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SURVEY OF ENDEMIC FLORA OF RAROTONGA AND PREPARATION OF IUCN THREAT ASSESSMENTS



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Survey of Endemic Flora of Rarotonga and Preparation of IUCN Threat Assessments

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1. INTRODUCTION

The Cook Islands Natural Heritage Trust commissioned Wildland Consultants to undertake a survey the endemic flora of Rarotonga, and to prepare threat assessments for submission to the IUCN Red List. The focus of the survey were rare endemic species such as *Cyrtandra lillianae*, *Sclerotheca viridiflora*, *Radiogrammitis cheesemanii*, and *Garnotia cheesemanii* within cloud forest habitats, and at lower elevations *Balanophora wilderi*, *Cyrtandra rarotongensis*, and *Psychotria whistleri*. Additionally, whilst surveying, the extinct *Acalypha wilderi* and extirpated *Pilea bisepala* would also be searched for.

The survey is of high priority for the future conservation of species endemic to Rarotonga. Much of the information regarding population sizes and location is anecdotal, and some species have not been recorded for a decade or more. These knowledge gaps provide a barrier to the implementation of conservation management of these species, which are at serious risk of extinction. Survey and assessment of the endemic flora of Rarotonga, with subsequent listing of threatened species with the IUCN, is seen as an essential next step; recognition of the conservation status of these species by the IUCN provides a sound basis for the prioritisation of conservation action, and firmly establishes the need for funding.

This project was a collaborative effort between the Gerald McCormack (Director, Cook Islands Natural Heritage Trust - CINHT), Dr Tim Martin (Plant Ecologist, Wildland Consultants), and Dr Peter de Lange (Threatened Plant Scientist, Department of Conservation).

2. METHODS

2.1 Previous records

Known locations of the threatened or rare flora of Rarotonga were primarily obtained from Gerald McCormack (CINHT), but also from literature searches and a search of herbarium records held at the Auckland Museum.

2.1.1 Local knowledge

Gerald McCormack, as Director of the Cook Islands Nature Heritage Trust, spent extensive time in the interior of Rarotonga from 1984 to 2000. As part of his work, he described the major plant communities of Rarotonga, which are described in the book “Rarotonga’s Mountain Tracks and Plants: a field guide (McCormack and Kunzle 1995). In addition to this work, Gerald provided sketch maps of where subpopulations of endemic species had previously been located. These were used to both relocate subpopulations, and to note subpopulations that had been lost since the time of last survey.

2.1.2 Literature search

In 1899, Thomas Cheeseman (1903) was the first person to survey the flora of the island, following which he described nine of the endemic plant species of Rarotonga.

Specimens collected by Cheeseman at this time are held in the Auckland Museum Herbarium. Observations made by Thomas Cheeseman provide a useful baseline for the assessment of vegetation change on Rarotonga over the past century.

2.1.3 Herbarium records

The Auckland Museum holds over 1,500 plant specimens from Rarotonga, collected from 1899 until the 1980s. The database was searched for each target survey species and relevant records were collated and mapped.

2.2 Field survey

A field survey was undertaken of the key habitats for threatened endemic flora on 6-11 July 2010. The locations, dates, and field crew are given in Table 1. A total of 152 field survey hours were accumulated by the survey team.

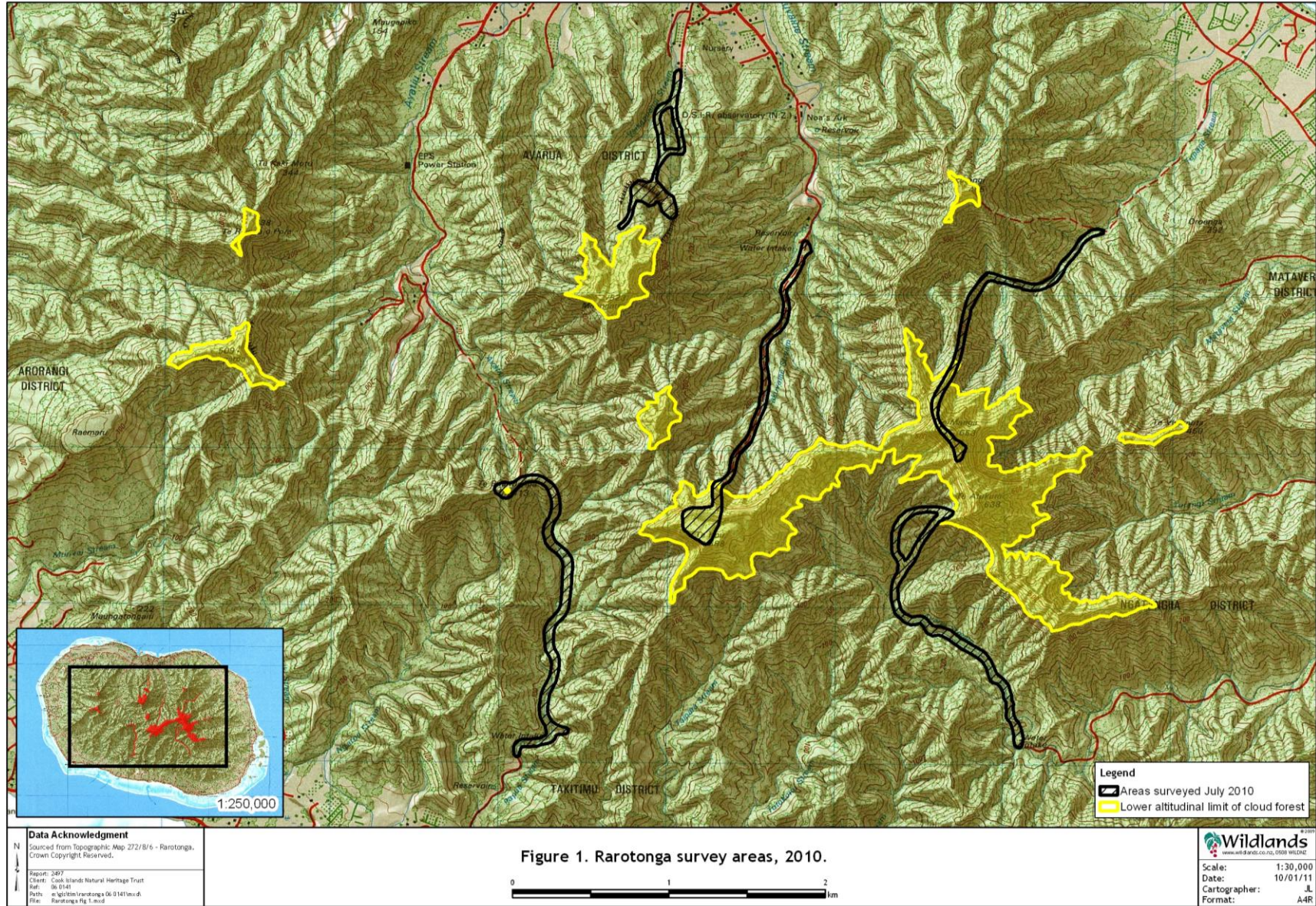
Table 1: Date, locations, and field crew for Rarotonga flora survey, July 2010.

Date	Location	Field Surveyors
6 July 2010	Maungatea	Tim Martin, Peter de Lange
7 July 2010	Maungatea	Tim Martin, Peter de Lange, Gerald McCormack
8 July 2010	Te Kou	Tim Martin, Peter de Lange, Colin Rattle
9 July 2010	Te Manga	Tim Martin, Peter de Lange, Gerald McCormack, Edwin Apera
10 July 2010	Lower Papua Stream catchment	Tim Martin, Peter de Lange
11 July 2010	Avana Stream catchment	Tim Martin, Peter de Lange, Gerald McCormack, Edwin Apera

In many areas, the search routes were limited to a narrow band either side of the tracks due to time restrictions and the precipitous terrain. When populations of threatened endemic flora were located, a GPS unit (GPS map 62s) was used to obtain a position, and a population estimate was obtained. Notes were also made on population structure and actual or potential threats (e.g. weed invasion, landslides, seed predation by rodents).

The approximate search routes and the area of cloud forest above 400 m altitude are shown in Figure 1.

During the course of the survey, it became apparent that *Geniostoma rarotongensis* and *Coprosma laevigata*, endemics that were reputedly common, were uncommon or sparse. Some subpopulations of these species were recorded, but no targeted survey for these species occurred. Following the survey, the presence of an additional endemic species (*Asplenium schizotrichum*) also came to our attention. First collected by Cheeseman in 1899 this species is only known from three locations on the southern slopes of Rarotonga, with a population estimate of eight plants. *Coprosma laevigata*, *Geniostoma rarotongensis*, and *Asplenium schizotrichum* were added to the suite of species for which IUCN threat assessments were prepared.



Then project scope was then extended to prepare IUCN threat assessments for the remaining endemic species that were common within their respective habitats on Rarotonga, including *Cyathea parksiae*, *Fitchia speciosa*, *Homalium acuminatum*, *Meryta pauciflora*, and *Pittosporum rarotongense*.

IUCN assessments have not been prepared for species endemic to other islands in the Cook Islands group, which includes species that are regarded as endangered (e.g. *Pritchardia mitiarioana*, *Tetramolopium mitiarioense*, *Pandanus arapepe*, and *Microsorium katuii*). Preparation of IUCN Red List assessments for all remaining Cook Islands endemic plants would be a logical and worthwhile extension of this project.

3. GPS RECORDS OF POPULATIONS

Prior to the 2010 survey, most locations of threatened plant populations were marked onto topographical maps, or recorded with their general location, e.g. “on the final ascent to Te Manga” or “on Koputu, the peak between Taipara and Totokoitu”. During the 2010 survey, all plant locations of interest were recorded using a GPS unit. This data will facilitate the relocation of plant populations for future research, monitoring, and conservation management.

A copy of the GPS locations of plant subpopulations is presented in Table 2.

Table 2: GPS locations for plant subpopulations, 6-11 July 2010.

Species	Site	Latitude ¹	Longitude ¹	Sub-Population Size Estimate
<i>Acrophorus raiateensis</i>	1			2
<i>Acrophorus raiateensis</i>	2			50
<i>Coprosma laevigata</i>	1			1
<i>Coprosma laevigata</i>	2			1
<i>Coprosma laevigata</i>	3			6
<i>Coprosma laevigata</i>	4			3
<i>Cyrtandra lillianae</i>	1			30
<i>Cyrtandra rarotongensis</i>	1			1
<i>Cyrtandra rarotongensis</i>	2			1
<i>Garnotia cheesemanii</i>	1			7
<i>Geniostoma rarotongensis</i>	1			5
<i>Homalanthus nutans</i>	1			1
<i>Homalanthus nutans</i>	2			1
<i>Homalanthus nutans</i>	3			1
<i>Homalanthus nutans</i>	4			1
<i>Homalanthus nutans</i>	5			1
<i>Myrsine cheesemanii</i>	1			1
<i>Myrsine cheesemanii</i>	2			1
<i>Myrsine cheesemanii</i>	3			1
<i>Psychotria whistleri</i>	1			13
<i>Psychotria whistleri</i>	2			50
<i>Radiogrammitis cheesemanii</i>	1			Abundant
<i>Radiogrammitis cheesemanii</i>	2			Common
<i>Radiogrammitis cheesemanii</i>	3			Abundant
<i>Sclerotheca viridifolia</i>	1			4
<i>Sclerotheca viridifolia</i>	2			3

¹ For the security of these populations, GPS locations are available upon request.

4. IUCN RED LIST SUBMISSIONS

The draft IUCN Red List submissions for all species, including distribution maps, are presented in Appendices 1-19 as separate documents. These submissions are scheduled to be data based and reviewed by the IUCN in 2012. A summary of the draft threat rankings is provided below.

Table 3: Summary of draft IUCN Red List Threat Assessments for Rarotonga flora.

Species	Family	Distribution	Draft Threat Ranking
<i>Acalypha wilderi</i>	Euphorbiaceae	Rarotonga	Extinct
<i>Acrophorus raiateensis</i>	Dryopteridaceae	Rarotonga, Society Islands	Critically Endangered
<i>Asplenium schizotrichum</i>	Aspleniaceae	Rarotonga	Critically Endangered
<i>Balanophora wilderi</i>	Balanophoraceae	Rarotonga	Data Deficient
<i>Coprosma laevigata</i>	Rubiaceae	Rarotonga	Critically Endangered
<i>Cyathea parksiae</i>	Cyatheaceae	Rarotonga	Least Concern
<i>Cyrtandra lilianae</i>	Gesneriaceae	Rarotonga	Critically Endangered
<i>Cyrtandra rarotongensis</i>	Gesneriaceae	Rarotonga	Critically Endangered
<i>Fitchia speciosa</i>	Asteraceae	Rarotonga	Least Concern
<i>Garnotia cheesemanii</i>	Poaceae	Rarotonga	Critically Endangered
<i>Geniostoma rarotongensis</i>	Loganiaceae	Rarotonga	Data Deficient
<i>Haloragis stokesii</i>	Haloragaceae	Rarotonga	Critically Endangered
<i>Homalium acuminatum</i>	Salicaceae	Rarotonga	Least Concern
<i>Meryta pauciflora</i>	Araliaceae	Rarotonga	Least Concern
<i>Myrsine cheesemanii</i>	Primulaceae	Rarotonga, Ma'uke, Miti'aro, Mangaia	Data Deficient
<i>Pittosporum rarotongense</i>	Pittosporaceae	Rarotonga, Ma'uke, Miti'aro, Mangaia	Least Concern
<i>Psychotria whistleri</i>	Rubiaceae	Rarotonga	Critically Endangered
<i>Radiogrammitis cheesemanii</i>	Grammitidaceae	Rarotonga	Vulnerable
<i>Sclerotheca viridiflora</i>	Campanulaceae	Rarotonga	Critically Endangered

5. CONCLUSIONS

A field survey of Rarotonga endemic flora was undertaken in July 2010, with a focus on threatened cloud forest endemics. Draft IUCN Red List assessments were made for 19 species; one species was assessed as “Extinct”, nine species “Critically Endangered”, one species “Vulnerable”, three species “Data Deficient”, and five species “Least Concern”. None of the Rarotonga endemic flora are currently subject to conservation management, and with a lack of management the long-term survival of several species is unlikely. Many of the key habitats for endemic flora are chronically threatened by weed invasion, and several invasive weed species (e.g. *Mikania micrantha*) are now establishing on the remote mountain peaks that have acted as refuges for “Critically Threatened” endemics (e.g. *Cyrtandra lilianae*, *Sclerotheca viridiflora*). Lowland habitats are, in most of the island’s catchments, severely modified by invasive plant species. The survey only located two plants of the Rarotonga *Cyrtandra* (*Cyrtandra rarotongensis*). While additional surveys for this species are urgently needed, this species is unlikely to be secure anywhere on Rarotonga. *Cyrtandra rarotongensis*, with its reliance on lowland habitats, has a high chance of extinction in next 20 years if no conservation management for this species is implemented soon.

The Red Listing of the endemic flora of Rarotonga will hopefully lead to a much greater awareness of the island's unique flora, and lead to active conservation management of the threatened plant species of the island. Additional survey work, particularly of less modified lowland habitats that may support additional subpopulations of *Cyrtandra rarotongensis*, and research to document causes of population decline, are of the highest priority. IUCN Red List assessments should also be prepared for the remaining Cook Island endemics.

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