretations. Typically animal pests were straightforward, although the evaluation of animals useful agriculturally and invasive in natural ecosystems was difficult and interesting. The idea of a plant as a weed was often countered by the knowledge that it also had a usefulness. In many cases it was difficult to decide whether the negative impacts of a species outweighed the useful features. Fortunately there were many species that were clearly more negative and these should be

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		Ecosystem type	
		Natural	Agro/domestic
Species type	Plant	P1	P2
	Animal	A1	A2

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English later. Plants and animals of interest were identified by the Chief Technical Consultant during the meetings, although in a few cases samples were taken for later identification.

Endangered Plant/Animal Submissions	
a	Its name (any language)
b	Why it should be saved
c	Where it lives and how abundant it is
d	What is threatening it and how it might be saved

The top endangered species identified in each category are listed in Section 5 (1. Community Identified Endangered Species, p.63). In addition, Section 4 (parts 5 and 6, pages 58 to 61), presents Natural Heritage Project data on Cook Islands endemic species, and on native species that are seriously nationally endangered.

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Weeds/Animals Pests Submissions

The recording system for the work-groups was again a simple four-point system. One of the highlights of the sessions was the entertaining presentation of results and comments from other workgroups. After the presentations the whole workshop voted for the top invasives in each category.

The top invasive species identified in each category are listed in Section 5 (2. Community identified invasive species, p. 71).

Weeds/Animal Pests Submissions	
a	Its name
b	What damage it does (or would do)
c	Where it lives and how abundant it is
d	What might be done to control it (or to make sure it never arrives)

C. National Biodiversity Workshop

The National Biodiversity Workshop involved representatives of each of the community workshops, government agencies and NGOs with biodiversity-related activities or involvement. Unfortunately the remote northern atolls were poorly represented. Their environmental problems are quite different from those of the more heavily populated islands of the Southern Group, and there is a need to have a separate meeting of Northern Group people in the future to develop an integrated approach to their biodiversity needs.

The participants had a day of introductory presentations by a wide range of speakers to bring the focus up from the community level of the Community Workshops to a national and integrated focus to develop a national strategy and action plan. The participants were then divided into two groups to enable an input on all the basic aspects of a National Biodiversity Strategy and Action Plan aiming to meet our obligations as a signatory to the Convention on Biological Diversity, upon which the workshop sessions were based.

Presenters and Resource Personnel:

Vaine Teotokai, Karla Eggelton, Tanya Temata, Gerald McCormack, Thomas Samuel, Ed Saul, Jacqui Evans, Eddie Drollet, Ian Bertram, William Wignore, Poona Samuel, Pasha Carnuthers, Vaitoti Tupa, Jolene Bosanquet.

Representatives:

Rarotonga: Richard Akanoa, David Anoa, William Cowan, Tereapii Enua, Maria Henderson, Lily Henry, Kapu Joseph, Motu Kora, Carina Langford, Avaiki Aperau, Mou Mouauri, Joe Ngatae, Michael Tavioni, Tamara Teretai, Tony Utanga, and Tom Wichman.

Mangaia: Allan Tuara, Tako Ruatoe, Tere Tauakume, and Tearapiri Teaurina.

Ōtū: Vainameroa Koronui, Teremoana Mingi, Ina Teiotu, and Tanga Vainepoto.

Ma'uke: Putai Kairae, Tereapii Dyer, Roland Papa, and Vae Oti.

Miti'āro: Julian Apuni, Tuaine Ngametua, Ake Pouao, and Matatai Taia.

Aitutaki: Ana Kiria, Teiti Teiti, Maki Toko, and Tai Turia.

Manihiki: Matai Mokoroa and Teina Tuatai.

Rakahanga: Taunga Temu and Mrs Taunga Temu

Pendhyn: Willie John.

Agriculture: Poona Samuel, Noo Tokari, and William Wignore.

Marine Resources: Ian Bertram.

Environment: Pasha Carnuthers, Dianne McFadzien, Tauraki Raea, Tania Temata, and Vaitoti Tupa.

NBSAP Steering Committee: Mataora Harry, Tapuni Henry, Taata Tangatakino, and Vaine Teotokai.

NBSAP Coordinators: Tuamotu Matamaki and Gerald McCormack.

Workshop Programme

Day 1 – Monday 25 June 2001

8.30 - 10.00 am	<p>Opening Prayer Opening Address - Deputy Prime Minister, Hon. Norman George Cook Islands Biodiversity and NBSAP - Gerald McCormack</p>
10.30 - Noon	<p>Economic Benefits of Biodiversity The economic value of Biodiversity - Vaine Teokotai, Chairman NBSAP Steering Committee Tourism and Biodiversity - Carla Eggelton of Tourist Authority Genetic Resources and the sharing of benefits - Tanya Temata of Environment Service (ES) Information and Education Inventories of Biodiversity and related information - Gerald McCormack of NHP Biodiversity in school curricula – Thomas Samuel of the Education Curriculum Unit Biodiversity Knowledge and Intellectual Property Rights – Tanya Temata of ES</p>
1.00 - 2.30 am	<p>Actions to maintain noteworthy Cook Islands biodiversity Kakerori Recovery Programme and the Takitumu Conservation Area - Ed Saul of TCA Rarotonga's Marine Rā'oui - Jacqui Evans for Koutu Nui Suwarrow National Park - Eddie Drollet of Prime Minister's Office Takūtea Wildlife Sanctuary - Gerald McCormack for Aronga Mana of 'Ātiū Marine Biodiversity management – Ian Bertram of Ministry of Marine Resources Conservation of agrospecies, incl. gene banks – William Wigmore of Agriculture Ministry</p>
3.00 - 4.30 pm	<p>Controlling Invasive Species Biosecurity (Management of invasive plants and animals) - Poona Samuel of Quarantine Biosafety and LMOs - Tanya Temata of Environment Service Special groups: PICCAP biodiversity-related activities – Pasha Carruthers Environment Service biodiversity-related activities – Vaitoti Tupa WWF Biodiversity-related activities - Jacqui Evans Taporoporoanga Ipukarea Society biodiversity-related activities - Jolene Bosanquet</p>

Day 2 – Tuesday 26 June 2001

	Green Group	Blue Group
8.30 - 9.00 am	Introductory presentation on endemic and endangered plants and animals	
9.00 - 10.00 am	Theme A: Endangered Species Management Goal 1 – Conserve Cook Islands native and important naturalised species of plants and animals and provide for their sustainable use.	Theme A: Endangered Species Management Goal 2 – Conserve important agricultural and non-naturalised species and provide for their sustainable use (Agro-Biodiversity).
10.30 - Noon	continue	continue
1.00 - 2.30 pm	continue	continue
3.00 - 3.30 am	Introductory presentation on invasive plants and animals	
3.30 - 4.30 pm	Theme B: Invasive Species Management Goal 1: Reduce the adverse impacts of invasive species on indigenous species and ecosystems, and prevent new invasions.	Theme B: Invasive Species Management Goal 2: Reduce the adverse impacts of invasive species on agricultural species and ecosystems, and prevent new invasions.

Day 3 –Wednesday 27 June 2001

	Green Group	Blue Group
8.30 - 10.00 am	continue	continue
10.30 - Noon	continue	continue
1.00 - 2.30 pm	Theme C: Ecosystem Management Goal – Conserve important ecosystems through a system of protected areas with regulated and monitored activities.	Theme D: Equitable Sharing of Biodiversity Benefits, and Access to Genetic Resources Goal – Ensure that the uses of biodiversity, including genetic resources, bring equitable benefits to relevant stakeholders.
3.00 - 4.30 pm	continue	continue

Day 4 - Thursday 28 June 2001

	Green Group	Blue Group
8.30 - 10.00 am	Theme E: Management of Biodiversity Knowledge Goal – Record and maintain records of scientific and traditional knowledge related to biodiversity, with consideration of Intellectual Property Rights	Theme F: Biodiversity Awareness and Education Goal - Make biodiversity information more readily available to all stakeholders and interested people
10.30 - Noon	continue	continue
1.00 - 2.30 pm	Theme G: Mainstreaming Biodiversity Goal: Integrate biodiversity into national and sectoral legislation, policies, plans and programmes.	Theme H: Financial Resources and Mechanisms Goal – Secure long-term financial sustainability for all biodiversity related activities and programmes.
3.30 - 4.30 pm	continue	continue

Day 5 - Friday 29 June 2001

	Green Group	Blue Group
8.30 - 10.00 am	Plenary - workshop finalisation of proposed activities from the two groups	
10.30 - Noon	Plenary - preparation of the Workshop Communiqué	
1.00 - 2.30 am	Closing Session Hon. Norman George	



Back Row: (left to right)

Tere Tauakume, William Wigmore, Nao Tokari, Maki Toko, Richard Akanoa.

3rd Row:

Tauraki Raea, Tapuni Henry, William Cowan, Teerapiri Teaurina, Gerald McCormack, Pasha Carruthers, Tuamotu Matamaki, Matara Harry, Thaine Ngameta, Ina Teitotu, Teerapii Dyer, Roland Papa, Michael Taviani.

2nd Row: (left to right)

Tai Turia, Tom Wichman, David Anoa, Kapu Joseph, Willie John, Taata Tangatokino, Tangata Vainepoto, Poora Samuel, Vae Oti, Teiti Teiti, Joe Ngatae, Julian Apuriri, Teremara Mirigi, Vainamerua Koronui, Allan Tuara.

Seated: (left to right)

Vaine Teokotai, Tony Utanga, Awaiki Aperau, Tamara Teretai, Maria Henderson, Teerapii Enua, Matai Mākorua, Mrs Taunga Temu, Ana Kiria, Takō Ruatōe, Mōauri Tangimehua, Ake Pouao, Teina Tuatai, Matatai Taia, Carina Langford, Motu Korua.

Front: (left to right)

Putai Kaitrae, (grandchild), Lily Henry, Tangi Vainepoto.

Workshop Summary and Communiqué

The following communiqué was reviewed in detail and revised in the Plenary sessions.

Endangered Species Programmes

The development of programmes to conserve endangered species were seen as urgent for various native species and for some species and varieties of agricultural and domestic importance. The unique flowering plants such as the Miti ʻāro Fan-Palm (*Iniao*), the Te Manga Cyrtandra and the Cook Islands Myoporum (*Ngaio*) were absorbed into a programme to survey and conserve endemic flowering plants and other endangered native flowering plants. Among the endangered natives included were the important timber trees *Tamaru* (Pacific Mahogany), *Miro* (Portia Tree) and *Tou* (Pacific Rosewood).

The agriculture programme included the conservation of rare varieties of *Taro* (Wetland Taro) along with other introduced agrospecies. Community-based herbal medicine is a fundamental aspect of Cook Islands culture and a special programme was proposed to ensure the conservation of rarer medicinal (*vai rākau*) plants, such as the small *Tūtāe Tōrea* (*Lindernia*), *Ti ʻāpito* (an Adder's-tongue fern) and *Kava Māori*, the latter having been lost from several islands.

Other endangered species programmes included one for endemic and rare native animals, including birds, and one for marine animals commonly used by the communities for food. The focus in this section of the Workshop was on programmes emphasising species-management.

Invasive Species Programmes

Participants found no shortage of invasive species to fill the various invasive species programmes. The first programme was one to eradicate invasives that have recently invaded or are otherwise still restricted in their distribution on different islands. For example, most islands rated the thorny Sensitive Weed (*Rākau Pikikaʻa*) as one of their most troublesome agricultural invasives, yet it had only three small populations on Mangaia. Red Passionfruit is a major forest invasive on Rarotonga and ʻĀtiu, yet on Maʻuke it is restricted to a small area along one road. Most islands had some invasives for which complete removal or eradication was realistic if decisive action is taken in the near future.

Every island had several candidates for a programme to reduce the abundance of some of the already widespread and serious invasives. The classic example within the programme was Balloon Vine on Rarotonga which had increased dramatically in the last twenty years and now covers many trees on the lowlands and in the outskirts of the inland native forest. Mosquitoes and sandflies (*Culicoides belkini*) need to be controlled - the latter first appeared on Aitutaki in 1964, and has since spread to Manuae and Miti ʻāro.

There was much concern about the arrival of new invasives from other countries and from other islands within the country. The Ministry of Agriculture recounted their interception of Giant African Snails on a container delivered to a site on Rarotonga - this large snail is a voracious consumer of vegetables. The workshop reflected on invasives in different categories, such as in agriculture, in the marine environment, of medical importance, and within the native forest.

After much discussion it was decided to recommend that Government investigate the practicality of moving away from the traditional New Zealand model of having "quarantine" within mainline Ministries such as Agriculture and Marine Resources, and create an independent multi-stakeholder Biosecurity Agency to control the movement of terrestrial and marine plants and animals into and out of the country, and between the islands. Such an agency would bring a more integrated and uniform approach to the introduction of plants and animals by the general public, the Ministry of Agriculture and the Ministry of Marine Resources.

Inter-island Biosecurity was a major concern with destructive invasives such as the recently-arrived Coconut Flat-moth on Rarotonga, but not yet to the Outer Islands. Because the islands are physically isolated the distribution of invasives is irregular. For example, the Giant Sensitive-Weed, the more destructive big-brother of Sensitive Weed, is presently only on Aitutaki; the parasitic Dodder is presently on only two islands; and Sicklepod (*Pi ʻAungakimo*) is restricted to Maʻuke where it rates as that community's most troublesome weed. The Ship Rat (*Kiore Toka*) is not on Aitutaki nor on ʻĀtiu, which enables these islands to support rat threatened birds. The urgency of the problem of arrival of new invasives requires immediate action while long term solutions are sought.

Ecosystems and Protected Areas

The Cook Islands is a Party to the 1976 Apia Convention (Convention on the Protection of Nature in the South Pacific) to develop national systems of protected areas. Within two years of signing, the Government declared the uninhabited island of Suvarrow a National Park, to protect its wildlife. The Convention on Biological Diversity again commits its Members to establish protected areas to conserve important species and ecosystems.

The participants concluded that the conservation and sustainable use of Suvarrow should be managed by an independent Suvarrow National Park Authority, representing the main stakeholders. It was concluded that a representative management group could be entrusted with the responsibility to manage wildlife conservation and environmentally sustainable revenue-generating activities.

Equitable Sharing of Benefits and Access to Biodiversity

The focus moved rapidly to the management of access by foreign people to the biodiversity resources of the Cook Islands, in particular, resources that might be medically beneficial. The Workshop concluded that a "lock the stable" approach was unrealistic and would drive

researchers elsewhere and the Cook Islands would simply miss out on the benefits of such research. At present all research undertaken by filmmakers, historians, anthropologists, doctors, geologists, oceanographers, biologists and so forth are approved and registered by the National Research Committee. It was concluded that biodiversity research was such a diverse area that it should be managed by an independent body developed for this specific purpose, and that this group should be pro-active in encouraging research for potentially useful chemicals within our biodiversity.

Management of Knowledge Related to Biodiversity

While it was recognised that there should be programmes to record local plants and animals, and to map and record ecosystems and protected areas, the main discussion was on intellectual property rights, especially that related to the medicinal use of plants and marine animals. This topic was also a focus of attention by the group dealing with "Equitable Sharing of Benefits and Access to Biodiversity".

Discussion initially emphasised protection of knowledge but gradually moved towards ways to benefit from knowledge. The change in emphasis came about mainly as it was recognised that much of Cook Islands herbal knowledge is similar to that of Tahiti and that in both countries much of the information is already in the public domain. It was concluded that there should be a programme to record the medicinal knowledge of the practitioners who wish to have their knowledge recorded, with full acknowledgement of the informant and the nature of the associated *mana*.

The workshop concluded that the best way to both protect and benefit from traditional knowledge was to have a specific and pro-active Biodiversity Research Committee with suitable legislated powers to manage the interests of both the knowledge owners and the researchers.

Biodiversity Awareness and Education

Awareness programmes should be included in all biodiversity-related programmes. Unfortunately the Education Curriculum Officers were unable to attend this session so it was simply concluded that integrating biodiversity education into the school curriculum was essential and that this should be included as an important programme.

Mainstreaming

To achieve shared responsibility it is important that policies, programmes, administrative and financial activities, at national, district and community levels include biodiversity concerns. This will be a continuous process leading to long-term sustainability.

Financial Resources and Mechanisms

The Workshop concluded that there should be a specific Biodiversity Trust Fund to support the wide range of activities required to maintain local biodiversity in an integrated and equitable manner. Such a Trust would consist of a board representing the different communities, traditional leaders and the main Government bodies involved with biodiversity. Because the Government is one of the main beneficiaries of local biodiversity it was concluded that Government should provide the core funding for the Trust Fund, supported where possible by overseas donors.

The Board would table annual reports with audited accounts to Parliament, and make these reports available for wider distribution. The secretariat for the Board could be provided by the Environment Service, but it would have the power to change this arrangement if the need arose.

Conclusion





The signatories to the Convention on Biological Diversity have committed themselves to: (1) conserve their endangered species; (2) develop a system of protected areas; (3) reduce the harmful effects of invasive species and prevent further invasions; (4) use biodiversity in a sustainable manner; (5) preserve all knowledge related to biodiversity; and (6) ensure an equitable sharing of benefits.

The Workshop participants developed a series of programmes and mechanisms by which the Government could meet its obligations as a Party to the Convention.

Section 4: Cook Islands Biodiversity

The following tables of species have been provided by the Cook Islands Natural Heritage Project, which collects scientific and traditional knowledge on all Cook Islands plants and animals. The NHP is developing a multimedia database that presently lists about 3,700 species.

This screen image shows the first four birds for the database selection: “Native - Atiu - Land birds”.

Species found = 7		Higher Taxons downward	CLOSE
	Landbird Native, Resident Breeder Scientific: <Ducula pacifica> English: Pacific Pigeon Traditional: Rupe Family: COLUMBIDAE (Pigeon & Dove)	More?	Other Names: Significance: ID Features: OTHER COMMON: None. TRADITIONAL: Rupe (RR, AT, MK, MT, MH), Pigeon / Rupe (PL), Lupe (FK)
	Landbird Native, Resident Breeder, Endemic c Scientific: <Ptilinopus rarotongensis> English: Cook Islands Fruit Dove Traditional: Kūkupa Family: COLUMBIDAE (Pigeon & Dove)	More?	Other Names: Significance: ID Features: OTHER COMMON: None. TRADITIONAL: Kūkupa (RR, AT, MK)
	Landbird Native, Resident Breeder, Endemic c Scientific: <Aerodramus sawtelli> English: Atiu Swiftlet Traditional: Kōpeka Family: APODIDAE (Swift)	More?	Other Names: Significance: ID Features: OTHER COMMON: None. TRADITIONAL: Kōpeka (AT, MK)
	Landbird Native, Endemic of se.Polynesia Scientific: <Halcyon tuta> English: Chattering Kingfisher Traditional: Ngōtare Family: ALCEDINIDAE (Kingfisher)	More?	Other Names: Significance: ID Features: OTHER COMMON: None. TRADITIONAL: Kōtare (RR), Ngōtare (AT, MK)

1. Terrestrial Animal Biodiversity

Updated: 25/11/2001

BioGroup	No.	Origin	Notes
Land Mammals	1 3 10	Native Intro. Poly. Intro. Recent	- Pacific Fruit-Bat only - Pacific Rat, Polynesian Dog, and Polynesian Pig - excluding extirpated Donkey, Sheep, Rabbit
Birds - Land	11 2	Native Intro. recent	- including the Grey Duck and Reef-Heron; 6 are endemic - Blue Lorikeet and Common Myna naturalised - there are about 6 species of cagebirds
Birds - Migratory	6 7	Regular Vagrant	- including the Bar-tailed Godwit - known from less than 5 sightings
Birds - Seabirds	18 22	breeding non-breeding	- breeding seabirds, including 5 breeding procellariids - non-breeding vagrants and migrants
Lizards	1 10 1	Native Intro. Poly Intro. Recent	- Mournful-Parent Gecko - 2-3 of these might be native - House Gecko
Turtles/Tortoises	1	Intro. Recent	- Common Long-necked Tortoise naturalised on Manuae, excluding Red-eared Slider short-lived on Rarotonga
Snakes	-	Nil	- no native land-snakes
Frogs/Toads	-	Nil	- no native frogs/toads, introduction of Southern Bell-Frog failed, and invasion by Cane Toad destroyed by Quarantine.
Earthworms	1 8	Native Introduced	- upper-shore species - probably all Recent
Landcrabs	17	Native	- 6 COENOBITIDS, 7 GRAPSIDS, and 4 Cardisoma
Landsnails/Slugs	45 2	Native Intro. Recent	- 12 are endemic, excluding the 14 extinct endemics - 4 Recent
Scorpions	2	all sources	- 1 native and 1 Introduced - Recent
Mites			no estimate
Spiders	66	all sources	- origins not determined, 3-4 possibly endemic
Millipedes	4	Intro. Recent	
Centipedes	4	Intro. Recent	- 1 might be native
Insects	1300	all sources	- origins not determined. Endemics not determined

Insect Biodiversity by Family

Updated: 25/11/2001

Orders of Insects	Known species	Likely Total	Notes on likely origin
Thysanura - silverfishes	1	5	all introduced since 1820
Odonata - dragonflies	11	13	all indigenous, continuous arrival
Blattodea - cockroaches	6	10	~3 indigenous, the rest introduced since 1820
Isoptera - termites	2	6	~all introduced since 1820
Mantodea - praying-mantids	1	1	introduced - recent - probably not established
Dermaptera - earwigs	2	3	~all introduced since 1820
Orthoptera - grasshoppers	6	20	all introduced since 1820
Phasmatodea - stickinsects	1	1	introduced - Polynesian
Embioptera - web-spinners	1	1	probable record Aitutaki, introduced since 1820
Psocoptera - booklice	2	6	all introduced since 1820
Phthiraptera - lice Sucking Lice	4 ?	10 ?	sucking lice introduced since 1770 mainly indigenous species on birds
Hemiptera - true bugs	(56)*	200	30-50 indigenous (including 3-6 endemics), the rest introduced since 1820
Thysanoptera - thrips	1	4	all introduced since 1820
Neuroptera - lacewings	3	5	all introduced since 1820
Coleoptera - beetles	(53)*	250	50-75 indigenous (including 5-10 endemics), the rest introduced since 1820
Siphonaptera - fleas	1	3	Cat Flea only so far, introduced since 1820
Diptera - true flies	(26)*	300	70-100 indigenous (including 5-10 endemics), the rest introduced since 1820
Lepidoptera - butterflies & moths	186	200	± all indigenous, continuous arrival (including ~2 endemics, and ~10 Eastern Polynesian endemics)
Hymenoptera - wasps & ants	(92)*	200	50-70 indigenous (including 2-3 endemics), the rest introduced since 1820
Total of likely insect species:		~1,250	

2. Terrestrial Plant Biodiversity

Updated: 25/11/2001

BioGroup	No.	Origin	Notes
Fungi - typical	?	Native	- unknown, probably more than 100 species
Fungi - lichens	88	Native	- incl. 1 endemic; total probably about 200 species
Mosses	45	Native	- incl. 5 endemic; total probably more than 100
Ferns & allies	97 15	Native Intro. Recent	- 7 endemics - ornamentals, several have naturalised
Flowering Plants	183 56 832	Native Intro. Recent	- incl. 3 probably lost, incl. 24 endemics (1 lost) - mainly food plants, but also various weedy species - on Database, probably a further 200 unrecorded

3. Freshwater Biodiversity

Updated: 25/11/2001

BioGroup	No.	Origin	Notes
Fish	9 4	Native Intro. Recent	- including 3 anguillid eels - Tilapia and "mosquito-eating fishes"
Snails/Slugs	2 3	Native Intro. Recent	- 1 very rare - 2 Polynesian, 1 Recent
Insects	6	Native	- Dragonflies, Damselflies, Waterstrider and beetle
Crustacea	6 1	Native Intro. Recent	- 5 prawns and 1 crab - short-lived, did not establish

4. Marine Animal and Plant Biodiversity

Updated: 25/11/2001

BioGroup	Species	Origin	Notes
Mammals	7 1 5	Native, Resident Native, Migrant Native, Vagrant	- resident - Humpback Whale here each year, ?plus others - visit irregularly, probably do not breed here
Reptiles	4	Native	- 3 marine turtles, and pelagic Yellow-bellied Sea-Snake
Fish - Bony	570	Native	- including 89 deepbottom or pelagic species
Sharks & Rays	22	Native	- 17 sharks and 5 rays
Shellfish	390 4	Native Intro. Recent	- 304 gastropods, 74 bivalves, 12 others - Trochus, Hippos, <i>Tridacna gigas</i> and <i>Tridacna derasa</i>
Crustacea	100	Native	- including 35 shrimps
Echinoderms	50	Native	- including 20 sea-cucumbers
Worms	51	Native	- "worm-like" animals, under-represented
Corals - stony	116	Native	- including 25 staghorn corals, excluding solitary and soft-corals
Flowering Plants	0	na	- no mangroves, no seagrasses
Seaweeds / Algae	62 1 or 2	Native Introduced	- not well recorded, probably around 150 species - by MMR

5. Endemic Species Still Existent in the Cook Islands

Seriously endangered species are marked with asterisks (***) and **printed in bold type**.
Key: E/ck = Endemic of the Cook Islands; 1 = on one island, 2 = on two islands

Plants:

Moss	E/ck1	FISSIDENTACEAE	<i>Moenkemeyera rarotongae</i> , Rarotonga Moenkemeyera
Moss	E/ck1	SPIRIDENTACEAE	<i>Spiridens armatus</i>
Fern	E/ck1	GRAMMITIDACEAE	<i>Grammitis cheesemaniae</i> , Cloud Grass-fern
Fern	E/ck4	POLYPODIACEAE	*** <i>Phymatosorus katuii</i> , Cook Islands Oak-leaf Fern
Fern	E/ck1	HYMENOPHYLLACEAE	<i>Hymenophyllum involucreatum</i> , Rarotonga Filmy-fern
Fern	E/ck1	CYATHEACEAE	<i>Cyathea parksiae</i> , Rough Tree-fern (Panga Tua-taratara*)
Fern	E/ck?1	THELYPTERIDACEAE	<i>Pseudophegopteris paludosa</i> , Mist Thelypterid
Fern	E/ck?1	ASPLENIACEAE	<i>Asplenium parksii</i> , Parks' Aplenium
Fern	E/ck1	ASPIDACEAE	*** <i>Acrophorus leucorhachis</i> , Rarotonga Acrophorus
Herb	E/ck2	PIPERACEAE	<i>Peperomia rhomboidea</i> , Cook Islands Peperomia
Herb	E/ck1	PIPERACEAE	<i>Peperomia wilderi</i> , Rarotonga Peperomia
Tree	E/ck2	FLACOURTIACEAE	<i>Homalium acuminatum</i> , Cook Islands Homalium
Herb	E/ck1	BRASSICACEAE	*** <i>Lepidium n.sp.Sykes</i> , Mitiaro Peppergrass
Tree	E/ck4	MYRSINACEAE	<i>Myrsine cheesemaniae</i> , Cook Islands Myrsine
Tree	E/ck4	PITTOSPORACEAE	<i>Pittosporum rarotongense</i> , Cook Islands Pittosporum
Shrub	E/ck1	HALORAGACEAE	*** <i>Haloragis n.sp.Sykes</i> , Rarotonga Haloragis
Herb	E/ck1	BALANOPHORACEAE	*** <i>Balanophora wilderi</i> , Rarotonga Balanophora
Tree	E/ck1	ARALIACEAE	<i>Meryta pauciflora</i> , Rarotonga Meryta
Shrub	E/ck1	LOGANIACEAE	<i>Geniostoma rarotongensis</i> , Rarotonga Geniostoma
Shrub	E/ck2	LOGANIACEAE	<i>Geniostoma sykesii</i> , Makatea Geniostoma
Shrub	E/ck2	MYOPORACEAE	<i>Myoporum wilderi</i> , Cook Islands Myoporum
Shrub	E/ck1	GESNERIACEAE	*** <i>Cyrtandra lillianae</i> , Te Manga Cyrtandra
Shrub	E/ck1	GESNERIACEAE	*** <i>Cyrtandra rarotongensis</i> , Rarotonga Cyrtandra
Shrub	E/ck1	CAMPANULACEAE	*** <i>Sclerotheca viridiflora</i> , Rarotonga Sclerotheca
Tree	E/ck1	RUBIACEAE	<i>Coprosma laevigata</i> , Rarotonga Coprosma
Shrub	E/ck1	RUBIACEAE	<i>Psychotria whistleri</i> , Rarotonga Psychotria
Tree	E/ck1	ASTERACEAE	<i>Fitchia speciosa</i> , Rarotonga Fitchia
Palm	E/ck1	ARECACEAE	*** <i>Pritchardia mitiarioana</i> , Mitiaro Fan-Palm
Tree	E/ck2	PANDANACEAE	<i>Pandanus arapepe</i> , Ngaputoru Pandanus
Grass	E/ck1	POACEAE	*** <i>Garnotia cheesemaniae</i> , Rarotonga Garnotia-Grass
Herb	E/ck1	ORCHIDACEAE	*** <i>Habenaria amplifolia</i> , Rarotonga Ground-Orchid

6. Native Species Seriously Nationally Endangered

Excluding the endangered native species that are endemic and denoted in the above table with three asterisks (***), the following are native species that are seriously nationally-endangered.

Plants:

Fern	N	OPHIOGLOSSACEAE	<i>Ophioglossum nudicaule</i> , Adder's-tongue Fern
Fern	N	OPHIOGLOSSACEAE	<i>Ophioglossum reticulatum</i> , Stalked Adder's-tongue Fern (<i>Ti^aapito</i>)
Fern	N	SINOPTERIDACEAE	<i>Cheilanthes concolor</i> , Cheilanthes Fern
Fern	N	VITTARIACEAE	<i>Antrophyum plantagineum</i> , Antrophyum Fern
Fern	N	DENNSTAEDTIACEAE	<i>Hypolepis dicksonioides</i> , Cloud Ground-Fern
Vine	N	MENISPERMACEAE	<i>Cocculus orbiculatus</i> , Cocculus Vine
Tree	N	ULMACEAE	<i>Trema cannabina</i> , Trema
Shrub	NEP ^{se}	SANTALACEAE	<i>Santalum insulare</i> , Polynesian Sandalwood (<i>A^o</i>)
Shrub	N?	MALVACEAE	<i>Gossypium hirsutum</i> var. <i>taitense</i> , Upland Cotton
Tree	N	COMBRETACEAE	<i>Terminalia samoensis</i> , Samoan Tropical-Almond
Tree	N	EUPHORBIACEAE	<i>Homalanthus nutans</i> , Southsea Homalanthus
Tree	N	RHAMNACEAE	<i>Alphitonia zizyphoides</i> , Alphitonia (<i>Toi</i>)
Vine	N	RHAMNACEAE	<i>Ventilago vitiensis</i> , Ventilago Vine
Sedge	N	CYPERACEAE	<i>Gahnia aspera</i> , Dark-flower Sedge
Sedge	N	CYPERACEAE	<i>Isolepis nodosa</i> , Leafless Sedge
Grass	N	POACEAE	<i>Cenchrus calyculatus</i> , Native Burr-Grass
Herb	NEsPX	ORCHIDACEAE	<i>Liparis clypeolum</i> , One-leaf Orchid
Herb	N	ORCHIDACEAE	<i>Peristylus minimiflorus</i> , Peristylus Orchid

Animals:

FW snail	N	NERITIDAE	<i>Neritina porcata</i>
Crab	N	PORTUNIDAE	<i>Scylla serrata</i> , Mangrove Crab (<i>Úpaki</i>)
Turtle	N	CHELONIIDAE	<i>Caretta caretta</i> , Loggerhead Turtle
Turtle	N	CHELONIIDAE	<i>Chelonia mydas</i> , Green Turtle (<i>^oOnu Kai</i>)
Turtle	N	CHELONIIDAE	<i>Eretmochelys imbricata</i> , Hawksbill Turtle (<i>^oOnu Taratara</i>)
Seabird	N	PROCELLARIIDAE	<i>Pterodroma brevipes</i> , Collared Petrel
Seabird	NVagB	PROCELLARIIDAE	<i>Pterodroma neglecta</i> , Kermadec Petrel
Seabird	N	PROCELLARIIDAE	<i>Pterodroma nigripennis</i> , Black-winged Petrel (<i>Titi</i>)
Seabird	N	PROCELLARIIDAE	<i>Puffinus lhierminieri</i> , Audubon's Shearwater

Seabird	N	PROCELLARIIDAE	(<i>Räkoa (Mangaia)</i>) <i>Puffinus pacificus</i> , Wedge-tailed Shearwater (<i>Úpoa</i>)
Seabird	N	SULIDAE	<i>Sula dactylatra</i> , Masked Booby (<i>Lulu (Pukapuka)</i>)
Landbird	N	RALLIDAE	<i>Porzana tabuensis</i> , Spotless Crake (<i>Mo^oomo^o</i>)
Migrant Bird	N	SCOLOPACIDAE	<i>Numenius tahitiensis</i> , Bristle-thighed Curlew (<i>Teue</i>)
Seabird	NVagB	STERNIDAE	<i>Sterna lunata</i> , Spectacled Tern
Seabird	N	STERNIDAE	<i>Sterna sumatrana</i> , Black-naped Tern (<i>Kakavai Mäui</i>)
Seabird	N	STERNIDAE	<i>Procelsterna cerulea</i> , Blue-grey Noddy (<i>Kära^uura^u</i>)

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Fern	N	SINOPTERIDACEAE	<i>Cheilanthes concolor</i> , Cheilanthes Fern
Fern	N	VITTARIACEAE	<i>Antrophyum plantagineum</i> , Antrophyum Fern
Fern	N	DENNSTAEDTIACEAE	<i>Hypolepis dicksonioides</i> , Cloud Ground-Fern
Vine	N	MENISPERMACEAE	<i>Cocculus orbiculatus</i> , Cocculus Vine
Tree	N	ULMACEAE	<i>Trema cannabina</i> , Trema
Shrub	NEPse	SANTALACEAE	<i>Santalum insulare</i> , Polynesian Sandalwood (A'i)
Shrub	N?	MALVACEAE	<i>Gossypium hirsutum</i> var. <i>taitense</i> , Upland Cotton
Tree	N	COMBRETACEAE	<i>Terminalia samoensis</i> , Samoan Tropical-Almond
Tree	N	EUPHORBIACEAE	<i>Homalanthus nutans</i> , Southsea Homalanthus
Tree	N	RHAMNACEAE	<i>Alphitonia zizyphoides</i> , Alphitonia (Toi)
Vine	N	RHAMNACEAE	<i>Ventilago vitiensis</i> , Ventilago Vine
Sedge	N	CYPERACEAE	<i>Gahnia aspera</i> , Dark-flower Sedge
Sedge	N	CYPERACEAE	<i>Isolepis nodosa</i> , Leafless Sedge
Grass	N	POACEAE	<i>Cenchrus calyculatus</i> , Native Burr-Grass
Herb	NEsPX	ORCHIDACEAE	<i>Liparis clypeolum</i> , One-leaf Orchid
Herb	N	ORCHIDACEAE	<i>Peristylus minimiflorus</i> , Peristylus Orchid

7. Cook Islands Protected Areas

The following table includes protected areas regardless of whether they are called national parks, nature reserves, rä^oui, motu, marine reserves, conservation areas or wildlife sanctuaries.

7. Cook Islands Protected Areas

The following table includes protected areas regardless of whether they are called national parks, nature reserves, rāʻui, motu, marine reserves, conservation areas or wildlife sanctuaries.

Takūtea	Takūtea Wildlife Sanctuary	120ha	1903; re-established 1950 under Aronga Mana	
Suwarrow	Suwarrow National Park	160ha	1978. Under Prime Minister's Office. 160ha of land, lagoon inclusion not determined.	
Rarotonga	Tākitumu Conservation Area	155ha	1996. Under landowner committee.	
Rarotonga	Pouara Rāʻui	5ha	Feb. 1998 for 2yrs; open 1day; closed for 2yrs.	
	Avana-Aroko-Nukupure Rāʻui	37ha	Feb. 1998 for 2yrs. Part kept closed and part open for 2weeks; closed for 2yrs.	
	Tikioki Rāʻui (2yrs) Tikioki Marine Sanctuary Akapouao Rāʻui	16ha ?2ha 37ha	Feb. 1998 for 2yrs; most opened open 1 day, closed permanently Feb. 2000 for 2 yrs.	
	Rutaki Rāʻui Kavera / Betela Rāʻui Āroa Rāʻui	18ha 36ha 16ha	Feb. 1998 for 10mths. - opened Nov. Mar. 1999 for 10mths - opened Dec. Mar. 2000 for 2yrs.	
	Nika'o Rāʻui	23ha	Feb. 1998 for 2 yrs; opened 3 wks; imposed March 2000 for 2 yrs.	
	Vaimaanga Rāʻui	66ha	Apr. 2000 for 9mths.	
	Parliament Rāʻui	20ha	early 2000 for 5yrs.	
	Ruaau Rāʻui	64ha	early 2000 for 9mths, now removed.	
	Rarotonga typical TOTAL		120ha	12% of reef-flat (120 of 1000ha)
	Aitutaki	Ootu Reserve	190ha	?1993: ~140ha in lagoon. June 2000: 140ha No Entry, added 50ha Restricted Entry to southeast corner.
Maina Reserve		440ha	June 2000: 210ha No Entry, mainly reef-flat; and 230ha Restricted Entry in lagoon.	
Motukituu Reserve		80ha	June 2000: Restricted Entry 80ha in lagoon; (No Entry 130ha, mainly reef-flat, not implemented)	
Aitutaki TOTAL		700ha	10% (7 of 72km ²) of lagoon and reef-flat	
Pukapuka	Motu Kōtaʻa	90ha	ancient to Yato village, whole islet	
	Motu Ko	300ha	ancient to Ngake village, whole islet	
	Motu Uta	50ha	ancient to Loto village, on Wale islet, 30% of islet	
	Motu Nuia	10ha		
	Pukapuka TOTAL		450ha	ancient to Yato village, on Wale islet 81% of land area (450 of 550ha)

Section 5: Biodiversity Information from the Workshops

1. Community Identified Endangered Species

Biological identifications per the Cook Islands Biodiversity and Natural Heritage Database.

Key: “W” is Wild/Natural ecosystems, and “D” is Domestic/Agricultural ecosystems; and “P” is Plant and “A” is Animal.

RAROTONGA

Rarotonga, Te Au-o-Tonga - animals (wild and domestic)

<i>Rank</i>	<i>Scientific Name</i>	<i>English Name</i>	<i>Local name</i>	<i>Notes</i>
W1	<i>Chelonia mydas</i>	Green Turtle	°Onu	
W2	<i>Ducula pacifica</i>	Pacific Pigeon	Rupe	
W3	<i>Leptoscarus vaigiensis</i>	Seagrass Parrotfish	°Ümoemoe	
W4	<i>Tringa incana</i>	Wandering Tattler	Kuriri	
W5	<i>Asaphis violascens</i>	Pacific Asaphis	Ka°i	
W6	Blennies	Blennies	Panako	
W7	<i>Mulloidichthys flavolineatus</i>	Yellowstripe Goatfish	Köma	the young Vete
W8	<i>Modiolus auriculatus</i>	Winged Mussel	Kuku	
D1	<i>Equus caballus</i>	Horse	°Oro-°enua	
D2	<i>Capra hircus</i>	Goat	Puakani°o	

Rarotonga, Te Au-o-Tonga - plants (wild and domestic)

<i>Rank</i>	<i>Scientific Name</i>	<i>English Name</i>	<i>Local name</i>	<i>Notes</i>
W1	<i>Cordia subcordata</i>	Pacific Rosewood	Tou	
W2	<i>Ophioglossum reticulatum</i>	Stalked Adder’s-tongue Fern	Ti°apito	
W3	<i>Tacca leontopetaloides</i>	Pacific Arrowroot	Pia Māori / Piä-°ei	
W4	<i>Sophora tomentosa</i>	Silverbush	Pö°utukava	
W5	<i>Abelmoschus moschatus</i>	Muskmallow	°Aute	Ta°uri°au (MG), Vavai Tara (AT) MK MT AK)

W6	<i>Pipturus argenteus</i>	Pipturus	Orongä	
D1	<i>Piper methysticum</i>	Kava Shrub	Kava Mäori	
D2	<i>Solanum viride</i>	Garland Berry	Poro ^o ti	
D3	<i>Epiphyllum oxypetalum</i>	Queen-of-the-night Cactus	Tiare Ora-varu	
D4	<i>Artocarpus heterophyllus</i>	Jackfruit	Kuru Papa ^a	also called Kuru Tiaki

Rarotonga, Takitumu - animals (wild and domestic)

Rank	Scientific Name	English Name	Local name	Notes
W1=	<i>Selar crumenophthalmus</i>	Bigeeye Scad	^o Ature	
W1=			Mo ^o emo ^e (plankton)	
W3	<i>Macrobrachium lar</i>	Bracelet Prawn	Köurä-vai	Köurä-vai T ^o aka
	<i>Macrobrachium latimanus</i>	Thick-claw Prawn		Köurä-vai Rapa-nui
W4	<i>Turbo setosus</i>	Rough Turban	Ariri	
W5	<i>Pteropus tonganus</i>	Pacific Fruit-Bat	Moä Kirikiri	
W6	<i>Eleotris fusca</i>	Brown Gudgeon	Kökopu	Inanga (young Kokopu)
W7	<i>Puffinus pacificus</i>	Wedge-tailed Shearwater	Üpoa	
D1	<i>Equus caballus</i>	Horse	^o Oro- ^e enua	
D2	<i>Sus scrofa</i> hybrids	Pig	Puaka Maori	
D3	<i>Cairina moschata</i>	Muscovy Duck	Mokorä	

Rarotonga, Takitumu - plants (wild and domestic)

Rank	Scientific Name	English Name	Local name	Notes
W1	<i>Tacca leontopetaloides</i>	Pacific Arrowroot	Piä- ^o ei / Pia-a ^o ei	Pia Mäori
W2	<i>Lindernia crustacea</i>	Lindernia	Tütäe Törea	
W3	<i>Peperomia pallida</i>	Glossy Peperomia	Pikimato	check ID
W4	<i>Musa troglodytarum</i>	Mountain Banana	^o Ütü	
W5	<i>Ficus tinctoria</i>	Dye Fig	Mati	
W6	<i>Chamaesyce fosbergii</i>	Polynesian Beach-Spurge	Totototo	
D1	<i>Piper methysticum</i>	Kava Shrub	Kava Mäori	
D2	<i>Leucas decemdentata</i>	Leucas	Püa ^o ikao	Püeikao
D3			Renga Maori	not in database
D4	<i>Solanum viride</i>	Garland Berry	Por ^o ti	

Rarotonga, Puaikura - animals (wild and domestic)

Rank	Scientific Name	English Name	Local name	Notes
W1	<i>Ducula pacifica</i>	Pacific Pigeon	Rupe	
W2	<i>Puffinus pacificus</i>	Wedge-tailed Shearwater	Üpoa	
W3	<i>Macrobrachium lar</i>	Bracelet Prawn	Köurä-vai	mainly Köurä-vai T ^o aka

D1	<i>Gallus gallus</i>	Domestic Fowl	Moa Kainga
D2	<i>Equus caballus</i>	Horse	°Oro-°enua
D3	<i>Capra hircus</i>	Goat	Puakani°o

Rarotonga, Puaikura - plants (wild and domestic)

<i>Rank</i>	<i>Scientific Name</i>	<i>English Name</i>	<i>Local name</i>
W1	<i>Elaeocarpus tonganus</i>	Polynesian Elaeocarpus	Karaka
W2	<i>Ficus tinctoria</i>	Dye Fig	Mati
W3	<i>Bischofia javanica</i>	Bischofia	Koka
D1	<i>Leucas decemdentata</i>	Leucas	Püeikao
D2	<i>Musa troglodytarum</i>	Mountain Banana	°Ütü
D3	<i>Lindernia crustacea</i>	Lindernia	Tütäe Törea

AITUTAKI

Aitutaki - wild (plants and animals)

<i>Rank</i>	<i>Scientific Name</i>	<i>English Name</i>	<i>Local name</i>	<i>Notes</i>
P1=	<i>Cordia subcordata</i>	Pacific Rosewood	Tou	
P1=	<i>Thespesia populnea</i>	Portia Tree	Miro	
P3	<i>Peperomia pallida</i>	Glossy Peperomia	Pikimato	check ID
P4	<i>Ficus tinctoria</i>	Dye Fig	Mati	
P5	<i>Aleurites moluccana</i>	Candlenut	Tuitui	
A1	<i>Apis mellifera</i>	Honey Bee	Rango meri	

Other plants mentioned: Kaika makatea, Ii, Maire enua, Tutae torea, Mapua, Rokaroka, Kokii

Other animals mentioned: Paua, Rakoa, Piraki, Onu, Karavia, Eengu, Kuriri, Kuramoo, Tupa, Upaki

Aitutaki - agro/domestic (plants and animals)

<i>Rank</i>	<i>Scientific Name</i>	<i>English Name</i>	<i>Local name</i>	<i>Notes</i>
P1	<i>Solanum viride</i>	Garland Berry	Porofiti	
P2	<i>Annona squamosa</i>	Sugar Apple	Naponapo	Tapotapo Māori
P3	<i>Vitex trifolia</i>	Medicinal Vitex	Rara	
P4	<i>Plumeria rubra</i>	Frangipani	Tipani °Eua	
A1	<i>Equus caballus</i>	Horse	°Oro-°enua	

Other plants mentioned: Parapotini, Tiare Maori, Sunflower, Tiare Venevene, Rau-Ti, Honeysuckle, Pawpaw, Lemon, Coconut, Vei

Other animals mentioned: Onu, Cattle, Pigs, Horse, Goats, Chicken

MA'UKE

Ma'uke - wild (plants and animals)

<i>Rank</i>	<i>Scientific Name</i>	<i>English Name</i>	<i>Local name</i>	<i>Notes</i>
P1	<i>Cyrtosperma merkusii</i>	Atoll Taro	Puraka	
P2	<i>Musa troglodytarum</i>	Mountain Banana	Vë'i	
P3	<i>Leucas decemdentata</i>	Leucas	Nüroa	Püeikao
P4	<i>Kyllinga nemoralis</i>	White Kyllinga	Neke °Enea	
P5	<i>Phyllanthus virgatus</i>	Early Phyllanthus	Matakura	Moemoe °Enea
P6		Two Seaweeds	Remu ponini & kotaa	check ID
P7			Po'oto	ID???
P8	<i>Syzygium malaccensis</i>	Malay Apple	Ka'ika Tavake	Ka'ika Māori
A1	<i>Birgus latro</i>	Coconut Crab	Unga Kaveu	
A2	<i>Conger cinereus</i>	Conger Eel	Köiro	°Ä'ä Teatea (RR)
A3	<i>Anas superciliosa</i>	Grey Duck	Mokorä Vairau	

Others mentioned: Poro'iti, Oro Enea, Mape (Pilinut), Mo'ó

Ma'uke - agro/domestic (plants and animals)

<i>Rank</i>	<i>Scientific Name</i>	<i>English Name</i>	<i>Local name</i>	<i>Notes</i>
P1	<i>Dioscorea alata</i>	Winged Yam	U'i	
P2	<i>Xanthosoma sagit</i>	Taruä	Taro Taruä	
P3	<i>Solanum viride</i>	Garland Berry	Poro'iti	
P4	<i>Cocos nucifera</i>	Coconut Palm	Nu Pokura / Kere	particular varieties
P5	<i>Talinium paniculatum</i>	Talinium	Pi Mörri	
P6	<i>Capsicum frutescens</i>	Chilli Pepper	°Öporo	
P7	<i>Tacca leontopetaloides</i>	Pacific Arrowroot	Pia Māori	
P8	<i>Passiflora quadrangularis</i>	Giant Granadilla	Maratini	
P9	<i>Vanilla planifolia</i>	Vanilla	Vänira	
A1=	<i>Cairina moschata</i>	Muscovy Duck	Mokorä	
A1=	<i>Meleagris gallopavo</i>	Turkey	Pipikororö	
A1=	<i>Equus caballus</i>	Horse	°Oro°enea	

Other plants mentioned: Taretare, Toatoa Vai, Anani Maori, Aratita (Peanut)

MITI'ĀRO

Miti'āro - animals (wild)

<i>Rank</i>	<i>Scientific Name</i>	<i>English Name</i>	<i>Local name</i>	<i>Notes</i>
A1	<i>Birgus latro</i>	Coconut Crab	Üngäkave'u	
A2	<i>Porzana tabuensis</i>	Spotless Crane	Mo'o	
A3	<i>Tridacna maxima</i>	Elongate Giant-clam	Pä'ua	
A4=	<i>Asaphis violascens</i>	Pacific Asaphis	Ka'i	
A4=	<i>Panulirus longipes</i>	Double-spine Spiny-Lobster	Kōura	
A6	<i>Chelonia mydas</i>	Green Turtle	°Onu	
A7	<i>Apis mellifera</i>	Honey Bee	Rango Meri	
A8	<i>Thunnus albacares</i>	Yellowfin Tuna	°A'ai °Iku-rōroa	
A9	<i>Phaethon rubricauda</i>	Red-tailed Tropicbird	Tavake	
A10	<i>Decapterus macarellus</i>	Mackerel Scad	Köperu	plus two other species

Others mentioned: To'everi, Trochus

Miti'āro - animals (agro/domestic)

<i>Rank</i>	<i>Scientific Name</i>	<i>English Name</i>	<i>Local name</i>
A1	<i>Equus caballus</i>	Horse	°Oro°enua
A2	<i>Cairina moschata</i>	Muscovy Duck	Mokorä Käinga
A3	<i>Chanos chanos</i>	Milkfish	Ava
A4	<i>Capra hircus</i>	Goat	Pokoni'o

Miti'āro - plants (wild)

<i>Rank</i>	<i>Scientific Name</i>	<i>English Name</i>	<i>Local name</i>	<i>Notes</i>
W1	<i>Santalum insulare</i>	Polynesian Sandalwood	A'i	Including Maramia variety for fish baskets
W2	<i>Pandanus tectorius</i> complex	Pandanus	Rau makatea	
W3	<i>Alyxia stellata</i>	Alyxia	Maire	
W4	<i>Tacca leontopetaloides</i>	Pacific Arrowroot	Pia Māori	
D1	<i>Solanum viride</i>	Garland Berry	Poroporo	Poro°iti elsewhere
D2	<i>Vanilla planifolia</i>	Vanilla	Vänira	
D3	<i>Leucas decemdentata</i>	Leucas	Nuroa	
D4=	<i>Cananga odorata</i>	Perfume Tree	Mata°oi	
D4=	<i>Musa troglodytarum</i>	Mountain Banana	Vë'i	
D6	<i>Mirabilis jalapa</i>	Four-o'clock Flower	Tiare Moe	

Others mentioned: Vi 'Uru'uru (Otaheite Apple, D), Mata Koviriviri (W), Mati (W), Puapua (Acalypha Weed, W), Mauku Puakatoro (Water-Grass, W)

MANGAIA

Mangaia - endangered all

Rank	Scientific Name	English Name	Local name	Notes
W1	<i>Terminalia glabrata</i>	Polynesian Tropical-Almond	Taraira	
W2=	<i>Calophyllum inophyllum</i>	Polynesian Mahogany	Tamanu	
W2=	<i>Cordia subcordata</i>	Pacific Rosewood	Tou	
W4	<i>Barringtonia asiatica</i>	Barringtonia	°Utu	
D1	<i>Solanum viride</i>	Garland Berry	Porō°iti	
D2	<i>Piper methysticum</i>	Kava Shrub	Kava Māori	
W1	<i>Pteropus tonganus</i>	Pacific Fruit-Bat	Moä Kirikiri	
W2	<i>Halcyon ruficollaris</i>	Mangaia Kingfisher	Tangae°o	
W3	<i>Anas superciliosa</i>	Grey Duck	Mokorä	is name complete?
W4	<i>Birgus latro</i>	Coconut Crab	Unga Puku°ara	
W5	<i>Procelsterna cerulea</i>	Blue-grey Noddy	Kāra°ura°u	
D1	<i>Equus caballus</i>	Horse	°Aka°oro	
D2	<i>Capra hircus</i>	Goat	Pu°āni°o	

Other animals mentioned: Ature, Tarapuatoro, Paua Kute, Kuku, Paua, Trochus, Pirake, Tavake, Titi

Other plants mentioned: Maararau, Riply Queen, Ti Varani, Rauta°i, Ma°oi ???, Anini Maori, Puraka, Tumu Enuu (Native Chaff-weed), Tutae Torea, Kava Maori, Nekeneke (a yam), Vanilla, Parapotini, Mangaro & Pokura (???)

‘ĀTIU

‘Ātiu - wild (plants)

Rank	Scientific Name	English Name	Local name	Notes
P1	<i>Dioscorea alata</i>	Winged Yam	U°i Teve	check ID
P2	<i>Caulerpa racemosa</i>	Sea-Grapes Seaweed	Remu	
P3	<i>Pandanus tectorius</i> complex	Pandanus	°Ara-tai	
P4	<i>Cananga odorata</i>	Perfume Tree	Motoi	domestic?
P5	<i>Citrus sinensis</i>	Sweet Orange	°Ānani Māori	check ID, domestic?

Other plants mentioned: Piäkato (Leather Fern, *Acrostichum aureum*), To°etupou (*Geophila*, *Geophila repens*), Vē°i (Mountain Banana, *Musa troglodytarum*), Vavai Tara (Muskmallow, *Abelmoschus moschatus*)

‘Ātiu - wild (animals)

Rank	Scientific Name	English Name	Local name
A1	<i>Birgus latro</i>	Coconut Crab	Unga Kaveu
A2	<i>Apis mellifera</i>	Honey Bee	Rango Meri
A3	<i>Anas superciliosa</i>	Grey Duck	Mokorä Taetaevao
A4	<i>Phaethon lepturus</i>	White-tailed Tropicbird	Pirake
A5	<i>Porzana tabuensis</i>	Spotless Crake	Mo°o

Others wild animals mentioned: Ngöio (Brown Noddy, *Anous stolidus*), °Aravi°i (Long-tailed Cuckoo, *Eudynamis taitensis*), Tītirakoia (Black-winged Petrel, *Pterodroma nigripennis*), Kötuku (Reef Heron, *Egretta sacra*), Toretoreä (Pacific Golden-Plover, *Pluvialis fulva*)

‘Ātiu - agro/domestic (animals)

Rank	Scientific Name	English Name	Local name	Notes
A1	<i>Sus scrofa</i> hybrids	Pig	Puaka	
A2	<i>Capra hircus</i>	Goat	Puakanio	
A3	<i>Gallus gallus</i>	Domestic Fowl	Moa Tumutumu	check variety
A4	<i>Equus caballus</i>	Horse	°Oro°enua	
A5	<i>Canis familiaris</i>	Dog	Kuri	

Other domestic animals mentioned: Mokorä Kainga (Muscovy Duck, *Cairina moschata*)

‘Ātiu - agro/domestic (plants)

Rank	Scientific Name	English Name	Local name	Notes
P1	<i>Colocasia esculenta</i>	Wetland Taro	Taro Atiu (Niue)	
P2	<i>Citrus aurantifolia</i>	Lime	Tīporo	
P3	<i>Manihot esculenta</i>	Cassava	Māniota	
P5	<i>Persea americana</i>	Avocado	°Āpuka	
P6	<i>Musa nana</i>	Cavendish Banana	Meika Kina	Meika °Āmoa of Rarotonga

Other domestic plants mentioned: Raparapa (Carambola, *Averrhoa carambola*), Kātara°apa (Soursop, *Annona muricata*) Kaika Makatea (Malay Apple, *Syzygium malaccensis*), Rēmene (Lemon, *Citrus limon*), Tiare Māori (Tahitian Gardenia, *Gardenia taitensis*), Takatakai°ara (Medicine Daisy, *Dichrocephala integrifolia*), °Aute (Paper Mulberry, *Broussonetia papyrifera*), Kauariki (Tropical Almond, *Terminalia catappa*)

PENRHYN

Penrhyn - wild (plants) - Nearly lost

<i>Rank</i>	<i>Scientific Name</i>	<i>English Name</i>	<i>Local name</i>	<i>Notes</i>
P1	<i>Pandanus tectorius</i>	Pandanus	Hara Ngangie	a variety of edible pandanus
P2	"	"	Hara Vaevae	"
	"	"	Hara Tävai	"
P3	<i>Cordia subcordata</i>	Rosewood	Tou	
P4	<i>Hernandia nymphaeifolia</i>	Lantern Tree	Puka	one tree in Omoka
P5	<i>Timonius polygamus</i>	Timonius	Turämoa	on two motu only

Edible Pandanus propagated by cuttings, not by seed. There were nine named varieties (Hara Ngangie, Tävai, Vaevae, Tüeka, Kura, Säkatu, Moenga, Kina, and Soamimi).

Penrhyn - wild (animals) - Endangered

<i>Rank</i>	<i>Scientific Name</i>	<i>English Name</i>	<i>Local name</i>	<i>Notes</i>
A1	<i>Sterna fuscata</i>	Sooty Tern	Tara	
A2			Miamoa	unidentified small bird - migratory?
A3	<i>Birgus latro</i>	Coconut Crab	Kaveu	
A4			Tonu	
A5	<i>Sphyaena</i> spp.	Barracudas	Tätü	* see below
A5	<i>Epinephelus polyphkadion</i>	Marbled Grouper	Häpuku	** see below
A6		Young fishes	Kikosami	

* *Sphyaena forsteri* and *Sphyaena helleri* Blackspot Barracuda and Sharpfin Barracuda

** ID ? possibly Brown-marbled Grouper (*Epinephelus fuscoguttatus*)

Penrhyn - agro/domestic (animals) - endangered - nil

Penrhyn - agro/domestic (plants) Endangered

<i>Rank</i>	<i>Scientific Name</i>	<i>English Name</i>	<i>Local name</i>
P1	<i>Musa</i> spp	Banana	Maika
P2	<i>Cucurbita pepo</i>	Pumpkin	Mautini
P3	<i>Citrullus lanatus</i>	Water Melon	Merëni
P5	<i>Hibiscus rosa-sinensis</i>	Scarlet Double-Hibiscus	Kaute Kumukumu

2. Community Identified Invasive Species

Biological identifications per the Cook Islands Biodiversity and Natural Heritage Database.

Notes on insect pests: ants, scale-insects, mealybugs, aphids, caterpillars and whiteflies were simply listed as a group and there is a need to identify the species that people find the most troublesome.

RAROTONGA

Rarotonga, Te Au-o-Tonga - weeds (wild and domestic)

Rank	Scientific Name	English Name	Local name	Notes
P1	<i>Sorghum bicolor</i>	Grain Sorghum	Tarapī	
P2	<i>Cardiospermum grandiflorum</i>	Grand Balloon-Vine	Kopūpū Takaviri	
P3	<i>Mimosa pudica</i>	Sensitive Weed	Rākau Pikika ^a	
P4	<i>Bidens pilosa</i>	Beggar's-tick	Piripiri Kerekere	
P5	<i>Mikania micrantha</i>	Mile-a-minute Weed	Maire i te miniti	
P6	<i>Ficus benjamina</i>	Benjamin Fig	Tamarumarū	
P7	<i>Cenchrus echinatus</i>	Burr Grass	Piripiri Putaputa	Pārango (Ngāpūtoru)
P8	<i>Elephantopus spicatus</i>	False Elephant's-foot	Tapuae ʻErepani	
P9	<i>Paspalum conjugatum</i>	T-Grass	Mauku Taravao	

Rarotonga, Te Au-o-Tonga - animal pests (wild and domestic)

Rank	Scientific Name	English Name	Local name	Notes
A1	<i>Aedes polynesiensis</i>	Polynesian Mosquito	Namu-Tore	
	<i>Aedes aegypti</i>	Egyptian Mosquito		
A2	<i>Acanthaster planci</i>	Crown-of-Thorns	Taramea	
A3	<i>Ctenocephalides felis</i>	"Dog Flea"	Tutua	is actually the Cat Flea
A4	not identified	Blowfly	Rango Iro	Rango kakā (Ngaputoru)
A5	<i>Rattus rattus</i>	Ship Rat	Kiore Toka	main species
A6	<i>Periplaneta americana</i>	American Cockroach	Kararu	
A7		Ants	Rō	worst species need ID
A8	<i>Scolopendra subspinipes</i>	Brown Centipede	Veri Tara	
A9	DROSOPHILIDAE	a Vinegar Fly	Naonao	
A10	<i>Acridotheres tristis</i>	Common Myna	Manu Kavamani	
A11	<i>Pediculus humanus</i>	Head Louse	Kutu Tangata	

Rarotonga, Takitumu - weeds (wild and domestic)

Rank	Scientific Name	English Name	Local name	Notes
P1	<i>Solanum capsicoides</i>	Spiny Necklace-berry	Porofiti Taratara	
P2	<i>Brachiaria mutica</i>	Para Grass	Mauku Para	usually Mauku Puakatoro
P3	<i>Xanthium purgens</i>	Cockleburr	-	
P4	<i>Mimosa pudica</i>	Sensitive Weed	Tatani Pikika ^a	Rākau Pikika ^a
P5	<i>Desmodium incanum</i>	Spanish Clover	Tita Paniora	Local name coined
P6	<i>Lantana camara</i>	Lantana	Tātaramoa	
P7	<i>Cenchrus echinatus</i>	Beach Burr	Piripiri Pārango	

Rarotonga, Takitumu - animal pests (wild and domestic)

Rank	Scientific Name	English Name	Local name	Notes
A1		Ants	Rō	
A2	<i>Aedes polynesiensis</i>	Polynesian Mosquito	Namu	and ?Egyptian Mosquito
A3	<i>Rattus rattus</i>	Ship Rat	Kiore-toka	
A4	<i>Periplaneta americana</i>	American Cockroach	Kararu	
A5	<i>Musca domestica</i>	Housefly	Rango Kainga	
A6	<i>Acanthaster planci</i>	Crown-of-Thorns	Taramea	
A7	<i>Polistes olivaceus</i>	Yellow Paper-Hornet	Rango Patia	
A8	<i>Scolopendra subspinipes</i> ?ID	Brown Centipede	Veri-tara	
A9	<i>Physalia utriculus</i>	Portuguese Man-o'-war	Tütæ To ^o rä	or Tü-pakipaki-tai

Rarotonga, Puaikura - weeds (wild and domestic)

Rank	Scientific Name	English Name	Local name	Notes
P1	<i>Brachiaria mutica</i>	Para Grass	Matie Puakatoro	
P2	<i>Cardiospermum grandiflorum</i>	Grand Balloon-Vine	Käkä Taviri	or Kopüpü Takaviri
P3	<i>Elephantopus spicatus</i>	False Elephant's-foot	Tapuae ^o Erepani	
P4	<i>Xanthium purgens</i>	Cockleburr	-	
P5	<i>Mimosa pudica</i>	Sensitive Weed	Rākau Pikika ^a	
P6	<i>Ruellia prostrata</i>	Creeping Ruellia	-	

Other weeds mentioned: Mauku oropäpā Bermuda Grass, Mauku Vai Commelina, Rattlepod Red-streaked, Po'ue Beach Pea

Rarotonga, Puaikura - animal pests (wild and domestic)

Rank	Scientific Name	English Name	Local name	Notes
A1		Whitefly		
A2	<i>Bactrocera xanthodes</i> <i>Dacus melanotus</i>	Pacific Fruitfly Cook Islands Fruitfly	Ongaonga	

A3		Aphids		
A4		Mealybugs		
A5	<i>Aedes polynesiensis</i>	Polynesian Mosquito	Namu	also Namu-Tore
A6	<i>Rattus rattus</i>	Ship Rat	Kiore Toka	
A7	<i>Periplaneta americana</i>	American Cockroach	Kararu	
A8		Slug on vegetables	Patito 'Enuā	
A9		Caterpillars	Anue	
A10		Ants	Rö	
A11	<i>Trigoniulus</i> species	Purple Millipede	Veri Tinito	
A12	<i>Acridotheres tristis</i>	Common Myna	Manu Kavamani	

AITUTAKI

Aitutaki - weeds (wild and domestic)

Rank	Scientific Name	English Name	Local name	Notes
P1	<i>Mimosa invisa</i>	Giant Sensitive Weed	Pikika ^a Papa ^a	
P2	<i>Brachiaria mutica</i>	Paragrass	Mauku Tara	usually Para Karäti on AK
P3	<i>Panicum maximum</i>	Guinea Grass	Tinikaräti	
P4	<i>Chrysopogon aciculatus</i>	Cling-grass	Tumu ^o Enuā	
P5	<i>Cenchrus echinatus</i>	Burr Grass	Piripiri	
P6	<i>Bidens pilosa</i>	Beggar's-tick	Piripiri Niroa	also Piripiri Kerekere
P7	<i>Indigofera suffruticosa</i>	Indigo	^o Initiko	
P8	<i>Elephantopus mollis</i> or <i>Elephantopus spicatus</i>	Elephant's-foot or False Elephant's-foot	Tapuae ^o Erepani	check ID
P9			Käkä	check ID
P10	<i>Hibiscus tiliaceus</i>	Tree Hibiscus	^o Au	

Other weeds mentioned: Totototo (Garden Spurge), Onion Grass

Aitutaki - animal pests (wild and domestic)

Rank	Scientific Name	English Name	Local name	Notes
A1	<i>Aedes polynesiensis</i>	Polynesian Mosquito	Namu	
A2	<i>Periplaneta americana</i>	American Cockroach	Ka ^a	also Kararu
A3		Ants	Ro	
A4	<i>Culicoides belkini</i>	No-see-'em Sandfly	-	
A5	<i>Epilachna vigintioctopunctata</i>	28-spot Ladybird	-	
A6	<i>Agonoxena pyrogramma</i>	Coconut Flat-moth	-	
A7	<i>Rattus exulans</i>	Pacific Rat	Kiore Toka	

A8	<i>Chrysomya megacephala</i>	Blowfly	Rango Iro
A9	<i>Acanthaster planci</i>	Crown-of-Thorns	Taramea
A10	<i>Pediculus humanus</i>	Head Louse	Kutu

Others pests mentioned: Veri - centipede, Rango Patia, Manu Kavamani, Ka'a -cockroach

MA'UKE

Ma'uke - weeds (wild and domestic)

Rank	Scientific Name	English Name	Local name	Notes
P1	<i>Pueraria phaseoloides</i>	Tropical Kudzu	Kudzu	
P2	<i>Senna obtusifolia</i>	Sickle Pod	Pi Aungakino	
P3	<i>Elephantopus mollis</i>	Elephant's-foot or False Elephant's-foot	Tapuae Erepani	
P4	Unidentified clumping grass on central plateau.		Mauku Puakatoro	ID?
P5	<i>Syngonium augustatum</i>	Leaflet Taro-vine	-	
P6	<i>Syzygium cumini</i>	Java Plum	Kaika	
P7	<i>Derris malaccensis</i>	Derris	Ora Papua	
P8	<i>Sorghum bicolor</i>	Grain Sorghum	Tarapi	
P9	<i>Cenchrus echinatus</i>	Beach Burr	Parango	
P10	<i>Ruellia prostrata</i>	Creeping Ruellia	-	

Other weeds mentioned: Remu (Azolla Water-fern), Papiro, Prostrate Spurge, Keketa (Beach Pea), Hedge Vine (Kuku Tita), Tataramoa (Lantana) 1 area

Ma'uke - animal pests (wild and domestic)

Rank	Scientific Name	English Name	Local name	Notes
A1	<i>Aedes polynesiensis</i>	Polynesian Mosquito	Namu	
A2	<i>Musca domestica</i>	Housefly	Rango	
A3	<i>Rattus rattus</i>	Ship Rat	Kiore	or Pacific Rat (<i>Rattus exulans</i>)
A4	<i>Periplaneta americana</i>	American Cockroach	Karauka	
A5	<i>Bactrocera cucurbitae</i>	Melon Fruitfly	Rango Patia Uarakau	
A6		a Mite?	Manumanu	
A7	<i>Graeffea crouanii</i>	Coconut Stick-insect	Ī'ē	
A8	<i>Pediculus humanus</i>	Head Louse	Kutu	
A9	<i>Acridotheres tristis</i>	Common Myna	Manu Kavamani	
A10		Ants	Ro	

Other pests mentioned: Whitefly, Kākā (Portuguese Man-o'-War), Cat

MITI'ĀRO

Miti'āro - weeds (wild and domestic)

<i>Rank</i>	<i>Scientific Name</i>	<i>English Name</i>	<i>Local name</i>
P1	<i>Mimosa pudica</i>	Sensitive Weed	Tita Avare
P2	<i>Cyperus rotundus</i>	Nut Sedge	Oniani Tita
P3	<i>Cenchrus echinatus</i>	Burr Grass	Parango
P4	<i>Chrysopogon aciculatus</i>	Red Cling-grass	Tuakura / Tokura
P5	<i>Bidens pilosa</i>	Beggar's-tick	Piripiri
P6	<i>Elephantopus spicatus</i>	False Elephant's-foot	Tapuae Erapani
P7	<i>Stachytarpheta urticaefolia</i>	Blue Rat's-tail	
P8	<i>Sida rhombifolia</i>	Broom Weed	Purumu
P9	<i>Cassytha filiformis</i>	Cassytha	Tainoka
P10	<i>Capparis cordifolia</i>	Capparis	Kopara

Other weeds mentioned: Oniani Tita (Nut Grass), Rau'ara Tai (to Maire harvesters), Matie (Bermuda Grass), Riri enua (Crinum Lily)

Miti'āro - animal pests (wild and domestic)

<i>Rank</i>	<i>Scientific Name</i>	<i>English Name</i>	<i>Local name</i>	<i>Notes</i>
A1	<i>Culicoides belkini</i>	No-see-'em Sandfly	Rango Kirikiri	
A2	<i>Rattus rattus</i> + ? <i>Rattus exulans</i>	Ship Rat +?	Kiore	ID?
A3		Ants	Rö	
A4	<i>Periplaneta americana</i>	American Cockroach	Potipoti	
A5	<i>Aedes polynesiensis</i>	Polynesian Mosquito	Ramu	Namu elsewhere
A6	<i>Musca domestica</i>	Housefly	Rango	
A7	<i>Polistes olivaceus</i>	Paper Hornet	Koonga	
A8		a Vinegar Fly	Naonao	
A9	<i>Graeffea crouanii</i>	Coconut Stick-insect	Ē'ē	

MANGAIA

Mangaia - weeds (wild and domestic)

<i>Rank</i>	<i>Scientific Name</i>	<i>English Name</i>	<i>Local name</i>	<i>Notes</i>
P1=	<i>Centrosema pubescens</i>	Centro Vine	Bluebell	
P1=	<i>Phyllostachys nigra</i>	Black Bamboo	Ko'e Tiapani	
P1=	<i>Canna indica</i>	Red Canna	Tiare Papa'a	
P1=	<i>Cuscuta campestris</i>	Dodder	Tiaea	

P1=	<i>Pennisetum purpureum</i>	Elephant Grass	“giant reed”	NOT Giant Reed (<i>Arundo donax</i>)
P1=	<i>Mimosa pudica</i>	Sensitive Weed	Rakau Pikika ´a	

Other wild weeds mentioned: Balsam Pear, Red Passionfruit, Mile-a-minute, Water Lily, Albizia, Rakau Papua, Blue Rat’s-tail, Tini Karaati, Tira - Chinaberry, Pigweed, Ruellia - Kissplant, Desmodium, Purumu

Mangaia - animal pests (wild and domestic)

Rank	Scientific Name	English Name	Local name
A1		Taro Aphid	Patapata
A2	<i>Rattus rattus</i>	Ship Rat +?	Kiore
A3		Whiteflies	Whitefly
A4		Snowscale	Snow-scale

Other wild pests mentioned: Pig, Goat, Kuri (Dog), Tataraiu, No ´u, Veri Taratara-Brown Centipede, Kiāo Rere-vao (feral cat)

Other domestic pests mentioned: Chicken, Caterpillar, Patito Enuu, Moko - green, 28-spot Ladybird

‘ĀTIU

‘Ātiu - weeds (wild and domestic)

Rank	Scientific Name	English Name	Local name
W1	<i>Lantana camara</i>	Lantana	Tutae oroenua
W2	<i>Caesalpinia major</i>	Yellow Nicker	Tataramoa
W3	<i>Merremia peltata</i>	Peltate Morning-glory	Kurima
D1	<i>Cyperus rotundus</i>	Nut Sedge	Oniani
D2	<i>Sorghum bicolor</i>	Sorghum Grass	Tarapi
D3	<i>Paspalum conjugatum</i>	T-grass	Mauku Taravao

Other wild weeds: Kaika (Java Plum), Kaka (Water Vine)

Other domestic weeds: Poepoe (Job’s-tears), Piripiri (Beggar’s-tick)

‘Ātiu animal pests (wild and domestic)

Rank	Scientific Name	English Name	Local name	Notes
D1		Taro Aphid	Patapata Taro	
D2	<i>Epilachna vigintioctopunctata</i>	28-spot Ladybird	Manu-Vaine	
D3=		Coconut Blister-beetle	Manu Rörö-Nü	ID?
D3=	<i>Aleurodiscus dispersus</i>	Spiralling Whitefly	Manumanu teatea	the main whitefly?
D5	<i>Adoretus versutus</i>	Rose Beetle	-	
W1	<i>Acridotheres tristis</i>	Common Myna	Manu Rataro	

W2	<i>Sus scrofa</i> hybrids	Feral Pig	Puaka Taetaevao
W3	<i>Rattus exulans</i>	Pacific Rat	Kiore
W4	<i>Solenopsis geminata</i>	Fire Ant	Ro

PENRHYN

Penrhyn - weeds (wild and domestic)

<i>Rank</i>	<i>Scientific Name</i>	<i>English Name</i>	<i>Local name</i>	<i>Notes</i>
W1	<i>Cenchrus echinatus</i>	Beach Burr	Piripiri	
W2			-	
D1	<i>Cenchrus echinatus</i>	Beach Burr	Piripiri	
D2	<i>Bidens pilosa</i>	Beggar's-tick	Piripiri Kerekere	
D8	<i>Eleusine indica</i>	Wire Grass	Mauku	
D7	<i>Cyperus rotundus</i>	Nut Grass	Mauku 'Oniäni	
D5	<i>Sporobolus pyramidalis</i>	Tall Smut-grass	Mauku	
D4	<i>Sporobolus pyramidalis</i>	Broom Weed	Mauku Purumu	
D6	<i>Fimbristylis cymosa</i>	Sand Bulrush	Mauku	
D3	<i>Desmodium incanum</i>	Spanish Clover	Pikipiki	Specimen not seen. ID?

Penrhyn animal pests (wild and domestic)

<i>Rank</i>	<i>Scientific Name</i>	<i>English Name</i>	<i>Local name</i>	<i>Notes</i>
D1	<i>Rattus exulans</i> , <i>Rattus rattus</i> .	Pacific and Ship Rat	Kiore	
D2	<i>Aedes</i> sp(p)	Mosquitoes	Namu	not identified
D3		Flies	Rango	atoll species and blowflies
D4	<i>Periplaneta americana</i>	American Cockroach	Potipoti	Australian Cock roach also seen
D5		Ants	Roa	
D6	<i>Cardisoma carnifera</i>	Butcher Landcrab	Tupa	
D7	<i>Felix catus</i>	Cat	Pikiahara	
D8	<i>Sus scrofa</i> hybrid	Pig	Puaka	Typically an early variety
D9		Small Insect???	Nönö	not identified
D10		Coconut Blister-beetle	Manu Möri	not identified
W1	<i>Rattus exulans</i> , <i>Rattus rattus</i> .	Pacific and Ship Rat	Kiore	

3. Community Proposed Protected Areas

Communities spent some time discussing the idea of establishing terrestrial and marine protected areas or rāhui areas. Land ownership was typically a major obstacle to reaching a conclusion because the final decision on a particular area would rest with the landowners. It was thought that such areas would be useful to help maintain local biodiversity and focus attention on the need to actively maintain biodiversity.

The National Workshop participants concluded that there should be an active programme to establish a national series of protected areas, and the following table includes their suggestions of areas that could be considered.

Captions for the photographs on the cover

1. White-tailed Tropicbird (*Räkoa*)
2. Coconut Crab (*Kaveu*)
3. Polynesian Freycinetia (*Kiekie*)
4. Mangaia Kingfisher (*Tanga^oeo*)
5. Crab's-eye Vine (*Pitipitiö*)
6. Green Turtle (*^oOnu*)
(photograph by Greenpeace)
7. *Favia stelligera*
(photograph by Sonja Miller)
8. Atiu Swiftlet (*Köpeka*)
9. Scarlet-clawed Fiddler-Crab
(*Kö^oti Raukura*)
10. Rarotonga Fitchia (*Nini*)
11. Yellowfin Goatfish (*Takua*)
(photograph by Jack Stoffers)
12. Te Manga Cyrtandra
13. Dandy Skink (*Moko Maunga*)
14. Spinner Dolphin (*Päpati*)
(photograph by Michael Poole)
15. Barringtonia (*^oUtu*)
16. Red Hermit-Landcrab (*Unga Kute*)
17. Schilders' Cowrie (*Pöre^o*)
18. Leucas (*Püeikao*)
19. Wandering Tattler (*Kuriri*)
20. Wikstroemia
21. Water Vine (*Käkä Vai*)
22. Black-brown Brittlestar (*Veritara Tai*)
23. Crown-of-Thorns (*Taramea*)
(photograph by Dr. Bernhard Moldenhauer)
24. Cook Islands Fruit-Dove (*Kükupa*)
25. Red-footed Booby (*Toroa*)
26. Crow Butterfly (*Pepe Tako*)
27. Cook Islands Reed-Warbler (*Kereärako*)
28. *Cyerce nigricans*
29. Geophila (*To^oetupu*)
30. Leucauge Web-Spider
31. Polynesian Metrosideros (*Rata*)
32. Rarotonga Starling (*^oI^oi*)
33. Banded Mantis-Shrimp (*Varo Tea*)
34. Ngaputoru Pandanus (*^oAra Pepe*)
35. Sooty Tern (*Tara*)
36. Dye Fig (*Mati*)



Back Row: (left to right)

Tere Tauakume, William Wigmore, Noo Tokari, Maki Toko, Richard Akanoa.

3rd Row:

Tauraki Raea, Tapuni Henry, William Cowan, Tearapiri Teaurima, Gerald McCormack, Pasha Carruthers, Tuamotu Matamaki, Mataora Harry, Tuaine Ngametua, Ina Teiotu, Tereapii Dyer, Roland Papa, Michael Tavioni.

2nd Row: (left to right)

Tai Turia, Tom Wichman, David Amoa, Kapu Joseph, Willie John, Taata Tangatakino, Tangata Vainepoto, Poonaa Samuel, Vae Oti, Teiti Teiti, Joe Ngatae, Julian Aupuni, Teremoana Mingi, Vainemoeroa Koronui, Allan Tuara.

Seated: (left to right)

Vaine Teokotai, Tony Utanga, Avaiki Aperau, Tamara Teretai, Maria Henderson, Tereapii Enuu, Matai Mokoroa, Mrs Taunga Temu, Ana Kiria, Tako Ruatoe, Mouauri Tangimetua, Ake Pouao, Teina Tuatai, Matatai Taia, Carina Langford, Motu Kora.

Front: (left to right)

Putai Kairae, (grandchild), Lily Henry, Tangi Vainepoto.