CRITICAL ECOSYSTEM PARTNERSHIP FUND

ECOSYSTEM PROFILE

POLYNESIA-MICRONESIA BIODIVERSITY HOTSPOT

FINAL VERSION
MAY 2007

Prepared by:

Conservation International-Melanesia Center for Biodiversity Conservation

In collaboration with:

Secretariat of the Pacific Regional Environment Program

With the technical support of:

The Bishop Museum- Honolulu
Conservation International-Center for Applied Biodiversity Science
The Nature Conservancy – Micronesia Program
Societé d'Ornithologie de la Polynésie
Wildlife Conservation Society – Pacific Islands

And of the Ecosystem Profile Preparation Team:

James Atherton
Joanna Axford
Nigel Dowdeswell
Liz Farley
Roger James
Penny Langhammer
François Martel
Harley Manner
David Olson
Samuelu Sesega

Assisted by the following experts and contributors:

FIJI ISLANDS
Aaron Jenkins
Alex Patrick
Aliki Turagakula
Alivereti Bogiva
Alumita Savabula
Craig Morley
Dale Withington
Dick Watling
Etika Rupeni
Gunnar Keppel
Guy Dutson
Jo Ceinaturaga
Jone Niukula
Kesaia Tabunakawai
Linda Farley
Manoa Malani
Marika Tuiwawa
Philip Felstead
Randy Thaman
Roger James
Sairusi Bulai
Timoci Gaunavinaka
Vilikesa Masibalavu

FRENCH POLYNESIA
Claude Carlson
Claude Serrat
Eli Poroi
Francis Murphy
Georges Sanford
Hinano Murphy
Isabelle Vahirua-Lechat
Jacques Iltis
Jean-François Butaud
Jean-Yves Meyer
Maxime Chan
Mehdi Adjeroud
Neil Davies
Olivier Babin
Paula Meyer
Philippe Raust
Philippe Siu
Tea Frogier
Vernance Sanford
Willy Tetuanui
Yves Doudoute

HAWAII & USA
Allen Allison
Ana Rodrigues
Art Whistler
Audrey Newman
Dieter Mueller-Dombois
Jim Space
John Pilgrim
Lucius Eldredge
Mark Merlin
Robert Cowie
Robert Waller
Tom Brooks

MICRONESIA
Anne Brook
Bill Raynor
Bob Beck
Brian Vander Velde
David Hinchley

Deborah Barker
Harley Manner
Herman Francisco
Ishmael Lebehn
Joseph Acfalle
Lois Engelberger
Lucille Apis-Overhoff
Nancy Vander Velde
Okean Ehmes
Roseo Marquez
Willy Kostka

WESTERN POLYNESIA
Asipeli Palaki
Bronwyn Sesega
Cedric Schuster
Easter Galuvao
Emily Waterman
Faumuina Saililimalo Pati Liu
Gerald MacCormack
Hans Decker Thulstrup
Joshua Seamon
Liz Dovey
Mary Power
Matt McIntyre
Myriam Philip
Seuili Vainuupo
Semese Alefaio
Tom Twining Ward
Toni Tipamaa
Walter Vermuelen

OTHER LOCATIONS
Elspeth Wingham
Greg Sherley
Michael Brown
Patricia Vargas Casanova
Phillipe Keith

CONTENTS

EXECUTIVE SUMMARY

The Critical Ecosystem Partnership Fund (CEPF) is designed to safeguard the world's biodiversity hotspots. CEPF is a joint initiative of Conservation International, l'Agence Française de Développement, the Global Environment Facility, the Government of Japan, the John D. and Catherine T. MacArthur Foundation, and the World Bank.

A fundamental purpose is to ensure that civil society, such as nongovernmental organizations (NGOs), community groups, and private sector partners, is engaged in efforts to conserve biodiversity in the hotspots. An additional purpose is to ensure that those efforts complement existing strategies and frameworks established by national governments.

The purpose of the ecosystem profile is to provide an overview of biodiversity values, conservation targets or "outcomes" and causes of biodiversity loss coupled with an assessment of existing and planned conservation activities in the Polynesia-Micronesia Hotspot. This information is then used to identify the niche where CEPF investment can provide the greatest incremental value for conservation. The ecosystem profile recommends broad strategic funding directions that can be implemented by civil society to contribute to the conservation of biodiversity in the hotspot. Applicants propose specific projects consistent with these broad directions and criteria. The ecosystem profile does not define the specific activities that prospective implementers may propose in the region, but outlines the strategy that will guide those activities.

The Polynesia-Micronesia Hotspot includes all the islands of Micronesia, tropical Polynesia, and Fiji. Included in this enormous expanse of ocean are more than 4,500 islands, representing 11 countries, eight territories and one U.S. state (Hawaii). Despite its large marine coverage, 2.6 times larger than the continental United States, it is one of the smallest hotspots in terms of terrestrial land area, covering only 46,315 square kilometers or about the size of Switzerland. The total population of the hotspot is approximately 3,235,250 but 65 percent of the population is found in Hawaii and Fiji.

Not all countries and territories in the hotspot are eligible for CEPF funds; only countries that are World Bank members and signatories to the Convention on Biological Diversity are eligible. Thus six countries and territories in the hotspot, including Nauru; the U.S. state of Hawaii; the U.S. territories of American Samoa and Guam; the Commonwealth of the Northern Mariana Islands, and Tuvalu are ineligible. While this ecosystem profile includes data and analysis from all 20 countries and territories in the hotspot, conservation outcomes and strategic directions only refer to the 14 eligible countries and territories. However, it is hoped that this profile will be used to leverage funds to conserve threatened species and sites in countries and territories not eligible for CEPF investment.

The geographic complexity and isolated nature of Pacific islands have led to the development of extremely high levels of endemism in this hotspot. The various mechanisms of island biogeography and evolution have been able to work particularly clearly in the Pacific free of continental influences. However, the extreme vulnerability of

island ecosystems and species to impacts such as habitat destruction and invasive species has resulted in the flora and fauna of this hotspot being amongst the most endangered in the world. In fact, species extinction rates in this hotspot approach the highest in the world, especially for birds and land snails.

Plant, bird, and invertebrate diversity in the hotspot are particularly high, but diversity of non-volant mammals, reptiles and amphibians is low. Overall the hotspot is home to approximately 5,330 native vascular plant species, of which 3,074 (57 percent) are endemic, 242 breeding native bird species of which approximately 164 (68 percent) are endemic, 61 native terrestrial reptiles, of which 30 (49 percent) are endemic, 15 native mammals, all bats, 11 (73 percent) of which are endemic, and three native amphibians, all endemic. Although there are no true native freshwater fish, at least 96 marine species are found as adults in freshwater and 20 species are endemic. Knowledge of invertebrate diversity is very patchy, but for many groups that have been studied, it is high. Land snail diversity is particularly high with over 750 species in Hawaii alone and perhaps 4,000 species in the insular tropical Pacific.

The major threats to Pacific biodiversity are human induced and include invasive species, habitat alteration and loss, destructive harvest techniques, and over-exploitation of natural resources. An analysis of data on the globally threatened species in the hotspot indicates that habitat loss and invasive species are the two most serious threats. The impact of extreme natural events such as cyclones, drought, and fire may also be significant at times. The future impact of climate change and sea level rise is uncertain at this stage but could be significant, especially on the low lying islands and atolls which could disappear completely. While many of the threats to native Pacific biodiversity are similar to those in other tropical regions of the world, Pacific island biotas are particularly vulnerable because the biota evolved in the absence of mammalian predators, grazing herbivores, and many of the diseases that evolved on larger land masses. Furthermore, the small size and isolated nature of Pacific islands results in increased vulnerability to disturbances that may be relatively minor on a larger land mass.

There are a number of constraints to mounting an effective response to environmental threats in most countries in the hotspot. Except in the larger, more developed states and territories, the major constraints include a paucity of technical infrastructure and expertise, a lack of current information on the state of natural resources and biodiversity, a poor understanding of environmental issues among the general population, and poor integration of environmental issues in national development planning. An analysis of current investments and strategies in the hotspot indicates that significant implementation gaps remain in a number of areas. Terrestrial conservation efforts in general and species and site conservation efforts in particular are chronically under-funded. The taxonomic groups that have been least well supported include the flying foxes, land snails, and plants. Furthermore, while a number of national and regional conservation strategies have been developed, they need significant resources for implementation.

This ecosystem profile includes a commitment and emphasis on using conservation outcomes—targets against which the success of investments can be measured—as the

scientific underpinning for determining CEPF's geographic and thematic focus for investment. Conservation outcomes can be defined at three scales – species, site, and landscape, reflecting a simplification of a complex hierarchical continuum of ecological scales. The three scales interlock geographically through the presence of species in sites and of sites in landscapes. They are also logically connected. If species are to be conserved, the sites on which they live must be protected and the landscapes or seascapes must continue to sustain the ecological services on which the sites and the species depend. Given threats to biodiversity at each of the three levels, quantifiable targets for conservation can be set in terms of extinctions avoided, sites protected and, where appropriate, biodiversity conservation corridors created or preserved. This can only be done when accurate and comprehensive data are available on the distribution of threatened species across sites. However, in the context of the archipelagic Polynesia-Micronesia Hotspot, only species and site outcomes have been defined since landscape-scale outcomes are not considered appropriate.

Species outcomes in the Polynesia-Micronesia Hotspot include all those species that are globally threatened according to the 2003 IUCN Red List, the most recent Red List at the time the outcomes were defined in the profiling process. These comprise 476 globally threatened terrestrial species in all the countries and territories of the hotspot. However, almost half (232 out of 476) of the threatened species in the hotspot are in countries and territories that are ineligible for CEPF funding. The vast majority of the species in ineligible countries (214 species and almost half of all threatened species in the hotspot) are in Hawaii alone. The remaining 244 species in CEPF eligible countries define the universe of species outcomes for this hotspot. Species outcomes have been prioritized into six classes based on three major criteria: Red List Category; Taxonomic Distinctiveness (a measure of the uniqueness of a species); and need for species-focused action (i.e. a measure of whether a species needs special attention, such as the control of invasive species or harvesting).

Based on this objective analysis, 67 species belonging to priority classes one and two were selected for CEPF investment. However, it should be noted that given limitations in data availability and quality, the prioritization is an initial attempt and may change as more accurate data become available.

Site outcomes were determined by identifying the sites in CEPF eligible countries that contain populations of at least one globally threatened species. Key data sources for this analysis included published scientific articles, the IUCN-World Conservation Union regional ecosystem survey, a number of Geographical Information Systems data layers, data from the World Database on Protected Areas, National Biodiversity Strategy and Action Plan reports, ecological survey data, subregional workshops and communications with many scientists and stakeholders. Data on restricted-range species and globally significant congregations were not available for this analysis.

In total, 161 sites were identified for the hotspot, each containing at least one globally threatened species. The 161 sites are too many for one fund to handle alone. Consequently, sites were prioritized based on irreplaceability (whether the site contains

taxa found in no other site); and vulnerability. Due to a lack of comprehensive threat data for each site, the threat status of a species found within the site was used as a proxy for vulnerability. A total of 60 sites were identified for CEPF support.

A niche for CEPF investment has been developed based on an analysis of three major themes: species and site outcomes; major threats to endangered species; and current environmental investments together with national and regional conservation strategies. Major findings of this analysis include the following: our knowledge of the hotspot's biodiversity is patchy, incomplete and poorly managed; terrestrial species and site conservation is currently weakly supported; conventional forms of protected area management have been largely ineffective; and invasive species are the major threat to native biotas, but tackling invasive species is relatively poorly supported. Finally, while there are many existing regional and national conservation strategies, these strategies need much stronger support for implementation.

The niche of CEPF in the Polynesia-Micronesia Hotspot will be to **catalyze action by civil society** to counteract threats to biodiversity, especially from invasive species, in key biodiversity areas in the Polynesia-Micronesia Hotspot. The **geographic focus** for CEPF intervention in the hotspot will be on CEPF eligible countries only. The three **primary strategic directions** are:

- prevent, control and eradicate invasive species in key biodiversity areas;
- strengthen the conservation status and management of 60 key biodiversity areas; and
- Build awareness and participation of local leaders and community members in the implementation of protection and recovery plans for threatened species.

A fourth strategic direction is to provide strategic leadership and effective coordination of CEPF investment through a regional implementation team and therefore complements the three primary strategic directions. A number of necessary interventions or investment priorities to achieve each strategic direction are outlined in the full ecosystem profile.

In conclusion, the species and ecosystems of the hotspot are among the most highly threatened in the world and yet terrestrial conservation activities are severely under funded and our biological knowledge of the hotspot is very incomplete and poorly managed. There are significant opportunities for CEPF to fund actions that empower the stewards of the biodiversity of the Polynesia-Micronesia Hotspot - the island communities and institutions - to have better knowledge, tools, and capacities to conserve biodiversity more effectively, especially those species and sites that are globally threatened. Since Pacific communities are still highly dependent on biological resources for survival, the achievement of biodiversity conservation outcomes is critical not only for the maintenance of essential ecosystem function, but is also essential for sustaining human livelihoods.

INTRODUCTION

The Critical Ecosystem Partnership Fund (CEPF) is designed to safeguard the world's threatened biodiversity hotspots in developing countries. It is a joint initiative of Conservation International (CI), l'Agence Française de Développement, the Global Environment Facility (GEF), the government of Japan, the John D. and Catherine T. MacArthur Foundation, and the World Bank. Conservation International administers the global program through a CEPF Secretariat.

CEPF supports projects in biodiversity hotspots, the biologically richest and most endangered areas on Earth. Conservation International administers the global program through a CEPF Secretariat.A fundamental purpose of CEPF is to ensure that civil society is engaged in efforts to conserve biodiversity in the hotspots. An additional purpose is to ensure that those efforts complement existing strategies and frameworks established by local, regional, and national governments.

CEPF promotes working alliances among community groups, nongovernmental organizations (NGOs), government, academic institutions, and the private sector, combining unique capacities and eliminating duplication of efforts for a comprehensive approach to conservation. CEPF is unique among funding mechanisms in that it focuses on biological areas rather than political boundaries and examines conservation threats on a corridor-wide basis to identify and support a regional, rather than a national, approach to achieving conservation outcomes. Corridors are determined through a process of identifying important species, site and corridor-level conservation outcomes for the hotspot. CEPF targets transboundary cooperation when areas rich in biological value straddle national borders, or in areas where a regional approach will be more effective than a national approach. CEPF provides civil society with an agile and flexible funding mechanism complementing funding currently available to government agencies.

The Polynesia-Micronesia Hotspot, which is one of the smallest hotspots in terms of land area, covering only 46,315 km², stretches from the Mariana and Palau archipelagos in the west to Easter Island (Rapa Nui) in the east, and from the Hawaiian Islands in the north to the Cook Islands, Tonga, and Niue in the south.

It qualifies as a global hotspot by virtue of its high endemicity and extremely high degree of threat. The hotspot was first identified as a global biodiversity hotspot in an analysis of biodiversity hotspots by CI conducted between 1996 and 1998 (CI 1999). The thousands of small, isolated islands that make up the hotspot are some of the most vulnerable in the world and Oceania has one of the highest proportions of Endangered species per unit land area of any region (Dahl 1986) and the largest number of documented species extinctions on the planet since 1600 (Given 1992).

The Ecosystem Profile

The purpose of the ecosystem profile is to provide an overview of biodiversity values, conservation targets or “outcomes,” and causes of biodiversity loss coupled with an assessment of existing and planned conservation activities in the hotspot. This information is then used to identify the niche where CEPF investment can provide the

greatest incremental value for conservation.

The ecosystem profile recommends broad strategic funding directions that can be implemented by civil society to contribute to the conservation of biodiversity in the hotspot. Applicants propose specific projects for funding consistent with these broad directions and criteria. The ecosystem profile does not define the specific activities that prospective implementers may propose in the region, but outlines the strategy that will guide those activities. Applicants for CEPF funding are required to prepare detailed proposals that specify the proposed activities and the performance indicators that will be used to monitor project success.

BACKGROUND

The Polynesia-Micronesia Hotspot includes all the islands of Micronesia, tropical Polynesia and Fiji (Figure 1). Included in this enormous expanse of ocean are more than 4,500 islands, representing 11 countries, eight territories and the U.S. state of Hawaii. Despite its large marine coverage, 2.6 times larger than the continental United States, it is one of the smallest hotspots in terms of terrestrial land area, covering only 46,315 km² or an area about the size of Switzerland. The total population of the hotspot is approximately 3,235,250 but 65 percent of the population is found in Hawaii and Fiji. Table 1 is a summary of key geographical data for the 20 political units or Pacific Island Countries and Territories (PICTs) in the hotspot.

The ecosystem profile and five-year investment strategy for the Polynesia-Micronesia hotspot was developed by the CI Melanesia Program in collaboration with the Secretariat of the Pacific Regional Environment Program (SPREP). In addition, the profiling process incorporated regional stakeholder expertise through four subregional roundtables and two hotspot-wide workshops. The subregional workshops were held in Fiji, French Polynesia, Micronesia, and Western Polynesia and coordinated by the Wildlife Conservation Society, Te Ora Fenua (Tahiti Conservation Society), the University of Guam with the support of The Nature Conservancy (TNC), and Pacific Environment Consultants. More than 85 experts and contributors assisted in analyzing current threats to biodiversity, inventorying conservation and development investment taking place within the region, and defining the geographic priorities for CEPF investment.

This profile focuses on conservation outcomes—biodiversity targets against which the success of investments can be measured—as the scientific basis for determining CEPF's geographic and thematic focus for investment. Such targets must be achieved by the global community to prevent species extinctions and halt biodiversity loss.

These targets are defined at three levels: species (extinctions avoided), sites (areas protected) and landscapes (corridors created). As conservation in the field succeeds in achieving these targets, these targets become demonstrable results or outcomes. While CEPF cannot achieve all of the outcomes identified for a region on its own, the partnership is trying to ensure that its conservation investments are working toward preventing biodiversity loss and that its success can be monitored and measured. CI's

Center for Applied Biodiversity Science (CABS) is coordinating the definition of conservation outcomes across the global hotspots.

Not all political units in the hotspot are eligible for CEPF funds; only countries that are borrowing members of the World Bank and are signatories to the U.N. Convention on Biological Diversity (CBD) are eligible. Thus six countries and territories in the hotspot, including Nauru, the U.S. state of Hawaii and the U.S. territories of American Samoa, Guam, the Commonwealth of the Northern Mariana Islands (CNMI), and Tuvalu are ineligible. Eligibility is indicated in the final column of Table 1. While this ecosystem profile includes data and analysis from all 20 countries and territories in the hotspot, conservation outcomes and CEPF strategic directions only refer to the 14 eligible countries and territories. However, it is hoped that this profile will be used to leverage funds from other donors to conserve globally threatened species and sites in countries and territories not eligible for CEPF funds.

History of the Hotspot

Until the establishment of SPREP as the regional agency with the mandate to protect and improve the Pacific islands environment, most conservation activity in the Pacific was conducted in an *ad hoc* manner at the national level. The need for a Pacific-wide regional environmental agency to coordinate effort was first formally recognized in 1969 at an IUCN-World Conservation Union Conference in Noumea, New Caledonia. However, it was not until 1982 that a formal agreement established SPREP as a program hosted by the Secretariat of the Pacific Community (SPC), formerly the South Pacific Commission, in Noumea. In January 1992 SPREP moved from New Caledonia to its permanent headquarters in Apia, Samoa (SPREP 2001).

Table 1. Key Geographical Data for Hotspot Political Units

Hotspot Country, State or Territory	Physical Geography	Land Area (km^2)	Population	GDP/ capita (US$)	CEPF eligibility
MICRONESIA		**3,214**	**536,100**		
Commonwealth of the Northern Mariana Islands	volcanic/uplifted coral	471	78,000	10,401	No
Federated States of Micronesia	volcanic/coral atolls	701	112,700	2,113	Yes
Guam	volcanic/uplifted coral	541	166,100	22,118	No
Kiribati	low and uplifted coral atolls	811	93,100	613	Yes
Marshall Islands	coral atolls	181	55,400	2,362	Yes
Nauru	uplifted coral atoll	21	10,100	7,292	No
Palau	volcanic/uplifted coral	488	20,700	5,808	Yes
FIJI	volcanic/a few coral islands and atolls	**18,272**	836,000	1,926	Yes
POLYNESIA		**24,829**	**1,863,150**		

American Samoa	volcanic/coral atolls	200	62,600	7,821	No
Cook Islands	volcanic/coral atolls	237	14,000	8,563	Yes
Easter island	Volcanic	166	3,000	6,000	Yes
French Polynesia	volcanic/low and uplifted coral atolls	3,521	250,500	15,637	Yes
Hawaii	volcanic/coral atolls	16,642	1,224,398	26,000	No
Niue	uplifted coral	259	1,600	5,854	Yes
Pitcairn Islands	volcanic/low and uplifted coral atolls	39	52	-	Yes
Samoa	Volcanic	2,935	182,700	2,108	Yes
Tokelau	low coral atolls	12	1,500	2,759	Yes
Tonga	volcanic/uplifted coral	650	98,300	1,893	Yes
Tuvalu	coral atolls	26	9,600	1,563	No
Wallis and Futuna	volcanic/low coral	142	14 ,900	1,666	Yes
TOTAL HOTSPOT		**46,315**	**3,235,250**		14 of 20

Key: - no current data available

Sources:

UNDP Human Development Report 2005

SPC 2003a (www.spc.int/demog/demogen/english01-2/recentstats/2003/03/poster.xls)

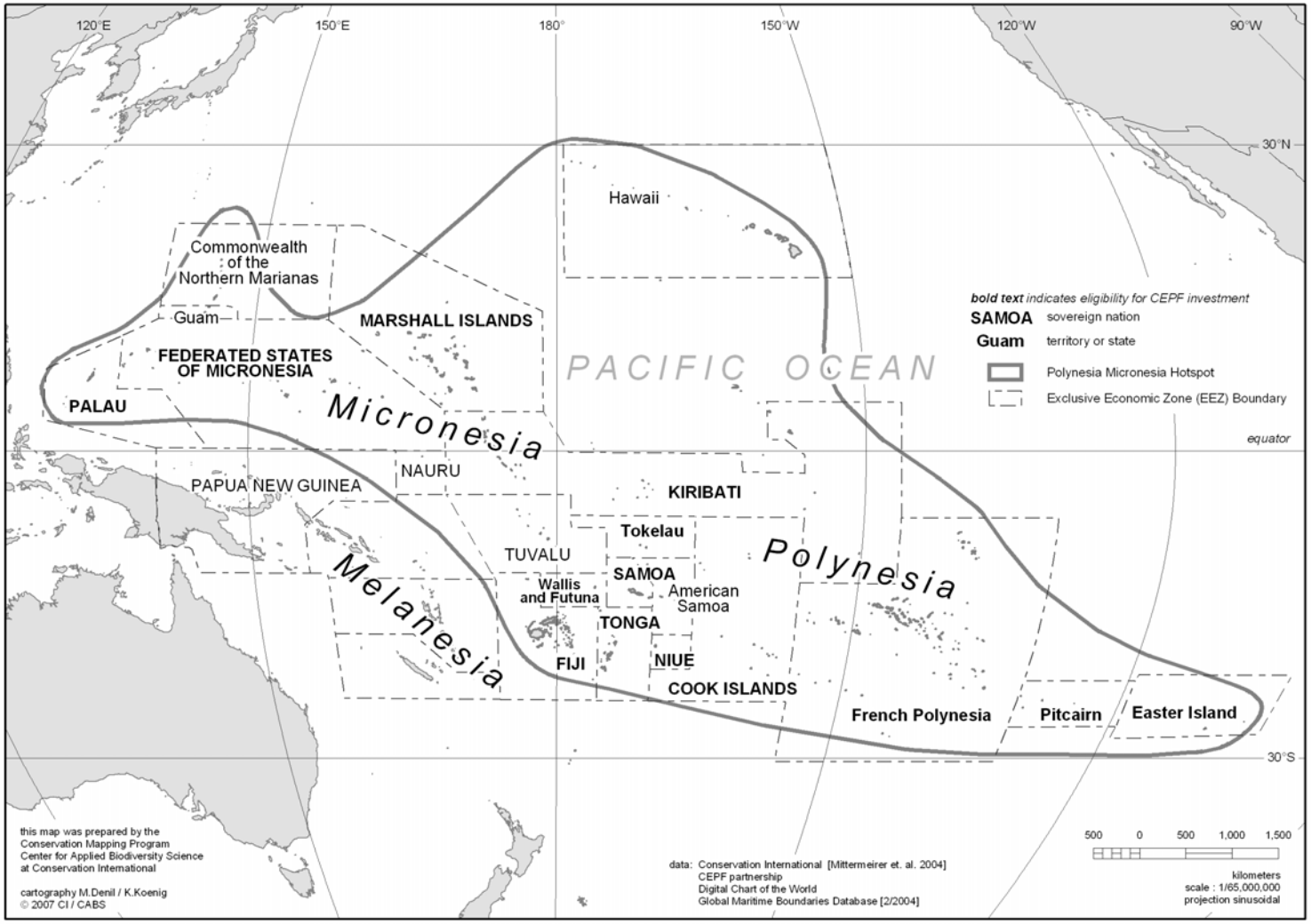
SPC 2004 (http://www.spc.int/prism/publications/SPS_Final.pdf)

Crocombe, R. 2001. *The South Pacific*. USP, Fiji.

U.S. Census Bureau 2003. (http://eire.census.gov/popest/estimates.php)

The development of the profile, especially the investment strategy, has been guided by a number of regional and national environmental management plans and strategies. The major regional strategy is the Action Strategy for Nature Conservation 2003-2007 (SPREP 2003a). The Action Strategy is a five-yearly strategy that reflects the approach of "mainstreaming nature conservation." The strategy provides a framework for mainstreaming conservation into all development sectors and involving partnerships between conservationists, governments, the private sector, and civil society. The strategy provides broad 30-year goals under each of the three main pillars of sustainable development: environment, cconomy, and society. Under each broad goal are five-year objectives or targets in the short term.

Figure 1. Map of the Polynesia-Micronesia Hotspot



At the national level many countries have undergone a series of conservation planning exercises. In the early 1990s SPREP executed a regional project to develop State of the Environment Reports and then National Environmental Management Strategies (NEMS) for seven PICTs. More recently, the United Nations Development Program (UNDP) implemented a regional project on the development of National Biodiversity Strategy and Action Plans (NBSAP) reports for 13 of the 14 independent countries in the region. The development of NBSAP reports is an obligation under Article 6 of the CBD.

The Polynesia-Micronesia profile was developed by a Profile Development Team. During the process, three subregional roundtable meetings were conducted, one in each of the following subregions: Western Polynesia, Fiji, and Micronesia. More than 50 participants from government and nongovernmental and scientific organizations participated in these roundtables. In addition, two expert roundtables involving participation from key regional environmental, educational, and donor agencies were conducted in Apia, Samoa.

The development of the profile dovetailed with the development of the "Living Archipelagos" initiative of the Bishop Museum in Honolulu. The objective of the Living Archipelagos initiative is to identify and help protect a select group of priority sites of high ecological value that can be quickly saved with relatively modest investment. The Living Archipelagos Program will use the findings of this profile to help identify up to 10 of the most biologically important archipelagos, including both terrestrial and marine biological diversity, in the region.

Geography of the Hotspot

The Pacific region is characterized by high levels of biodiversity and species endemism, extreme vulnerability to a wide range of natural disasters, and a diversity of cultures and languages, traditional practices, and customs focused on the environment (UNEP 1999). There is still a high cultural and economic dependence on marine and terrestrial resources for daily needs such as food, water, shelter, and medicine. Biodiversity conservation is therefore critical for social and economic development, as well as for the maintenance of essential ecosystem function.

The islands of the hotspot display great diversity in origin, geology, size and climate. Most of the islands in the region were originally formed from geological "hotspot" and fracture zone volcanism (Allison and Eldredge 1999). Physically the islands can be classified into several categories: younger volcanic islands, older volcanic islands, almost atolls (which have volcanic remnants surrounded by atoll islands), coral atolls, raised limestone islands (usually elevated atolls), mixed volcanic and limestone islands, and continental islands derived from fragments of old continental plates (SPREP 1992). A number of islands are currently or potentially active volcanically, including islands in Hawaii, Tonga, Samoa, and the Northern Mariana islands (Allison and Eldredge 1999).

The hotspot can be considered to have a maritime tropical climate, with relatively warm and constant temperatures except at high elevations. The climate is influenced largely by two major external factors: atmospheric currents and ocean currents. Internal influences

such as island shape, size and relief are also important but variable from island to island (Nunn 1994). Rainfall varies significantly horizontally across the hotspot, vertically within high islands, and seasonally. The wettest area is in the northwest of the hotspot in western Micronesia and the driest part of the hotspot is in the east around the Marquesas and Easter Island where an anticyclone persists for most of the year. Irregular climatic phenomena such as cyclones and the El Niño southern oscillation are important climatic events in most parts of the hotspot and have a significant environmental impact at times.

BIOLOGICAL IMPORTANCE OF THE HOTSPOT

The geographic complexity and isolated nature of Pacific islands have led to the development of extremely high levels of endemism in this hotspot. The various mechanisms of island biogeography and evolution have been able to work particularly clearly in the Pacific free of continental influences (Dahl 1986). However, the extreme vulnerability of island ecosystems and species to impacts such as habitat destruction and invasive species has resulted in the flora and fauna of this hotspot being amongst the most endangered in the world. In fact, species extinction rates in this hotspot approach the highest in the world, especially for birds (Steadman 1995) and land snails (Cowie 2001).

The present distribution of flora and fauna across the Pacific has resulted from the complex interplay of many factors in both time and space (Dahl 1984, Stoddart 1992). Endemism is a product of isolation, marginal environments, chance dispersal events like storms, and time (SPREP 1992). One of the key factors is the distance of an island from the major centers of evolution and distribution, such as Southeast Asia, the Indo-Malay Peninsula, Australia or America (MacArthur and Wilson 1967, Dahl 1980). The closer an island is to a center of evolution, the greater the opportunity that species from that area will have been able to colonize it (Dahl 1980). Other factors influencing Pacific biogeography are island size, type and precipitation (Mueller-Dombois 2002) and deep-sea trenches, such as the Tonga trench (Stoddart 1992).

The origins of most Pacific biodiversity are in Southeast Asia and New Guinea with a general attenuation in marine and terrestrial biodiversity from west to east. Thus there are no native amphibians east of Fiji and there are no native terrestrial mammals east of the Cook Islands, except for a single Hawaiian sub-species (a bat which originated from the Americas). The eastward diminution of biodiversity reflects several factors. The filtering effect of the ocean would be expected to filter out species that are not adept at crossing ocean gaps. Furthermore, island size and rainfall generally decrease eastwards and the greatest complexity of island types occurs in the west with continental islands not occurring east of Fiji (SPREP 1992). Last but not least, humans, who played a major role in the dispersal of species into the Pacific, migrated predominately from west to east (SPREP 1992).

Biodiversity of the Hotspot

In this section a brief summary of the terrestrial biodiversity of the hotspot is provided. The focus here is on hotspot biogeography and endemic species. In the subsequent section on ecosystems the emphasis is on the habitats, specifically on the biomes and

ecosystems, of Pacific islands. In the later chapter on conservation outcomes, the focus is on the globally threatened species listed in the IUCN Red List (IUCN 2003) at the time of the expert roundtabes.

Plant, bird, and invertebrate diversity in the hotspot are particularly high, but diversity of non-volant mammals, reptiles, and amphibians is low. Overall the hotspot is home to approximately 5,330 native vascular plant species (Allison and Eldredge 2004), of which 3,070 (58 percent) are endemic, 242 breeding native bird species of which approximately 164 (68 percent) are endemic, 61 native terrestrial reptiles, of which 30 (49 percent) are endemic, 15 native mammals, all bats, 11 (73 percent) of which are endemic, and three native amphibians, all endemic (Allison and Eldredge 2004). Although there are no true native freshwater fish, at least 96 marine species are found as adults in freshwater and 20 species are endemic (ibid). Knowledge of invertebrate diversity is very patchy, but for many groups that have been studied, it is high. Land snail diversity is particularly high with over 750 species in Hawaii alone (Cowie 1996) and perhaps 4,000 species in the insular tropical Pacific (Cowie 2000). A summary of the number of known native and endemic species by political units for each taxonomic group is shown in Table 2 and a description of the distribution of each group follows.

In the Pacific the islands that tend to have the largest and most varied biodiversity are the bigger, higher, older, volcanic and western-most islands close to land masses of continental origin. Such islands have a far greater range of habitats and niches for colonization and speciation than the low coral islands. Similarly, elevated atolls have higher biodiversity than reef islands just at sea level (Dahl 1980). However, although the more isolated oceanic islands may have fewer biological groups, those that managed to colonize such islands may have undergone intense speciation to form many new species (SPREP 1992). The Hawaiian islands, for example, are one of the most isolated island groups in the world and have no native amphibians and no endemic reptiles but do have very high rates of endemism for some taxonomic groups, approaching 98 percent for land snails and 83 percent for vascular plants.

The diversity of most taxonomic groups follows the general pattern already described for biodiversity in the hotspot as a whole. Plant diversity is highest on the larger and higher volcanic archipelagos such as Hawaii, Fiji and Samoa. These three island groups, along with the Marquesas islands, have been identified by WWF/IUCN as Centers of Plant Diversity in the hotspot (van Royen and Davis 1995). Such centers are areas with high plant diversity (although the actual number of species present may not be accurately known) and high plant endemicity (ibid).

Although bird diversity is not very high by global standards, endemism is very high (Allison and Eldredge 1999) as are the numbers of globally threatened birds (Stattersfield *et al* 1998). Threats to bird species are not a new phenomenon in the Pacific. In fact, the Pacific islands are believed to have had more than 2,000 bird extinctions since human colonization (Steadman 1995). The highest diversity and endemism is in Hawaii, Fiji and French Polynesia. There are a total of 15 Endemic Bird Areas (EBAs), as defined by

BirdLife International (Stattersfield *et al* 1998) in the hotspot. These are as follows, with the number of restricted range species in each EBA in brackets.

- In Polynesia : Hawaii (15), Central Hawaiian islands (23), Laysan island (2), Samoan islands (20), Southern Cook islands (7), Rimatara (2), Marquesas islands (10), Society islands (8), Tuamotu archipelago (8), Henderson Island (4), and Fiji (27).
- In Micronesia: the Mariana islands (12), Palau (16), Yap (7), and East Caroline islands (18).

Terrestrial reptile, mammal, and amphibian diversity in the hotspot are all quite low but endemicity is high. None of these groups are very vagile, especially at dispersing across large ocean gaps. The greatest diversity of all three groups is in the west and north of the region close to the biological source area (for most of the groups) of Southeast Asia. Of the 61 native terrestrial reptiles, Fiji and Palau have the greatest diversity. The terrestrial species include seven species of snakes and 53 species of lizards, mostly skinks and geckos but also two iguanas that are endemic to the Fiji-Tonga area (Allison and Eldredge 2004). Amphibian diversity in the hotspot is extremely low with only three native amphibians known to occur, all three endemic ranid frogs of the genus *Platymantis* (ibid). Two of the species are endemic to Fiji, the third to Palau and all three are believed to be related to species found in the Solomons and Papua New Guinea respectively (Allison and Eldredge 1999).

Table 2. Numbers of Native and Endemic Species in Major Taxonomic Groups by Political Units for Polynesia-Micronesia

Hotspot Country, State or Territory	Native Vascular Plants[i]		Breeding Birds [ii]		Native Mammals [iii]		Terrestrial Reptiles [ii]		Native Amphibians [ii]		Native Land snails [iv]	
	Species known	Percent endemic	Species known	Percent endemic	Species known	Percent endemic	Species known	Percent endemic	Species known	Percent endemic	Species known	Percent endemic
American Samoa	373	3	34	0	3	0	11	0	0	0	47	-
CNMI	221	37	28	7	2	0	11	0	0	0	-	-
Cook Islands	284	12	27	26	1	0	1[vi]	0	0	0	45 [vi]	-
Easter Island	-	-	-	-	0	0	-	-	0	0	0	0
FSM	782	25	40	45	6	83	-	-	0	0	-	-
Fiji	1,628	50	74	35	6	17	25	36	2	100	-	-
French Polynesia	959	58	60	43	0	0	10	0	0	0	>160**	-
Guam	330	21	18	11	2	0	11	9	0	0	27	-
Hawaii	1,200	83	112 [v]	55 [v]	1	0	3[vii]	0	0	0	763	98
Kiribati	22	9	26	4	0	0	-	0	0	0	-	-
Marshall Is	100	5	17	0	0	0	7	0	0	0	>6	-
Nauru	54	2	9	11	-	0	-	0	0	0	-	-
Niue	178	1	15	0	1	0	4	0	0	0	-	-
Palau	175	?	45	22	2	50	22	5	1	100	68	-
Pitcairn Islands	76	18	19	26	0	0	-	0	0	0	~30	~15
Samoa	770	15	40	20	3	0	8	0	0	0	64	-
Tokelau	32	0	5	0	0	0	7	0	0	0	-	-
Tonga	463	5	37	5	2	0	6	17	0	0	-	-
Tuvalu	44	0	9	0	0	0	-	0	0	0	-	-
US Minor Islands	-	-	-	-	0	0	-	-	0	0	-	-
Wallis & Futuna	475	15	25	0	1	0	-	0	0	0	-	-
Hotspot Total[v]	~5,330	57	242	68	15	73	61	49	3	100	~4,000[vi] ii	?

- no data available, ** Society Islands only. Note that species totals are not always additive because some species are distributed in more than one country.
Sources: i. van Royen, P., and Davis, S.D. (1995). *Centres of Plant Diversity*, except Federated States of Micronesia (FSM) data which are from UNDP (2002) and Samoa data which are from Whistler (pers.comm. 2003)
ii. WCMC. (1994). *Biodiversity Data Sourcebook*. World Conservation Press, Cambridge
iii. Flannery, T. (1995). *Mammals of the South-West Pacific and Moluccan islands*. Cornell University Press, New York
iv. Dr Robert Cowie (pers. comm.), except for Marshall Islands which is Vander Velde (pers.comm. 2003)
v. Allison, A., and Eldredge, L. 2004. Polynesia and Micronesia. in Mittermier *et al*. *Hotspots Revisited.*Cemex and Conservation International
vi. McCormack, G. 2002. *Cook Islands Biodiversity Strategy and Action Plan*. UNDP

vii. Eldredge, L., and Evenhuis, N.L. In Press. *Hawaii's Biodiversity: A detailed assessment of the numbers of species in the Hawaiian Islands*. Bishop Museum, Hawaii.
viii. Cowie, R. 2000. Non-indigenous land and freshwater molluscs in the islands of the Pacific: conservation impacts and threats. In *Invasive Species in the Pacific: A Technical Review and Draft Regional Strategy*. Sherley, G. (Ed.). SPREP, Apia. (Note that the figure includes all Pacific islands except New Zwaland and PNG).

There are only 15 native terrestrial mammals in the hotspot and all are bats (Allison and Eldredge 2004). Eleven species, or 56 percent of the bats, are endemic, all fruit bats (ibid). Most of the bats are found on the high islands in the north and west of the hotspot, and all, bar the single Hawaiian sub-species, *Lasiurus cinereus semotus*, are related to Indo-Pacific groups. None of the rat species, which inhabit most of the islands in the hotspot, are believed to be native; all are assumed to have been introduced by the early inhabitants, or by Europeans (Allison and Eldredge 1999)

Invertebrates have been poorly studied globally despite the fact that invertebrates make up 99 percent of all animal species (Lydeard *et al* In Press). This is also true of the Polynesia-Micronesia Hotspot, where very few invertebrate groups, such as the land snails, have been studied comprehensively. Globally, the greatest snail diversity and endemism appears to be in isolated environments such as islands and in mountains (WCMC 1992). This is certainly true in the Pacific where land snail diversity is particularly high – approaching 4,000 species (Cowie 2000). In the hotspot, the greatest land snail diversity is on certain extremely isolated islands such as Rapa, Oahu and Mangareva (Cowie 1996). Pacific land snails are dominated by a relatively small number of families including the endemic Partulidae, Achatinellidae, Amastridae, and Endodontidae and the nonendemic Charopidae, Pupillidae, Helicinidae, Helicarionidae, and Succinidae.

Although this ecosystem profile focuses on terrestrial biodiversity, no summary of the biodiversity of an essentially oceanic region such as Polynesia and Micronesia could be complete without a brief description of the marine biodiversity. The Western Pacific has the highest marine diversity in the world, with up to 3,000 species being recorded from a single reef (SPREP 1992). Overall, the Pacific region has the most extensive coral reef system in the world, the largest tuna fishery, and the healthiest remaining global populations of many marine species such as whales and sea turtles (UNESCO 2003a). Unlike the relatively depauperate terrestrial mammal fauna, the marine mammal fauna of the region is quite rich (Allison and Eldredge 1999). As with the terrestrial realm there is a gradient of decreasing numbers of species from west to east, but there is a second gradient from warm equatorial waters to more temperate waters away from the equator as well (Dahl 1984). There is evidence that widely distributed species are a larger component of marine, rather than terrestrial, flora and fauna (ibid).

Ecosystems

There have been a number of attempts to classify and map the ecosystems of the Pacific region, but none specifically for the hotspot. In 1974 IUCN classified and mapped the Pacific into 19 terrestrial biogeographical provinces based on island type, climate, and vegetation affinities. Dahl (1980) later modified the classification to 20 biogeographical provinces (terrestrial and marine) and classified the region into biomes and thence into 74 ecosystems, including about 27 terrestrial ecosystems, 12 freshwater ecosystems, and 35 marine ecosystems (ibid). Terrestrial biomes were distinguished according to vegetation type, while for the marine biomes, the substrate, as well as the dominant plant or benthic animals, was used to determine the classification.

The natural vegetation of the Pacific islands has been recently refined into 12 principal biomes (Mueller-Dombois and Fosberg 1998). Along the shores of most Pacific islands is salt and wind tolerant strand vegetation composed of herbs, vines and low shrubs. Fringing some sheltered shores, often where there is some freshwater source, are mangrove swamps composed of shrubs and trees. In inland areas on large, wet islands are various types of rain forest with a rich and diverse floristic composition of epiphytes, shrubs and trees. The natural vegetation at low elevations is coastal and lowland rain forest, although this has been eliminated on most islands in the hotspot. At higher elevations the rainforest changes to a lower stature, shrub and epiphyte-rich montane rainforest. At or above the cloud line on the highest islands are dwarf statured cloud forests. Above the cloud line on Hawaii and Maui the vegetation is a montane grassland or savanna mixed with xerophytic shrubs and trees while on the dry leeward slopes of some Hawaiian and Fijian islands is a mesophytic, or seasonally dry, evergreen forest composed of grasses and sclerophyllous shrubs and trees (ibid).

Wetlands have not been well studied in the Pacific, except in Hawaii and current and former U.S. territories (Scott 1993). However, some general statements can be made. On the whole, the atoll states have few, if any, significant wetlands other than reef systems. On the larger volcanic islands in the hotspot there are significant areas of wetlands of two main types, intertidal mangrove forests, and freshwater lakes, marshes, swamps and rivers. Fiji in particular has a diverse variety of inland wetlands including distinct sago swamps, peat bogs and pandanus savannas. Large mangrove forests are still found in coastal areas of Fiji, the Federated States of Micronesia (FSM) and Palau and to a lesser extent Tonga and Samoa. Mangrove forests are particularly important for fish, invertebrate and avian diversity, including a number of threatened migratory shorebirds. Freshwater wetlands such as coastal marshes, upland swamps and marshes, crater lakes and rivers cover a very small area overall but have unusual and poorly known floras and fish and invertebrate faunas. Many wetlands in the hotspot are threatened by development, pollution, invasive species and habitat conversion.

After centuries of human impact, the dominant vegetation types on most islands are now human induced or anthropogenic plant associations ranging from agroforests and secondary forest to grassland and savanna. It is estimated that more than three quarters of the original vegetation of the hotspot has been damaged or destroyed (Allison and Eldredge 1999). The forested area varies significantly from country to country in the hotspot but tends to be highest on the volcanic islands such as Fiji, Palau, and Samoa with 30-60 percent forest cover and lowest on the low islands and atolls from 5-40 percent forest cover (FAO 2003).

Recent assessments of globally significant ecosystems have identified a number of critical ecosystems or ecoregions in the hotspot. This could be interpreted as a strong endorsement of the choice of the hotspot by other environmental organizations. As mentioned, the hotspot includes four centers of plant diversity (van Royen and Davis 1995). Twenty two of the 867 global terrestrial ecoregions identified and mapped by WWF are in the hotspot, including all of the island groups in the hotspot (Olson *et al*

2001). Pacific terrestrial ecoregions have recently been revised slightly to take into account the latest information on invertebrate distribution (Olson pers. comm. 2003).

Many of the ecoregions mapped by WWF correspond closely to the biogeographic provinces of Dahl (1980). The main ecosystem represented in these ecoregions is tropical rain forests. However, included in the 22 ecoregions are a few occurrences of tropical dry forests in Hawaii, Fiji and Micronesia and shrublands and scrub in Hawaii. WWF's Global 200 list of the most outstanding examples of the world's ecosystems includes three terrestrial ecoregions in the hotspot, namely Hawaii's rain forests, Hawaii's dry forests and the South Pacific island forests which includes the rain forests of the Cook islands, Fiji, Tuamotus, Tonga, Society islands, Samoa, Marquesas, and Tubuai (Olson and Dinerstein 1998).

Assessments of global marine ecosystem diversity have identified a number of sites of global significance in the Pacific. WWF's Global 200 list includes five outstanding coral ecoregions in the hotspot, namely Palau, Tahiti, Hawaii, Rapa Nui (Easter island), and Fiji (Olson and Dinerstein 1998). Conservation International has identified 18 global marine centers of endemism based on the number of restricted range reef fish, corals, snails and lobsters (Roberts *et al* 2002). There are two such centers in the Polynesia-Micronesia Hotspot, namely the Hawaiian Islands and Easter Island.

A number of ecosystems and habitats in the hotspot have been identified as having national or even international significance and have been declared as protected areas-including national parks, reserves, and conservation areas. These sites are discussed in the next section.

Level of Protection

A protected area is defined by IUCN-The World Conservation Union (IUCN 2004a) as, "*an area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means.*" This definition encompasses government managed strict nature reserves through to areas managed by customary landowners for conservation and resource management.

There are at least 356 protected areas recorded within the hotspot covering approximately 1,872,196 hectares (18,722 square kilometers) of land and sea, however almost one-third of these are found in Hawaii alone. Excluding Hawaii, 154 of the hotspot's protected areas (60 percent) are terrestrial, covering an area of approximately 199,750 hectares (1,998 square kilometers) or 6.7 percent of the land area of the hotspot. Table 3 summarizes the known protected area coverage in hotspot political units.

Coverage

General assumptions on the effectiveness (i.e. representativeness and functionality) of the coverage of protected areas within the hotspot are subjective. Almost 40 percent of the protected areas listed in the *Pacific Protected Area Database* developed by Conservation International, have no recorded size. This may be because many of these areas have not

been delineated. This deficiency in the data has meant that the size estimates for each country and the whole hotspot are skewed and extremely misleading. For example, 17 of Fiji's 38 listed terrestrial protected areas have no size estimates. In general, where the land area covered by a protected area is defined, it is a general estimate or a contested figure. In addition, many of the areas listed are coastal areas with a terrestrial and marine component. There is often no clear distinction between the individual size of each (marine and terrestrial). Therefore, the summarized area listed in Table 3 may incorporate the marine component of a protected area in addition to the terrestrial component.

Table 3. Summary of Protected Areas by Political Units in the Polynesia-Micronesia Hotspot

Hotspot Country, State or Territory	No. of Protected Areas	Total Area Protected (marine & land)	Terrestrial Protected Areas	Land Area Protected (ha)
MICRONESIA	107	398,825	56	84,795
CNMI	12	2,323	8	2318
FSM	32	9,895	10	9,425
Guam	16	14,844	10	4,933
Kiribati	14	112,542	14	64,542
Marshall Islands	7	70,100	5	1,126
Nauru	-	-	-	-
Palau	22	134,927	8	1,067
US Minor Islands	4	54,194	1	1,384
FIJI	65	77,641	38	39,641
POLYNESIA	184	1,395,730	165	384,814
American Samoa	13	5,692	11	3,959
Cook Islands	15	5,027	12	3,670
Easter island	1	6,700	1	6,700
French Polynesia	9	23,030	8	19,710
Hawaii	-	-	105	309,500
Niue	3	6,057	2	6,029
Pitcairn islands	1	3,730	1	3,730
Samoa	14	20,874	11	11,852
Tokelau	3	1,000	-	-
Tonga	16	1,010,791	11	19,634
Tuvalu	2	3,300	1	-
Wallis et Futuna	2	30	2	30
TOTAL HOTSPOT	**356**	**1,872,196**	**259**	**509,250**

Note: The data in this table represent available information for each country, state, and territory at the time of compilation. The accuracy of the data is unknown at this stage and may be inaccurate and not necessarily representative of actual area protected. The information should therefore be treated with caution and should not be used as a guide to compare country coverage or to assess general protected area coverage within the hotspot.
Source: Conservation International's "*Pacific Protected Area Database"* except data for Hawaii, which is from SPREP (1999).
- no data available

The lack of information regarding size, boundaries and, in many cases, even location information, in part reflects the unique nature of customary land tenure and resource rights within the Pacific region. Information identifying a protected area that is locally owned, used, and managed may encompass sensitive local and or traditional knowledge

that the land and resource owners do not want revealed or publicized. In addition, most countries do not have a centralized up-to-date record of their protected areas due to limited government resources and capacity, and lack of national coordination between bodies responsible for protected areas.

When considering protected area coverage for the region it is important to recognize that many Pacific "protected areas" are not dedicated primarily for the purposes of biodiversity conservation. Many are areas that have been established for utilitarian purposes of resource management as well as the maintenance of ecological systems for continued sustainable use. The conservation of biodiversity may occur but it is not the primary objective of these areas.

Traditional Closures

Pacific island communities have traditional systems of "setting areas aside." These areas form part of the community's culture, customs, and traditional resource management practices and include areas such as "mo" areas in the Marshall Islands, "ra'ui" areas in the Cook Islands, and "tabu" areas in Fiji. These areas may be temporary closure areas such as Pouara Ra'ui in the Cook Islands, closed for two years, or permanent closure areas. National governments often do not recognize these traditional conservation and resource management arrangements. The *Pacific Protected Area Database* only encompasses permanent protected areas where they are publicly known. Subsequently many traditionally protected areas are not listed in the Database or included in Table 3. These areas play a vital role in the conservation effort within the hotspot and should not be overlooked.

Protected Area Classification

Protected areas are dedicated and managed for a variety of purposes including scientific research, wilderness protection, preservation of species and genetic diversity, maintenance of environmental services, protection of specific natural and cultural features, tourism and recreation, education, sustainable use of resources from natural ecosystems, and maintenance of cultural and traditional attributes (IUCN 2004a). IUCN developed six protected area management categories, illustrating the range of purposes and objectives protected areas can serve. The classification system provides a rationale for why the protected area was established. Increasingly along the continuum (from Ia – VI), emphasis is placed on direct human use and resource development.

Each country, state, and territory has an individual protected area categorization system, often outlined in the National Biodiversity Strategy and Action Plans, where these exist. These national interpretations exist in addition to the IUCN system. The difficulty in standardization lies in the different, and at times inaccurate, interpretations of the IUCN Classification system between countries and organizations. Some protected area sites have been allocated more than one category by different sources; the same site may be listed as a category II (National Park) in one source and as a category IV (Managed Resource Protected Areas) in another source. This may be due to the various interpretations of the classification system and to the multiple use nature of many protected areas and the different zones of management within many sites.

A number of sites in the hotspot have been identified as internationally significant and have been declared either World Heritage sites, Biosphere reserves, or Wetlands of International Importance (Ramsar sites). Three areas have been declared by the United Nations Educational, Scientific and Cultural Organization (UNESCO) as World Heritage sites for their globally significant cultural and or natural heritage. The Hawaii Volcanoes National Park was declared a World Heritage site in 1988 for its unique geology, including one of the most active volcanoes in the world. Rapa Nui National Park on Easter island was inscribed in 1995 for its unique cultural heritage and monumental basalt figures called *moai.* Henderson island in the Pitcairn group was inscribed in 1988 due to its pristine environment and large number of endemic terrestrial species. Many of the islands in the Central Pacific, including the Line islands and a number of reefs and islands in three countries, have been proposed as a combined World Heritage Site for their relatively intact and undisturbed natural communities with significant marine and avian biodiversity. Other sites in the hotspot, including sites in Fiji and a proposed Samoan Archipelago site, are also being assessed.

There are two Man and the Biosphere reserves in the hotspot, selected by UNESCO for their outstanding biological values and potential for scientific research. These two sites are the Atoll de Taiaro in the Tuamotu group of French Polynesia - declared in 1977 due to its pristine and unusual atoll environment, with a completely enclosed inner lagoon, and the Hawaii Islands Biosphere Reserve - declared in 1980 for the unique, highly endemic and threatened biodiversity of the Hawaiian islands. Only one site in the hotspot has been declared a Ramsar wetland site- Lake Ngardok, on Palau, dedicated in 2002. This 493 ha site has significant fish and avian fauna, including the national bird of Palau, the Palau Fruit Dove or “biib” (*Ptilinopus pelewensis*). Other sites in the hotspot have been nominated as Ramsar sites, including Lake Lanoto’o in Samoa, but have not yet been dedicated.

Many of the protected areas within the hotspot are managed for sustainable use of natural ecosystems (Category VI) but have small traditional closed (no-take) areas within them. This category is generally more appropriate within Polynesia and Micronesia because of the predominance of customary land ownership and the economic, social, cultural, and spiritual connection and dependence land and resource users have with their environment.

The regional trend for networks of small locally managed areas particularly in the marine sector should be noted. Small-scale protected areas linked by networks and supported by external organizations (NGO, private, or government) are considered more socially appropriate, financially feasible and managerially sustainable within the Pacific region. The Locally Managed Marine Area Network in the Western Pacific provides a good working example of this approach.

Governance

A variety of protected area models and governance arrangements occur within the hotspot. Most countries within the hotspot now have a centralized system of land and resource management, in line with western approaches to governance. Commonly these systems of governance have often been superimposed onto existing customary structures.

Due to the unwritten nature of customary tenure and law, this has occurred in some nations relatively quickly. However, there is now a renewed emphasis on people-oriented conservation initiatives within the region such as community-based conservation areas (CBCAs)[1] and co-managed protected areas. These governance structures can cover the full plethora of protected area categories and encompass a wide range of stakeholders and support including private, NGO, and government. National governments often have limited knowledge, involvement, and jurisdiction over community conservation areas. Despite this, national governments are generally the primary body responsible for reporting on the protected area status of their countries.

In recognition of the great diversity of protected area governance types and the influence these have on the management of a protected area, a typology of protected area governance was recently added as an extra dimension to the IUCN protected area categories. This was an outcome of the 2003 Vth World Parks Congress in Durban, South Africa. A protected area will therefore be any combination of the four types of PA Governance[2] and six IUCN management objective categories. This new dimension of classification will be invaluable when considering the conservation status of the Polynesia-Micronesia Hotspot in the future.

Community Conserved Areas

The status and management effectiveness of most of the protected areas summarized in Table 3 is unknown at this stage. Some general conclusions can however be made. The listed protected areas for the hotspot are poorly resourced with limited management support and capacity. The practice of conservation through conventional forms of protected areas throughout the Pacific islands region appears to have been largely ineffective, having historically been applied without due respect for customary land and resource tenure arrangements or traditional practices and rights. Consequently, the hotspot does not have an effective developed protected area system in the formal "western" sense.

There is new awareness of traditional approaches to conservation. The now more formalised community conserved areas must be considered when assessing protected area coverage. These areas have played, and will continue to play, a fundamental role in the conservation of biodiversity within the Polynesia-Micronesia Hotspot. In general, due to land tenure arrangements and customary resource rights, it appears that co-managed protected areas between communities and state or NGOs, and community conservation with government or NGO support, are the most appropriate governance models for protected areas in the hotspot.

---

[1] Community Conserved Areas are "natural and modified ecosystems including significant biodiversity, ecological services and cultural values voluntarily conserved by concerned communities through customary laws or other effective means" (IUCN 2004b).

[2] A.Government Managed PAs; B. Co-managed PAs; C. Private PAs; D. Community Conserved Areas. These governance types can represent any of the IUCN Categories (Management objectives) i.e. Strict Nature Reserve or Protected Landscape/seascape.

CONSERVATION OUTCOMES

This ecosystem profile includes a commitment and emphasis to achieve concrete conservation outcomes. To do this requires defining the set of quantifiable, justifiable targets that need to be achieved to prevent biodiversity loss.

Conservation outcomes can be defined at three scales – species, site, and landscape – reflecting a simplification of a complex hierarchical continuum of ecological scales. The three scales interlock geographically through the presence of species in sites and of sites in landscapes. They are also logically connected. If species are to be conserved, the sites on which they live must be protected and the landscapes or seascapes must continue to sustain the ecological services on which the sites and the species depend. As conservation in the field succeeds in achieving these targets, they become demonstrable results or outcomes: "Extinctions Avoided" (species level), "Areas Protected" (site level), and "Corridors Consolidated" (landscape level).

While CEPF cannot achieve all of the outcomes identified for a region on its own, the partnership is trying to ensure that its conservation investments are working toward preventing biodiversity loss and that its success can be monitored and measured. Therefore, the targets (hereafter "outcomes"), are the scientific underpinning for CEPF's geographic and thematic focus for investment in Polynesia and Micronesia. In the context of the archipelagic Polynesia-Micronesia Hotspot, only species and site outcomes have been defined since landscape-scale outcomes are not considered appropriate.

Species Outcomes

Defining conservation outcomes is a bottom-up process with a definition of species-level targets first, from which the definition of site-level targets is based. The process requires detailed knowledge of the conservation status of individual species. Although this information has been accumulating in global Red Lists produced by IUCN-The World Conservation Union and partners for more than 40 years, our knowledge of the population status of most threatened species is still very deficient. This is especially true in the Polynesia-Micronesia Hotspot, where surveys and research on rare species are very limited.

The Red Lists are based on quantitative criteria under which the probability of extinction is estimated for each species. Species classified as "threatened" on the Red List have a high probability of extinction in the medium term future. These include the three IUCN categories Critically Endangered (CR), Endangered (EN) and Vulnerable (VU). Defining outcomes is a fluid process and, as data become available, species-level outcomes will be expanded to include other taxonomic groups that previously had not been assessed, as well as restricted-range species. Avoiding extinctions means conserving globally threatened species to make sure that their Red List status improves or at least stabilizes. This in turn means that data are needed on population trends; for most of the threatened species, there are no such data.

The sheer size and scale of the hotspot and the large number of countries included in it meant that the volume of data gathered for defining outcomes was immense. A

comprehensive database was developed to assist this process. Data sources included published scientific papers, species recovery plans, NBSAP reports, field guides, and personal communications with many scientists. Key data sources for birds were the *Threatened Birds of the World* (BirdLife 2000) and *Endemic Bird Areas of the World* (Stattersfield *et al* 1998). Data on plant distributions was drawn from volumes 1-5 of *Flora Vitiensis Nova* by A.C. Smith (1979 to 1995), and volumes 2-5 of *Pacific Plant Areas* (Van Balgooy 1966-1993), for amphibians from the *Global Amphibian Assessment* (Frost 2002) and for mammals from *Mammals of the South West Pacific and Moluccan Islands* (Flannery 1995).

Species outcomes in the Polynesia-Micronesia Hotspot include all those species that are globally threatened according to the IUCN Red List (2003) at the time the outcomes were defined in the profiling process. At present, there are 476 globally threatened terrestrial species in all the countries and territories of the hotspot. Table 4 summarizes the taxonomic breakdown of the 476 threatened species in the hotspot while the full list of threatened species is shown in Appendix 1. Table 5 shows the geographic distribution of threatened species by political unit, while Figure 2 is a map of this information.

Almost half (232 out of 476) of the threatened species in the hotspot are in political units that are ineligible for CEPF funding. The vast majority of the species in ineligible countries (214 species and almost half of all threatened species in the hotspot) are in Hawaii alone. The remaining 244 species in CEPF eligible countries define the full set of species outcomes for this ecosystem profile. Species outcomes for the eligible portion of the hotspot (of the 244 species) include 129 plants, 42 molluscs, 58 birds, eight mammals, six reptiles and one amphibian. Of the 244 species, 92 are Critically Endangered, 48 are Endangered and 104 are Vulnerable. Absent from the list are fish and invertebrates, other than molluscs. This is likely because of the lack of an assessment of the conservation status of these taxa for inclusion in the Red List at the time.

Eighty percent of globally threatened species in eligible countries (192 out of the 244 species) are in Fiji and French Polynesia alone. The statistics imply that these two countries should be a major focus of conservation effort in the hotspot. However, it is likely that these figures are also a reflection of the amount of research effort that has been conducted in each country. Fiji and French Polynesia, being two of the wealthier countries in the hotspot, are where much of the research effort has been focused. It is clear that much more research is required in the less-studied countries of the hotspot to provide a more accurate representation of the distribution of threatened species throughout the hotspot.

It must be stressed therefore that there are significant deficiencies in the Red List for the hotspot with respect to both the taxonomic representation and the geographic distribution of Red Listed species. The taxonomic deficiencies are especially serious with respect to invertebrates, fish, and plants, while the geographic deficiency is especially true for the smaller, less wealthy countries of the hotspot. Appendix 2 includes a list of provisional species outcomes, which local and regional experts suspect are globally threatened. These species are in urgent need of assessment of population and threat status. If they are

reassessed as globally threatened during the five-year investment period, they could become species-level targets and therefore potentially eligible for CEPF investment.

Table 4. Summary of Species Outcomes (Globally Threatened Species) in the Polynesia-Micronesia Hotspot and Those Only in Countries Eligible for CEPF Funding

Taxonomic Group	Total Number of Globally Threatened Terrestrial Species in the Hotspot						Number of Globally Threatened Terrestrial Species in Countries Eligible for CEPF Funding			
	Vulnerable	Endangered	Critically Endangered	Total	% of known native species that are threatened[1]	No. of known extinctions in the past 200 years	Vulnerable	Endangered	Critically Endangered	Total
Plants	94	59	90	243	4%	24	61	19	49	**129**
Molluscs	7	31	68	106	~90%[2]	134	7	8	27	**42**
Birds	50	25	21	96	38%	35	33	16	9	**58**
Arthropods	13	2	0	15	?	39	0	0	0	**0**
Mammals	2	3	4	9	56%	2	2	2	4	**8**
Reptiles	1	2	3	6	9%	1	1	2	3	**6**
Amphibians	0	1	0	1	33%	?	0	1	0	**1**
Totals	167	123	186	476	?	?	**104**	**48**	**92**	**244**

Source: IUCN Red List 2003.

1. Calculated from data presented in Table 2.
2. Estimate provided by Dr Robert Cowie (pers.comm., 2004)

Figure 2. Distribution of Globally Threatened Terrestrial Species in the Polynesia-Micronesia Hotspot

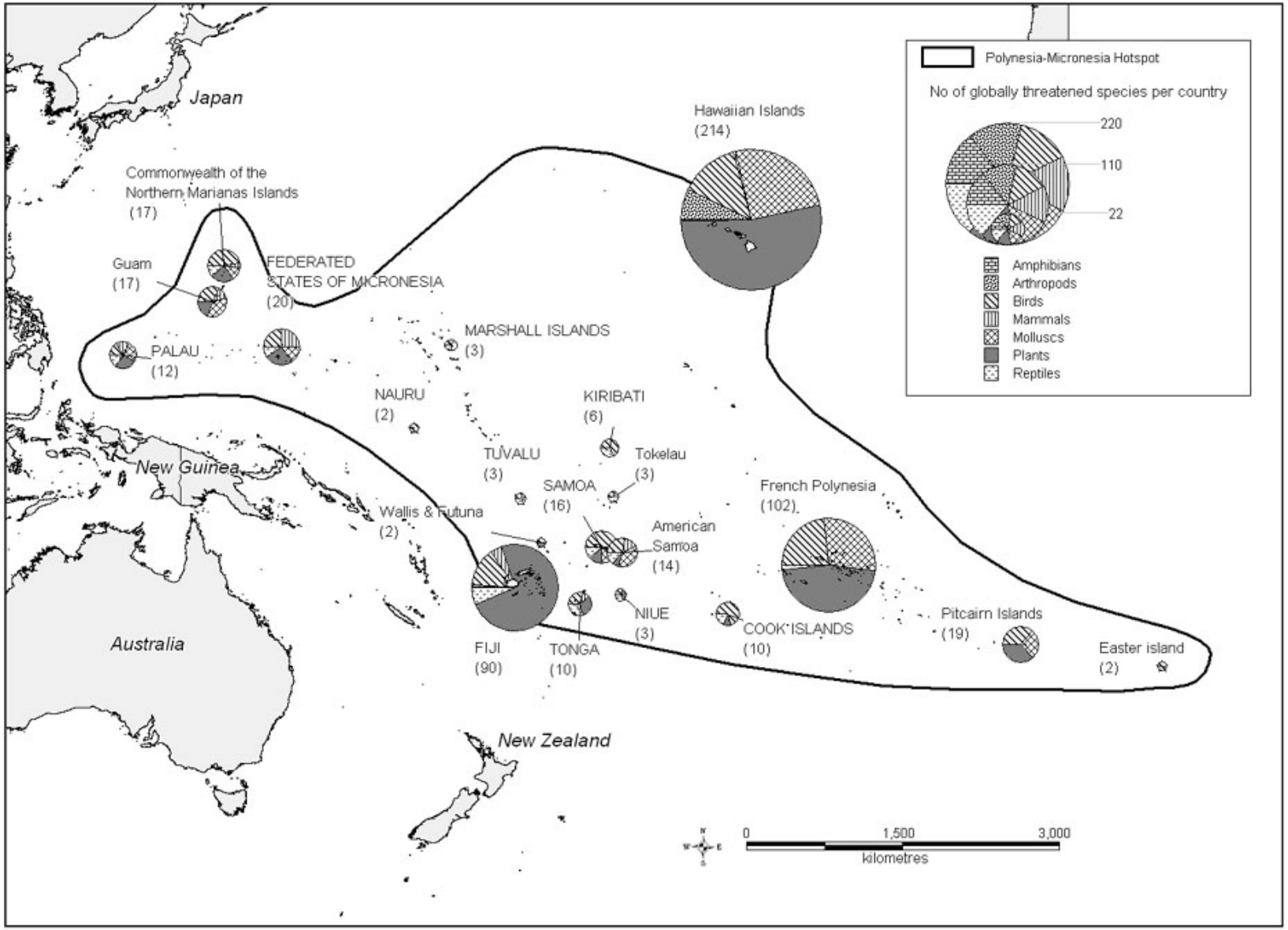


Table 5. Summary of Threatened Terrestrial Species in Political Units of the Polynesia-Micronesia Hotspot

Taxonomic Group	Threatened Terrestrial Species per Political Unit																					
	Amercican Samoa	Cook islands	Easter Islands	FSM	Fiji islands	French Polynesia	Guam	Hawaii	Kiribati	Marshall islands	Nauru	Niue	N. Mariana islands	Palau	Pitcairn islands	Samoa	Tokelau	Tonga	Tuvalu	Wallis & Futuna	US Minor islands	**CEPF eligible species**
Plants	1	1	0	5	66	47	3	113	0	0	0	1	4	3	7	2	0	3	0	1	0	129
Molluscs	5	0	0	3	0	29	5	54	0	0	0	0	2	3	5	2	0	0	0	0	0	42
Birds	4	7	2	5	13	24	5	30	4	1	2	1	8	2	7	8	1	3	1	1	1	58
Arthropods	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mammals	2	0	0	5	4	0	2	1	0	0	0	0	1	2	0	2	0	1	0	0	0	8
Reptiles	2	2	0	2	6	2	2	1	2	2	0	1	2	2	0	2	2	3	2	0	2	6
Amphibians	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Totals*	**14**	**10**	**2**	**20**	**90**	**102**	**17**	**214**	**6**	**3**	**2**	**3**	**17**	**12**	**19**	**16**	**3**	**10**	**3**	**2**	**3**	**244**

* Totals do not always add up because some species are found in more than one country.

Site Outcomes

Recognizing that most species are best conserved through the protection of the sites in which they occur, **key biodiversity areas** are defined as targets for achieving site-level conservation outcomes. Key biodiversity areas are physically and/or socioeconomically discrete areas of land that harbor species of global conservation concern including globally threatened species, but also of restricted-range species and globally significant congregations. Sites are scale-independent, in other words they can be small or large, but a major criterion for their selection is that they should be, as far as possible, manageable as a single unit (i.e. a unit with a single type of land tenure). These sites need careful management to conserve the species for which they were defined. The process of defining key biodiversity areas can only be done when accurate and comprehensive data are available on the distribution of threatened species across sites.

When appropriate data were available, Geographical Information Systems (GIS) tools were used to map and analyze species distributions. Such maps were useful for the identification of site outcomes, or key biodiversity areas. Digital datasets were obtained for the following taxonomic groups: birds (from BirdLife 2000), amphibians (from the Global Amphibian Assessment- Frost 2002) and corals (from Veron 1986). However, detailed species distribution maps have only been generated for a few species, and most species were only mapped to the country of occurrence and in a few cases to specific islands.

Key biodiversity areas were determined by identifying the sites in CEPF eligible countries that contain populations of at least one globally threatened species. Key data sources for this analysis included published scientific articles, the IUCN regional ecosystem survey (Dahl 1980), a number of GIS data layers, data from the World Database on Protected Areas (IUCN-UNEP 2003), NBSAP reports, ecological survey data, subregional workshops, and communications with many scientists. Data on restricted-range species and globally significant congregations were not available for this analysis but could be incorporated at a later date, especially with the upcoming project of BirdLife International to define Important Bird Areas (IBAs) for the Pacific. This hotspot is likely to have several sites containing globally important congregations of seabirds; however only one site, the Phoenix Islands, was identified using this criterion (Angela Kepler, pers comm). It is a priority to refine this analysis of key biodiversity areas by systematically applying the globally singificant congregations criteria, as well as restricted-range criteria, in the near future.

In total, 161 sites were identified for the hotspot, each containing at least one globally threatened species, and most of the sites contain several or many globally threatened species. A total of 243 species (all but one of the 244 eligible species) were assigned to at least one site. The only species which was not assigned to a site is the leatherback turtle (*Dermochelys coriacea*), which does not nest in the hotspot but has been reported from Palau and Fiji.

The full list of key biodiversity areas, with distribution by country, is presented in Appendix 3. Some of the sites are islands or groups of islands (typically small islands),

because finer-scale data for some areas were not available. Many of the sites selected have also been identified as critical sites for conservation by other environmental organizations. All sites are within one of the 20 Pacific terrestrial ecoregions (Olson *et al* 2001). Furthermore, 54 sites (33 percent) are, or are within, existing or planned protected areas, 70 sites (43 percent) are within an endemic bird area (Stattersfield *et al* 1998), and 51 sites (31 percent) are within a Center of Plant Diversity (van Royen and Davis 1995). Table 6 shows the distribution of sites by the 14 CEPF eligible countries in the hotspot. Note that there is also one transboundary site, the proposed Central Pacific World Heritage Site, which includes islands in three countries in the central Pacific: Kiribati, the United States, and the Cook Islands.

Table 6. Distribution of Site Outcomes (Key Biodiversity Areas) by Six Major Taxonomic Groups in CEPF Eligible Countries in the Hotspot

Taxonomic Group	Percentage of eligible globally threatened species captured in the sites				Number of Sites in CEPF eligible countries															Total Sites
	Vulnerable	Endangered	Critically Endangered	Total	Cook islands	Easter Islands	FSM	Fiji islands	French Polynesia	Kiribati	Marshall islands	Niue	Palau	Pitcairn islands	Samoa	Tokelau	Tonga	Wallis & Futuna	Transboundary	
Plants	100	100	100	100	1	0	11	27	18	0	0	1	1	2	4	0	2	1	0	68
Molluscs	100	100	100	100	0	0	2	0	6	0	0	0	1	1	2	0	0	0	0	12
Birds	100	100	100	100	4	0	11	27	32	3	6	0	4	3	6	1	2	1	1	102
Mammals	100	100	100	100	0	0	32	7	0	0	0	0	3	0	3	0	0	0	0	45
Reptiles	100	100	67	83	3	0	28	18	1	3	7	0	0	0	2	1	0	0	1	65
Amphibians	100	100	100	100	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	3
Totals*	**100**	**100**	**100**	**100**	**5**	**0**	**53**	**35**	**38**	**3**	**7**	**1**	**4**	**3**	**6**	**1**	**3**	**1**	**1**	**161**

* Totals do not always add up because most sites contain a mix of species from different taxonomic groups.

SOCIOECONOMIC FEATURES

Human Demography

Key human demographic features of most countries in the hotspot are high natural population growth rates, young populations (on average, around 40 percent of the population is under 14 years), increasing urbanization, and high out-migration to developed countries of the region such as Australia, New Zealand, and the United States.

At current natural population growth rates of between 1 and 3 percent per annum, the population of the Polynesia-Micronesia region would be expected to double in the next 30 years (Micronesia) to 58 years (Polynesia) (SPC 2003a). High natural population growth rates are a result of a relatively high fertility rate but a declining death rate. The highest fertility rates are in the Micronesian countries such the Marshall Islands and Kiribati, with the lowest rates in Niue and French Polynesia. However, Pacific people are in general highly migratory and with the exception of Hawaii and most U.S. and French territories, all countries and states in the hotspot have experienced negative net migration or extensive out migration over the past decade (SPC 2003a).

While much of the migration is to metropolitan Pacific rim countries, such as the United States, New Zealand and Australia, some of it is between Pacific countries, such as from Samoa to American Samoa, from Micronesian countries to Guam, and from Wallis and Futuna to New Caledonia. Migration has artificially reduced the population growth in real terms in most countries and even resulted in negative net growth rates in some countries. Negative population growth as a result of emigration to New Zealand is a particularly serious problem in Niue and Tokelau, which are struggling to maintain viable economies and infrastructures with a diminishing labour force.

While the majority of Pacific islanders still live in rural areas, urban settlements are growing rapidly throughout the hotspot. As elsewhere in the world, the greater development and infrastructure and services available in urban areas has encouraged internal migration from rural to urban areas and from outer islands to regional centers and national capitals. This is especially true in Micronesia, which is more urbanized than Polynesia and also has a higher urban growth rate (SPC 2003a). The population density in many townships in the Pacific, but especially on the atolls such as Majuro, Funafuti and Tarawa, is reaching high levels, and is associated with health, sanitation, housing, and infrastructural problems (UNDP 1994).

The high proportion of young people and adults in the Polynesia-Micronesia region has resulted in pressures on infrastructure and services. Unemployment and underemployment of young adults is a major development issue in many hotspot states. Most PICTs are diversifying their economies to meet demands for semi-formal and informal employment but this is compounded by the general lack of vocational and technical skills amongst the youth.

Economy

Pacific island economies are highly vulnerable to external economic fluctuations, changing trade policies, and environmental shocks. The susceptibility of economies stems from an interplay of factors such as remoteness from world markets, a high dependency on exports of agricultural commodities that have relatively low value on international markets, geographical dispersion of islands, vulnerability to natural disasters, small internal markets, and limited natural resource bases (UNDP 1999).

The ecological dependency of Pacific economies and societies is well recognized. Pacific island societies have traditionally depended on the environment and natural resources for food, shelter, water, and medicine. However, as aspirations and expectations of Pacific communities have changed, economies are becoming increasingly dualistic with the co-existence of monetary and subsistence economies. At the same time, lifestyles are increasingly materialistic and westernized.

Agriculture and fisheries remain the mainstay of the economies of most of the independent hotspot countries and are particularly important because they support both subsistence economies and export industries that contribute significantly to economic growth. Formerly, agricultural exports of copra, cocoa, and bananas were principal sources of foreign exchange for many PICTs, but their importance has declined as production has increased in other regions, especially South America. Sugar remains a major export from Fiji, but may decrease in importance as preferential access to the European market is phased out under World Trade Organization rules. Other extractive industries such as logging and mining are not significant industries in the independent countries of the hotspot, except in Fiji. Tourism is an important industry in some hotspot countries and territories, especially Fiji, the Cook Islands, French Polynesia, CNMI, and Guam, and is becoming increasingly important to many other island economies. Given the large marine area included in the Exclusive Economic Zones of most PICTs, development of offshore fisheries is one of the few industries with significant future development potential. The fisheries industry contributes approximately 11 percent of the combined GDP of all PICTs and about half of the value of all exports from the region (Gillet *et al* 2001).

Economic growth of many hotspot countries has been very slow in recent years with per capita incomes stagnant in many countries (UNDP 1999). Hawaii, the U.S. territories, and French Polynesia are the wealthiest, most developed, and industrialized political entities in the hotspot, while the independent atoll states of Kiribati and Tuvalu and the French Territory of Wallis and Futuna have the lowest GDP per capita (Crocombe 2001). Economic development within the hotspot varies significantly from country to country depending on natural resource endowments and socio-political affiliations with metropolitan nations. Because of their small size and lack of terrestrial resources, most hotspot states have relatively limited opportunities for development and are highly dependent on aid and remittances. In general, the atoll states are the most economically vulnerable because of their small, dispersed land masses and limited terrestrial resource bases, while it is the larger, volcanic island countries such as Palau, FSM, Fiji, Samoa, and Tonga that lead in terms of economic diversification and potential.

Aid and remittances are likely to remain an important feature of the economies of the independent states of the hotspot. The amount of aid received per person in the Pacific is the highest of any region in the world but is declining (Crocombe 2001). Overseas development assistance from bilateral donors particularly the Australian Agency for International Development (AusAID), the European Union, the Japanese International Cooperation Agency, and the New Zealand Agency for International Development (NZAid) and multilateral donors and banks, continues to play an important role in most Pacific island economies struggling with high debt deficits and deteriorating terms of trade (UNDP 1999).

Institutional Framework

There are a large number and variety of institutions, at both the regional and national level, involved in various aspects of environmental management in the Pacific. However, in general, the countries and territories of the Polynesia-Micronesia Hotspot still lack efficient institutional and legal arrangements at the national level to protect the environment, as well as staff, expertise, and funding resources dedicated to environmental management. There has been relatively little improvement in national institutional capacity or environmental quality in recent years, despite significant external support. While a more solid institutional framework exists at the regional level, major challenges still exist in improving national actions within the regional framework (ADB 2003).

National Institutional Framework

National institutional frameworks vary greatly across the hotspot, largely reflecting the colonial histories of each PICT. Of all the countries and territories in the hotspot, only Tonga was never a colony. Some hotspot states became independent in the 1960s (e.g. Samoa and Nauru) or 1970s such as Fiji and Kiribati. Former territories of the U.S. Trust Territories of the Pacific Islands became freely associated independent states in the 1980s and 1990s (FSM, Palau and the Marshall Islands). The Cook Islands and Niue are self-governing in free association with New Zealand, while American Samoa, CNMI, Easter Island, French Polynesia, Guam, Pitcairn Island, Tokelau, and Wallis and Futuna are still formally attached to metropolitan countries.

While environmental planning and management functions are actually conducted by a range of government institutions including departments of agriculture, forestry and fisheries, and health or economic affairs, environmental management is usually coordinated by a dedicated environmental unit, usually part of a larger resource management department. In current or former U.S. territories, environmental policy and management is usually coordinated by the local Environmental Protection Agency, while in former British colonies and current New Zealand dependencies, it is coordinated by a Department or Division of Environment in a Ministry of Natural Resources or Local Government. In most French Territories, it is coordinated by an Environment Delegation under a Ministry of the Environment.

Environmental departments and units have been strengthened in many countries in the hotspot in recent years, with increased staff levels (UNEP 1999). However, in general, most environment departments are still understaffed and under-resourced, but with a rapidly increasing workload. The thin institutional baseline remains a major constraint to the implementation of a wide range of environmental projects and programs in PICTs (ADB 2003). Capacity building such as human resource development, improving communications and information, policy, planning and institutional strengthening remain key national and regional priorities.

Despite the disappointing performance of many national institutions in improving the management of the environment, there have been some positive developments in recent years. The first relates to the increasing recognition of the close relationship between environment and development and the importance of "mainstreaming" environmental considerations into national development and financial planning. Mainstreaming has in fact become the leading theme for biodiversity conservation at both the national and regional level. Furthermore, there has been improved transparency and accountability of government bodies and the development of a more participatory and collaborative approach by government with local communities, NGOs, the private sector and academia (ADB 2003).

Paralleling and perhaps fuelling the increased recognition of NGOs and community-based organizations (CBOs), has been a rapid growth in the number and influence of such groups in the Pacific. There are now estimated to be more than 1,000 NGOs operating in the region, although most focus on human development issues such as education, health, and women's affairs, rather than the environment (Crocombe 2001).

A robust national environmental NGO infrastructure only exists in a few countries in the hotspot. Prominent national environmental NGOs in the hotspot include the Conservation Society of Pohnpei and the Palau Conservation Society in Micronesia, O le Siosiomaga Society in Samoa and Societé d'Ornithologie de la Polynésie in French Polynesia. Most, if not all, of these environmental NGOs are still in need of significant additional support to achieve conservation objectives.

Another recent development in the hotspot has been the establishment of conservation trust funds at the national and sub-national level in some countries. For example, community-based trusts are being established in the districts of Aleipata and Safata in Samoa to fund resource management in marine protected areas. Another example is the Micronesia Conservation Trust (MCT) in the Federated States of Micronesia. The MCT was developed to mobilize funding from a variety of sources to build an endowment fund to provide long-term support for sustainable natural resource management in the country. An additional initiative coming out of Micronesia is the establishment of a pilot Micronesia Leaders in Island Conservation network. This peer-learning network, developed with the assistance of TNC, aims to strengthen the organizational and technical skills of leaders and their organizations so they can better protect important natural areas of Micronesia.

Regional Institutional Framework

There are a large number of regional intergovernmental organizations active in the Pacific dealing with a range of socioeconomic, political and environmental issues. SPREP is the lead regional intergovernmental organization dealing with the sustainable development and management of the biological environment. The work of SPREP is guided by its four-yearly Action Plan, which is agreed by SPREP members. The SPREP member countries include the governments and administrations of 21 PICTs and four developed countries with direct interests in the Pacific islands region. SPREP's work falls under the following five key result areas: natural resource management (species protection, ecosystem management and development and management of conservation areas), pollution prevention (marine pollution, hazardous waste, and solid waste and sewage pollution), climate change and variability, economic development (integrating environment and development and trade, investment and environment) and processes (including legal, institutional capacity building, human resource development, and environmental information services) (SPREP 2003b).

The other three major regional agencies dealing with environmental issues in the Pacific are the Secretariat of the Pacific Community (SPC), the Forum Fisheries Agency (FFA), and the South Pacific Applied Geoscience Commission (SOPAC). SPC is the premier technical and development organization in the region and was the first intergovernmental agency to be established in the Pacific in 1947. SPC is an intergovernmental organization with focal points in Living Aquatic Resources and Maritime Development, Agriculture, Quarantine and Plant Protection, Forestry, Public Health, Demography, Women, Media, Youth, Rural Technology, Statistics and Community Education. In terms of resource management, SPC has major regional programs in forest management and coastal and oceanic fisheries management. The SPC headquarters are in Noumea, New Caledonia and there is a regional office in Suva, Fiji.

FFA was established in 1979 to help members of the South Pacific Forum to get maximum benefit from the conservation and sustainable use of their fisheries resources. A major focus of the work of the FFA has been on assisting members to manage and develop their tuna resources, and in particular to negotiate and implement agreements among its members and with nations undertaking deep-sea pelagic fishing. The FFA is based in Honiara, Solomon Islands.

SOPAC was established in 1972 in Suva, Fiji to assist member states to sustainably develop their non-living resources. SOPAC's work focuses on the development of mineral, water and energy resources, coastal management, hazard assessment and ocean development and on national capacity building in the geosciences (SOPAC 2001). An important recent SOPAC initiative has been the development of an Environmental Vulnerability Index (EVI) to measure the vulnerability of islands to a range of social, economic and environmental impacts (ibid). The EVI project aims to promote environmental vulnerability considerations into national development planning and management thereby encouraging sustainable development. A major SOPAC regional project is an European Union-funded project called "Reducing Vulnerability of Pacific ACP States" (SOPAC 2003). This project aims to introduce the concept of "Island

Systems Management" to strengthen integrated development in three focal areas: hazard mitigation and risk assessment; aggregates for construction; and water resources supply and sanitation (ibid).

There are a now a large number of universities and other tertiary institutions in the hotspot. Foremost among these is the University of the South Pacific, which is headquartered in Suva, Fiji, but has campuses and extension centers in a number of other PICTs. Other important academic institutions include the University of Guam in Agana, the Université de la Polynesié Français in Papeete, the University of Hawaii, and Brigham Young University (BYU) in Hawaii, the National University of Samoa in Apia and Community Colleges in Micronesia and American Samoa. Some of these Universities have important research institutions specialising in the study of the culture, language and environment of Pacific islands, including the Institute of Pacific Studies at USP, the Institute for Polynesian Studies at BYU and the Center for Pacific Island Studies at the University of Hawaii. Also in Honolulu, is the East-West Center that was established in 1960 to establish better relations and understanding between the United States and Asia and the Pacific islands through cooperative study, training, and research (Lal and Fortune 2000).

There are a number of research institutions in the hotspot, especially in Hawaii and in French Polynesia. One of the oldest and most important research institutions is the Bernice P. Bishop Museum in Honolulu which was established in 1889. The museum has a vast and comprehensive Pacific natural history collection and continues to take the lead in conducting biological and cultural research in Hawaii and across the Pacific region. Important research institutions in French Polynesia include the University of California at Berkeley's Richard B. Gump South Pacific Research Station on Moorea, the Institut Malardé, the Institut de recherche pour le développement, based in Tahiti, and the Centre de recherche et observatoire de l'environnement on Moorea.

The major scientific academic society in the region is the Pacific Science Association (PSA), set up in 1920 to promote cooperation and communication in science and technology among Pacific communities. It is hosted by the Bishop Museum and produces a quarterly journal called *Pacific Science.* Scientific networks related to the PSA include Diversitas International of the Western Pacific Area - a program to study the biodiversity in the Western Pacific Area, and the Pacific Asia Biodiversity Transect Network (PABITRA), a collaborative program for investigating the function of biodiversity and the health of ecosystems in the tropical Pacific Islands. PABITRA has already conducted workshops and training for Pacific island professionals in biodiversity assessment in Fiji and Samoa and developed standardised methodologies for the assessment of vegetation, fauna, climate and hydrology, stream and saltwater ecosystems, invasive species and other parameters (PABITRA 2004).

The U.N. system is well represented in the hotspot. UNDP has offices in Fiji (covering most of the Melanesian and Micronesian countries) and Samoa (covering Samoa, Niue, the Cook Islands and Tokelau). Much of UNDP's effort in the region is focussed on environmental issues such as biodiversity conservation, waste management and

adaptation to climate change. UNESCO and the Food and Agriculture Organization (FAO) have subregional offices for the whole Pacific based in Apia, Samoa. Together these U.N. agencies have a comprehensive assistance program covering a wide range of scientific, socioeconomic, and environmental issues.

Complementing the work of regional intergovernmental organizations are a growing number of international and regional NGOs which are active in the environmental sphere. The most prominent international environmental NGOs in the region include Greenpeace, Conservation International, the World Wide Fund for Nature South Pacific Program (WWF-SPP), BirdLife International, TNC's Pacific Program, and the Wildlife Conservation Society (WCS). Most of these international NGOs are based, and most active, in Melanesia and to a lesser extent Micronesia, rather than Polynesia. Conservation effort has generally focused on capacity building at the community level to improve resource management and conservation.

Important regional NGO networks include the Pacific Concerns Resource Center, which is based in Fiji and represents more than 100 affiliated Pacific NGOs and CBOs, and the Foundation of the Peoples of the South Pacific International (FSPI). FSPI has been active in environmental management projects such as in coral reef conservation, sustainable management of the aquarium reef trade, rainforest conservation and ecoforestry. Other regional NGOs include the Pacific Youth Caucus for the Environment, and the Pacific Island Association of NGOs. Once again, most of these regional NGOs tend to be most active in Melanesia, and to a lesser degree Micronesia, rather than Polynesia, where national NGOs tend to predominate.

There are a number of donors active in the hotspot region, many of them supporting environmental management projects and activities. Major multilateral assistance agencies supporting environmental management include the Asian Development Bank, the European Union, and the World Bank. Major bilateral donors include the governments of Australia, New Zealand, Germany, France, Canada, and Japan. Important foundations actively supporting environmental management in the region include the MacArthur Foundation and the Packard Foundation. The Global Environment Facility has been a key source of funds for many large regional programs, especially those related to the implementation of global environmental conventions such as the Convention on Biological Diversity and the UN Framework Convention on Climate Change. GEF has committed more than $60 million in the past decade to the Pacific region.

There has traditionally been poor coordination and information sharing between international and regional NGOs and development organizations in the Pacific. This has been an impediment to effective conservation effort. Recognition of this has led to the development of the Pacific Islands Roundtable for Nature Conservation in 1998. The Roundtable is the only forum where major international and regional environmental NGOs and donors meet to exchange information on projects, identify gaps and develop new ideas and methods to address the major regional conservation issues. It meets once or twice per year.

At the regional intergovernmental level, coordination between organizations has improved in recent years with the development of a formal coordination mechanism, now called the Council of the Regional Organizations of the Pacific (CROP). CROP, with the support of the Forum Secretariat, provides an important framework to ensure that regional institutions are focused on common regional goals and that environmental considerations are mainstreamed into regional policy and programs. The 10 members of the CROP include SPREP, SPC, USP and SOPAC, FFA, the Forum Secretariat, the Tourism Council of the South Pacific, the Pacific Islands Development Program, the Fiji Islands School of Medicine, and the South Pacific Board of Education.

Policy and Legislation

Environmental policies and legislation, like institutional frameworks, vary widely across the region. Current policies have evolved from a complex mix of often relatively recent colonial administrations and strong social and cultural values and mores (UNEP 1999). However, regardless of their particular history and form of government, Pacific countries share a common tradition of consultation at the local, national, and regional levels and a strong foundation of governance rooted in traditional political systems (ibid).

Environmental management in many PICTs has been guided by the development of National Environmental Management Strategies in the early 1990s, and more recently by National Biodiversity Strategies and Action Plans and National Sustainable Development Strategies. These strategies have set out the national blueprint for the development of environmental policies and plans. While the NEMS set out strategies to improve environmental management by strengthening environmental institutions, supporting environmental legislation and policy, and raising environmental awareness, amongst others, little progress has been made in implementation. Part of the problem may have been a failure to set priorities based on links to economically or socially based criteria (ADB 2003).

At the regional level, conservation effort is guided by the five yearly Action Strategy for Nature Conservation. As noted already, the current strategy (2003-2007) reflects the approach of mainstreaming conservation into development planning. The strategy provides a broad framework involving partnerships between conservationists, and governments, the private sector and civil society to promote the mainstreaming of conservation into all development sectors.

Legislation dealing with environmental management and nature conservation has been drafted and enacted in many countries and territories in the hotspot. In most countries there is legislation incorporating environmental impact assessment and regulating natural resource extraction activities such as forestry, fisheries and agricultural development, establishing and managing protected areas, protecting endangered species and controlling disposal of solid waste and other pollutants, amongst others. However, many PICTs still lack legal frameworks covering major aspects of environmental protection and natural resource management (ADB 2003).

The deficiency in environmental legislation frameworks may stem from conflicts between the Pacific tradition of local management authority and attempts by government to impose contemporary western-style legal frameworks. One result of this conflict is that even where national laws governing natural resource management do exist on paper, their enforcement at the local level remains weak to non-existent. Another factor contributing to the lack of enforcement of environmental laws is the slender technical and administrative resources of enforcement agencies. Fortunately, there is renewed appreciation of the need to consult with stakeholders and to take into account customary practise and tenure in regulatory frameworks. For example a national law was passed in Samoa in 1990 (the *Village Fono Act*) which legalises the traditional right of village councils to pass their own rules in a number of areas including the management and use of natural resources (Peteru 1993).

Hotspot states have signed up to most global and regional multilateral environmental agreements (MEAs). For example, most independent states have signed the U.N. Convention on the Law of the Sea, the UNFCCC, the CBD, the U.N. Convention on Combating Desertification (UNCCD) and the Kyoto Protocol to name a few. PICTs are active participants in conferences linked to these MEAs and to the related forums including the World Summit on Sustainable Development, the Barbados Program of Action for Small Island Developing States, and the United Nations Conference on Environment and Development (ADB 2003). A notable exception however, is the Convention on International Trade in Endangered Species (CITES), which has only been signed by Fiji, Palau, and Samoa (although it is applicable to all U.S., French and New Zealand territories).

Two regional MEAs form a particularly strong legal foundation on which further regional cooperation on environmental matters can be built. The first is the Convention on the Conservation of Nature in the South Pacific (the Apia Convention), while the second is the Convention for the Protection of the Natural Resources and Environment of the South Pacific Region (the SPREP Convention). The former seeks to encourage the creation of protected areas, including national parks and reserves, while the latter provides a broad framework for cooperation in preventing pollution of the marine and coastal environment and with the basic structure and mandate of SPREP.

A major catch of MEAs is that ratification of these agreements is required before financial resources can be obtained, but that the MEAs require a high level of engagement in dialogue and negotiations at international meetings, and place heavy reporting burdens on small environmental agencies and units. This puts a severe strain on limited resources of environment units and can divert attention away from pressing domestic environmental issues (ADB 2003). A recent GEF–supported initiative called the National Capacity Self Assessment (NCSA) aims to enable countries to assess the progress and barriers to the national implementation of the three major global MEAs (the CBD, UNFCCC and the UNCCD). The NCSA will allow countries to identify capacity development needs and efforts required to expedite the achievement of MEA objectives. The ultimate intention if the NCSA and other capacity assessments is to advocate for the use of National Sustainable Development Strategies which are required to be completed

by 2005 under the Johannesburg Plan of Implementation, as the primary vehicles for coordinated implementation and achievements of the objectives of MEAs (McIntyre pers. comm. 2004).

SYNOPSIS OF THREATS AND CONSTRAINTS

The major threats to Pacific biodiversity are human induced and include invasive species, habitat alteration and loss, destructive harvest techniques and over-exploitation of natural resources. An analysis of data on the globally threatened species in the hotspot indicates that habitat loss and invasive species are the two most serious threats (IUCN Red List 2003). The impact of extreme natural events such as cyclones, drought, and fire may also be significant at times. The future impact of climate change and sea level rise is uncertain at this stage but could be significant, especially on the low lying islands and atolls which could disappear completely (SPREP 1992, Allison and Eldredge 1999).

While many of the threats to native Pacific biodiversity are similar to those in other tropical regions of the world, Pacific island biotas are particularly vulnerable because the biota evolved in the absence of mammalian predators, grazing herbivores and many of the diseases that evolved on larger land masses (Allison and Eldredge 1999). Furthermore, the small size and isolated nature of Pacific islands results in increased vulnerability to disturbances that may be relatively minor on a larger land mass (SPREP 1992).

Threats to Pacific biodiversity are on the increase. Population growth in most countries in the hotspot is in the range of 1-3 percent per annum (SPC 2003a) and there is increasing commercialization, monetization and globalization of Pacific economies. Coupled with these changes in socioeconomic systems has been an erosion of traditional knowledge and traditional systems of resource management.

The outcome of the combination of extreme fragility and increasing threat is that the biological diversity in the Polynesia-Micronesia Hotspot is one of the most highly threatened in the world. Today, only 10,024 square kilometres, or 21 percent of the region's original vegetation, remain in more or less pristine condition throughout the hotspot (Allison and Eldredge 1999). Rates of deforestation range between 0 and 4 percent per annum in some countries (FAO 2003).

There are a number of constraints to mounting an effective response to environmental threats in most countries in the hotspot. Except in the larger, more developed states and territories, the major constraints include a paucity of technical infrastructure and expertise, a lack of current information on the state of natural resources and biodiversity, a poor understanding of environmental issues amongst the general population, and poor integration of environmental issues in national development planning.

Main Threats

Invasive species

Invasive species (both native and non-native) are arguably the major threat to Pacific biota and native ecosystems. Approximately three quarters of the 476 globally threatened species in the hotspot are threatened by invasive species (IUCN 2003). Invasive species were highlighted as a major threat at all three subregional workshops held during profile preparation. This makes the Pacific islands quite unique in their conservation situation compared with other tropical regions (Olson and Farley 2003). The major challenge is not only to control populations of existing invasive species, but also to prevent new introductions.

Ever since humans first colonized islands of the hotspot up to 3,000 years ago, introduced plants and animals have had a significant impact on native biota. The early Polynesians and Micronesian colonists deliberately introduced a number of plants and animals for food, medicines, building materials, and ornamentation. Some of these deliberate introductions, and other species that were introduced accidentally, became pests. Examples include pigs, dogs, and Pacific rats (*Rattus exulans*). However, following European colonization from the mid 19th Century onward, hundreds more species were introduced, many accidentally. Now, in many countries in the hotspot, there are as many or more introduced plant species and higher vertebrates as native species and the region is now full of examples of alien species that have become serious pests.

It is not known exactly how many invasive species there are on islands in the hotspot, but it certainly runs into the hundreds. The Pacific Island Ecosystems at Risk database (PIER 2004) lists 297 plant species that are invasive in the hotspot region, with another 125 potentially invasive plant species present in the Pacific (Space pers.comm. 2004). Approximately 82 land snails have been introduced to Pacific islands, many of which are invasive (Cowie 2001). The number of invasive species in other taxonomic groups is not known. The most serious invasive species vary from country to country in the hotspot but there are a few species that appear to be a problem on almost every island. Rats, especially the Pacific rat, and introduced arthropods such as ants, are particularly widespread (ISSG 2003). Other serious invasive species are not widespread but could cause devastation if allowed to spread further. In addition to the PIER database, another source of information on the distribution of invasive species in the hotspot is the Global Invasive Species Database (ISSG 2003). This database was provided to the ecosystem profile team to help inform CEPF strategy development. ISSG has commited to distribute the database on CD-ROM in the Pacific region to help increase public awareness about invasive species and to facilitate effective prevention and management activities.

The classic example of the impact of an introduced predator, is the brown tree snake (*Boiga irregularis*). In the past 40 to 50 years, this predator from the Papua region has caused the extinction of nine of 11 native species of forest birds and the apparent extinction of three skink species and two species of gecko on Guam (Sherley and Lowe 2000). The snake has now spread to Saipan and there are serious fears that if the snake

were to spread throughout the Pacific it would cause similar devastation (Allison and Eldredge 1999).

Fourteen alien vertebrates are considered "significant invasive species" in the South Pacific and Hawaii (Atkinson and Atkinson 2000). The most widespread are pigs, goats, cattle, cats, dogs, mice, and the three species of rat (ibid). The Pacific (*Rattus exulans*) and ship (or black) rats (*R. rattus*) are particularly serious pests and consume a wide range of prey including fruits, seeds, insects, snails, lizards and birds, including eggs and nestlings (Sherley and Lowe 2000). Pigs, goats, and cattle cause habitat disturbance by eating tree seedlings and thereby slowing forest regeneration and reducing native plant diversity (ibid). Both dogs and cats prey on seabirds and landbirds particularly surface nesting species, while cats also prey on skinks and geckos (Atkinson and Atkinson 2000). Mongooses are major predators on snakes, insects, frogs and on birds, especially ground dwelling species such as rails. Luckily they are only found on Hawaii and Fiji. Introduced birds, such as the Indian mynah bird, are a problem on some islands where they compete with native birds for food and nest sites and may introduce diseases.

Arthropods are the most numerous invasive species on islands and ants probably pose the greatest arthropod threat to conservation in the Pacific (Nishida and Evenhuis 2000). The potentially most damaging ant invaders include the bigheaded ant *Pheidole megacephala*, the long legged or crazy ant *Anoplolepis longipes*, the Argentine ant *Lineopthema humile*, little fire ant *Wasmannia auropunctuta* and others (ibid). Characteristics of ants that make them so destructive include the formation of large, non-competitive multi-queen colonies, the ability to hitchhike readily, highly aggressive behaviour and the limited number of effective control options. Lowland native vertebrates and invertebrates such as crabs, snails and aquatic and semi-aquatic invertebrates have all been decimated by introduced ants by predation, direct competition and by creating favourable conditions for other invasive biota (ibid).

Introduced land snails have decimated native snail species on many islands in the hotspot. The high islands appear to have the highest snail diversity, and are therefore at greatest risk from introduced snail species. The carnivorous rosy wolf snail, *Euglandina rosea* was introduced to control another introduction, the giant African snail (*Achatina fulica*), but has unfortunately decimated native land snails, especially in Hawaii, French Polynesia, Guam and American Samoa. On Guam, the flatworm *Platydemus manokwari* was also introduced to control the Giant African snail and has also impacted native species. Neither of the two introduced biological control agents appear to be effective control of *A. fulica* populations. Other examples of introduced invasive molluscs include species from the terrestrial Subilinidae, Helicidae, and Helicarionadae families, and freshwater species such as apple snails and Lymnaeid snails (Cowie 2000).

Hundreds of plants have been introduced to islands in the hotspot and more than 30 invasive alien plant species are considered to have become serious threats to native habitats of Pacific islands (Meyer 2000). The impacts of invasive plants on native flora and vegetation include decreased dominance of native species, decreased overall species richness, fewer vertical tiers of plants, and a lower range of biodiversity overall (ibid).

Many of the invasives are heliotropic and are more successful than native species in forest clearings from where they may spread into the forest. The spread of invasive plants has been hastened by habitat degradation on islands from cyclone damage or agricultural and logging activity. Some of the most aggressive weedy invaders include the following (ibid):

- trees and shrubs: African tulip tree (*Spathodea campanulata*), lead tree (*Leucaena leucocephala*), guava species (*Psidium cattleianum* and *P. guajava*), velvet tree (*Miconia calvescens*), red bead tree (*Adenanthera pavonina*), Koster's curse (*Clidemia hirta*), *Lantana camara, Clerodendrum* spp. and giant sensitive plant (*Mimosa invisa*);
- the climbing vines *Merremia peltata, Mikania micrantha* and *Passiflora* spp.;
- the grasses *Panicum* spp., *Paspalum* and *Pennisetum* spp.; and
- the creeping herb *Wedelia trilobata* and the aquatic plant *Eichornia crassipes*.

Other potentially destructive alien invaders include introduced fishes, amphibians and crustaceans which can impact on native biodiversity by altering habitats, competing for food and living space, introducing pathogens, hybridisation with native species and socioeconomic and environmental impacts (Eldredge 2000). It is important to note the impact of pathogens and diseases on native flora and fauna. A good example is avian malaria that decimated bird populations in Hawaii after it was inadvertently introduced in exotic birds along with the mosquito vector that spreads it.

Habitat alteration and loss

Habitat alteration and loss are another major threat to native species and ecosystems and affect three quarters of threatened species in the hotspot (IUCN Red list 2003). Habitat alteration and loss relate mostly to the conversion of native ecosystems to non-native ecosystems for economic activities such as agriculture and logging and to a lesser extent due to infrastructural development such as roads and settlements. Habitat degradation contributes to the direct impoverishment of biodiversity as well as a number of subsidiary problems including facilitating the influx of invasive weeds and browsing animals, soil erosion, reduced water quality, and the sedimentation of lagoon areas. Such impacts can seriously affect the livelihoods of the rural majority.

In most countries in the hotspot it is the coastal and lowland ecosystems that have been the most severely degraded because they are the closest to fast growing population centers that tend to be in the coastal zone. Intact altitudinal belts of forest on the larger volcanic islands are also being lost and this is impacting on species such as pigeons, doves and fruit bats that move seasonally or less predictably between lowland and montane forests in response to fruiting and flowering patterns.

Fragmentation of natural ecosystems from logging roads and agricultural plantations is a serious threat to many island species which originally had small ranges to begin with, such as plants, land snails and many invertebrates. Furthermore, research in Fiji shows that invasive predators such as rats, cats and mongooses travel into remote forests along roads but that their impact diminishes greatly more than 6km from the nearest road

(Olson pers.comm. 2003). Thus the larger, more remote intact blocks of forest may act as island refugia and are particularly important for the conservation of many native species.

Up to date and accurate annual rates of deforestation are lacking for most countries in the hotspot but range from close to zero in Kiribati, Palau, and Tonga to over 2 percent per annum in Samoa and over 4 percent in FSM (FAO 2003). Most of the deforestation is related to agricultural activities such as swidden agriculture and commercial cash cropping of kava, taro, copra, and cocoa. Commercial logging is an issue on some of the larger volcanic islands such as Savaii in Samoa and some of the Fijian islands, but the rate of reforestation is inadequate in relation to the total area being logged and subsequently deforested. Furthermore, the limited reforestation that has occurred has tended to use exotic species that lack fruits eaten by native birds and bats, have limited ecological value, and in some cases are invasive.

Over-exploitation of natural resources and destructive harvest techniques

Overharvesting and the use of destructive harvesting techniques can have major impacts on native biodiversity and ecosystems. The over harvest of natural resources often goes hand in hand with the use of destructive harvesting techniques. Examples include the use of bulldozers to clear land and dredge sand or dynamite and poisons to catch fish.

Hunting is a threat to some species on some islands such as coconut crabs (*Birgus latro*), fruit bats (mostly *Pteropus* spp.), pigeons (mostly *Ducula* and *Ptilinopus* spp.) and other large birds that are traditional food sources in many parts of the hotspot. Fruit bats in Samoa and Palau have been particularly susceptible to over-exploitation because of the export trade to Guam, where they are a highly desired culinary delicacy. Legal trade in fruit bats was terminated following a 1989 ban by CITES, except in Palau, which has now become the major supplier of fruit bats (Allison and Eldredge 1999).

The overharvest of frugiverous and nectarivorous animal species such as pigeons and fruit bats can be a serious ecological problem because both are important pollinators and/or dispersers of seeds in native ecosystems and are thus critically important to the health of the forest (Whistler 2002). In Samoa for example it is estimated that up to 30 percent of primary rain forest trees may depend on flying foxes for pollination and/or carrying their seeds through the forest (Faasao Savaii 1998). Forest regeneration is likely to be compromised if the populations of such species are reduced too low.

The illegal trade in terrestrial wildlife species does not appear to be a major issue in the hotspot. However, there is some activity targeting species such as Kadavu shining parrot, crested iguanas and giant longhorn beetles in Fiji. Wildlife trade can increase very rapidly if species are targeted and professional operators become involved so vigilance is necessary. An issue of concern is that most countries in the hotspot are not signatories to CITES.

Some plant species are also in serious decline due to harvesting at an unsustainable level. An example is *Intsia bijuga* a highly valued timber tree in many countries of the hotspot. This formerly widespread tree is threatened because the wood is highly valued for

carving, such as kava bowls in Samoa and Fiji. In Samoa the tree (called *ifilele*) has been extirpated from many places and even in forest conservation areas may be being harvested at an unsustainable rate (Martel and Atherton 1997).

Natural phenomena

The impact of natural phenomena, such as cyclones, floods, drought and fire, on native biodiversity should not be ignored, despite the fact that, in most cases, little can be done about them. Such events are a major contributing factor to the accidental extirpation of isolated populations of many species throughout the hotspot. Cyclones in particular have had a devastating impact on faunal populations and the health of habitats and ecosystems throughout the Pacific. In Samoa for example, cyclones Ofa (1990) and Val (1991) defoliated up to 90 percent of all trees and may have contributed to a drastic population decline of some species such as the insectivorous sheath-tailed bat (*Emballonura semicaudata*) (Goldin 2002).

The impacts of cyclones on native wildlife such as birds include the following (Faasao Savaii 1998):

- Mortality due to the cyclone itself;
- Starvation as a result of the non -existence of fruits for long periods after the cyclone;
- Predation of grounded wildlife by pigs, dogs, and cats;
- Hunting by humans; and
- Failure to breed because of the destruction of broods and stress.

Fire has shaped ecosystems in many countries of the hotspot, especially where it has been traditionally used to clear land such as in parts of Fiji and Micronesia. When forests are burned, especially in dry zones, a savanna dominated by grasslands emerges (Allison and Eldredge 1999). This ecosystem is ecologically depauperate compared with what preceded it. During the dry season, and especially during droughts, these areas are often set on fire again, an action that perpetuates the savanna and demonstrates how the effect of natural phenomena can be magnified by human actions.

Droughts and floods and are a localized and ephemeral problem often related to the El Niño Southern Oscillation phenomenon. While native forests are somewhat immune to flood damage, rainfall runs off much more rapidly from degraded forest, often resulting in soil erosion and flooding downstream with impacts on coastal zones and lagoon ecosystems. Droughts are not generally of long enough duration to be a serious problem to biodiversity in themselves, but may impact on biodiversity by creating the conditions necessary for fires.

Since the impacts of natural phenomena are part of the natural pattern in the Pacific, native species are adapted to such events and will normally recover. However, there are reasons for concern because of the reduction on the available refugia for recovery, that non-native animal and plant species may increase after such events and finally because of the potential increase in such events as a result of anticipated global climate change.

Global climate change and sea-level rise
Global warming and sea level rise may become the most serious environmental threats in the hotspot in future. The Intergovernmental Panel on Climate Change (IPCC) note that the average global surface temperature has risen by about 0.6 C in the 20th Century but the Pacific is likely to warm at a slightly lower rate (Salinger *et al* 2001). While the exact amount and rate of sea level rise that this will cause remains uncertain, the IPCC estimates a global sea-level rise of between 1.2mm/year and 8.6mm/yr over the period 1990 to 2100, with mid-range estimate of 4.5mm/yr or a total rise of 0.49m by 2100 (IPCC 1996).

It is not known exactly how much the Pacific will deviate from the global forecasts, however, the impacts of even modest increases on atolls which rarely exceed 5m above mean sea level could be catastrophic to both human and non-human biota. Impacts become even more severe when consideration of other effects such as possible increases in intensity and/or frequency of extreme weather events such as floods, drought, and cyclones associated with ENSO are taken into account. According to the IPCC, the natural systems most vulnerable to climate change include marine systems such as coral reefs, atolls and mangroves (Salinger *et al* 2001). This would include turtle nesting beaches and low lying seabird nesting areas (TNC 2003).

Constraints
As already highlighted, there are a number of serious constraints to effectively dealing with environmental problems in the hotspot. Foremost is the natural fragility and vulnerability of island ecosystems and biota to outside perturbations. Constraints that have an anthropogenic origin are similar to those in other tropical regions, and include: population growth, the deterioration of traditional systems and increased commercialization of economies, the lack of good public awareness and appreciation by decision makers of environmental issues, a lack of knowledge of the current status of biodiversity, a lack of capacity especially in terms of the paucity of trained staff and resources to deal with environmental problems and the poor integration of environment and development in decisionmaking.

Most of the constraints are highly inter-related. For example, a lack of up-to-date knowledge of the status and threats to biodiversity can lead to a lack of awareness and appreciation by decisionmakers of the environmental costs of development. This lack of appreciation itself can lead to a low emphasis being given to, and subsequent under-resourcing of, environment units and a lack of incorporation and integration of environmental issues in decision making. Similarly, poor environmental awareness is linked to a lack of resources available for dealing with environmental problems, which itself is exacerbated by high population growth.

Population growth
Many environmental management problems can be traced to high rates of population growth and high and increasing population densities. As mentioned earlier, the natural rate of population increase remains high in most hotspot political units, but has been

artificially lowered in recent decades due to emigration. As noted, even with current high rates of emigration from many Micronesian and Polynesian countries, the projected population doubling time ranges from 30 to 58 years (SPC 2003a). If the safety valve of emigration were to be turned off, impacts on environment would increase significantly.

Deterioration of traditional systems

In customary land and sea tenure arrangements, a large degree of control is traditionally maintained over use and exploitation of natural resources (ADB 2003). Deterioration of such systems and knowledge about them is occurring as a result of westernisation, industrialisation, urbanisation and accompanying alienation of the youth from their traditions (SPREP 1992). Although traditional systems were not always applied with a conservation ethic in mind, these controls were nevertheless practical management tools that developed over many generations to ensure the continued supply of particular food stocks or medicines (ibid). The decline in the use and knowledge of these systems goes hand-in-hand with a general erosion of the traditional authority of chiefs over people and resources and a move toward more individualistic and capitalistic socioeconomic activity.

As aspirations for western-style livelihoods and demands for material products increase, the traditional subsistence economies of Pacific countries are being supplemented or even replaced by cash economies and cash-earning opportunities. This change in socioeconomic systems has contributed to a number of the proximate threats to biodiversity, including the over-harvest of resources, habitat degradation, and development pressures, along with increased waste production and environmental pollution.

Poor environmental awareness

Poor environmental awareness has long been recognized as a major constraint to adequately dealing with environmental problems at a regional and national level throughout the Pacific. Since Pacific islanders have the most to gain, and to lose, by their behaviour in relationship to the environment, it is clear that raising awareness of the impacts of those behaviours and improving the knowledge base for sound environmental management must become priority actions. The use of “social marketing” tools, where increased awareness is translated into understanding, and finally to behavioral change, offer particular promise.

The following limiting factors to the development of environmental awareness have been identified by SPREP (SPREP 2003c):

(i) A lack of trained and experienced personnel dedicated to the task of environmental education and awareness (EEA);

(ii) Inadequate national budget allocations. National budgets need to ensure adequate allocation of funds to the area of environmental education and awareness;

(iii) Lack of mainstreamed activities in environmental education and awareness and a perception that education/awareness is the responsibility of a select few. Private sector, government ministries other than

environment and the civil society need to work together in a coordinated fashion to ensure effective action in EEA.

A regional Action Strategy for Environmental Education and Training in the Pacific Region 1998 – 2003, (SPREP 1998) has been endorsed by SPREP members and establishes a regional framework for implementation of environmental education and training. While significant progress has been made in implementing the strategy, much work is still required to develop and implement strategies at the national level (SPREP 2003c).

Poor knowledge of Pacific biodiversity

As already noted, a serious constraint to the development of effective environmental management strategies is the poor knowledge of much of the hotspot's biodiversity and the lack of consolidation of the biodiversity information that does exist. Good environmental decision making requires a sound information baseline that is systematically upgraded, monitored, and disseminated. This will improve the capacity to plan and evaluate environmental interventions and trends.

The current population and threat status of Endangered species is particularly lacking, even for fairly well known species. Furthermore, there are many candidate threatened species for the Red List that urgently require assessment of population and conservation status. Even the biodiversity and management effectiveness of protected areas, which have been better studied than most areas, is poorly known. The taxonomic data deficiency is particularly pronounced with fish, plants and invertebrates, while the geographic data deficiency is most serious with the more isolated islands especially in the less developed countries of the hotspot. Another issue is the loss of traditional knowledge which, as a result of social change and modernization, is not being passed on to the younger generation. This knowledge must be recorded soon before it is lost forever.

The Action Strategy for Nature Conservation highlights a number of actions that are required to improve the knowledge and understanding of the state of the Pacific's natural environment and biodiversity. Such actions include the development of standardized indicators and monitoring methods for ecosystems and natural resources, compiling regular state of the environment reports, documenting and disseminating lessons learned from conservation initiatives and traditional knowledge, and identifying research needs to address knowledge gaps in key areas of biodiversity conservation (SPREP 2003a). Another important task is to integrate and consolidate widely scattered data held in museum collections, in the scientific literature and elsewhere, into a standard format for dissemination throughout the Pacific.

Lack of capacity to deal with environmental problems

The lack of human, technical, and financial resources assigned to environmental management is a fundamental constraint to effectively dealing with environmental problems in most hotspot states and territories. Despite the recent strengthening of environment units, a major constraint remains the shortage of staff to perform the wide and expanding range of environmental management functions. As noted, capacity

building such as human resource development, improving communications and information, policy, planning, and institutional strengthening remain key regional priorities.

The under-staffing and under-resourcing of environment units is a function not only of the weak economies of many hotspot countries but also the greater emphasis given to economic growth and the perception that environmental management can be dealt with in the latter stages of economic development (ADB 2003). Lack of resources to deal with environmental problems is compounded by the great distance, isolation and dispersed nature of most hotspot states.

The importance of increasing the financial resources assigned to dealing with environmental problems is reflected in the Action Strategy. Recommended actions include raising government funding for conservation, incorporating national conservation funding plans in all NBSAPs or equivalent strategies, development of regional long-term financial mechanisms and directing a portion of natural resource rents to conservation initiatives, amongst others.

Poor integration of environment and development in decisionmaking

It is generally acknowledged that there has historically been poor coordination and integration of environmental issues in decisionmaking in the Pacific as a whole. The lack of integration has been demonstrated in the scant attention to the environment given in national development plans and sectoral plans and policies. This has resulted in conflicts in the roles of different line departments and development that has occurred with scant attention to environmental costs.

It is now acknowledged that little progress will be made if biodiversity conservation continues to be viewed an environmental issue (ADB 2003). Biodiversity conservation efforts must be seen within their correct context as sustaining Pacific livelihoods and economies as well as maintaining essential ecosystem function. As noted, the increased awareness of the linkages between socioeconomic development and ecological integrity has prompted the new emphasis on "mainstreaming" conservation into decision making adopted as the strategic focus of the current Action Strategy for nature conservation (SPREP 2003a).

SYNOPSIS OF CURRENT INVESTMENTS

This section outlines the current major investments and participants in biodiversity conservation in the hotspot and describes their strategic priorities and accomplishments. The synopsis of current investments is based on information from the following major sources:

- Asian Development Bank’s Draft Pacific Regional Environment Strategy (ADB 2003);
- CEPF Roundtable Reports for Fiji (Olson and Farley 2003), Micronesia (Manner 2003), West Polynesia (Sesega 2003) and French Polynesia (Raust 2003);

- Pacific Islands Roundtable Inventory of Conservation Action (http://www.dev-zone.net/pirnc/);
- Websites of several organizations including UNDP, SPREP, TNC, WWF-SPP, AFD, and others;
- Communications with a range of donors, NGOs, and individuals.

Overall investments within the region occur at two scales:

1) Regional-level investments are programs and projects executed by a regional or international organization and covering a number of countries in the region.
2) Country-level assistance denotes those projects executed within countries either by government agencies or local NGOs. Funds for these projects are received directly by the executing agency in country.

Across the hotspot, the majority of the bilateral and regional investments include institutional strengthening, climate change and adaptation, energy, infrastructural development, natural resource management, especially fisheries management, and biodiversity conservation. For example, the MacArthur Foundation has made several investments promoting community-based marine management in the South Pacific region, establishing the University of the South Pacific as the focal point for the locally managed marine area network.

The Australian government's Regional Natural Heritage Program (RNHP) recently supported CEPF in rolling out a series of pilot projects to prevent, control, and eradicate invasive species in key biodiversity areas in the hotspot. Titled *Local Action, Local Results: CEPF Invasive Alien Species Program for the Key Biodiversity Sites of the Polynesia & Micronesia Hotspot, Pacific Island Nations*, this initiative supported a series of complementary research and demonstration projects that were guided by technical advice from the Pacific Invasives Initiative.

These projects in eight countries addressed conservation outcomes in seven key biodiversity areas and 10 globally threatened species. Rat eradications were successfully conducted on two islands and detailed plans to perform eradications and control programs were prepared for another eight islands. Community engagement and support for this program were significant and the awareness of the threat of invasive species in the region was improved significantly, including rats, myna birds, yellow crazy ants and red fire ants, invasive mosquitoes, rabbits, and invasive weeds such as *Merremia peltata*.

At the national scale the data accrued are incomplete, especially for some of the smaller political units, for which few data were available. The threat of climate change and its significant local impacts lead the GEF to support the Kiribati Adaptation Program as well as a series of national capacity needs self-assessments.

Given the dispersion of such information, developing and maintaining an up-to-date register of regional and national investments will be a role of the regional implementation

team in conjunction with organizations such as Pacific Islands Roundtable Inventory of Conservation Action.

Analysis of Current Investments

Due to the gaps in available information, it is not possible to analyze comprehensively the geographic spread of investments and activity in biological conservation or to make a thorough assessment of the dollar value of investments made in various areas of biodiversity conservation.

In terms of the geographic spread of investments, Fiji has the largest number of biodiversity conservation projects in the hotspot (excluding Hawaii). This should not be surprising considering Fiji is the biggest and most developed independent hotspot country eligible for CEPF funds. Very few biodiversity conservation activities are occurring in the smaller pacific island counties such as Niue, Tokelau, and Tuvalu.

In terms of the thematic spread of funding, the following thematic areas are where funding has been focused:

(1) Resource management – a focus on forests, non-forest products and fisheries resources;
(2) Ecosystem conservation – a focus on coral reefs, marine and coastal areas including mangroves and wetlands;
(3) Species research and conservation – a focus on threatened bird, whale and turtle conservation;
(4) Invasive species – invasive species management projects in Cook Islands, Fiji, French Polynesia, Federated States of Micronesia, Kiribati, Palau, Samoa, Tokelau and Tonga;
(5) Biodiversity conservation planning – NBSAPs in most countries and ecoregional planning in two.

As stated in the ADB (2003) Regional Environmental Strategy, “it is clear that little progress will be made if biodiversity conservation continues to be viewed as an “environmental” issue. Conservation efforts must help to reduce poverty, enhance food security and provide obvious links between the establishment of sustainable livelihoods and the protection of species and ecosystems. This is fundamental to the mainstreaming of environmental considerations—including conservation—at the national and regional levels.” This is a critical point to consider in CEPF’s investment.

Resource Management

Sustainable resource management is the biggest single component of environmental assistance in the Pacific region, including the management of agricultural, marine, forest and other natural resources (ADB 2003). The community-based approach pioneered by the South Pacific Biodiversity Conservation Program (SPBCP) continues to be the preferred approach in the way area and resource management interventions are made. Engaging the local communities from the outset and paying due respect to the culture, traditions and tenure has been underscored by the projects funded by the RNHP funds.

The major areas of assistance are in sustainable forest management and coastal fisheries and marine resource management. Large forest resource management projects have been funded at the regional level by GEF, Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) and by AusAID and in Fiji, by USAID.

In terms of marine and coastal resource management, one of the most significant regional programs is the Strategic Action Plan for International Waters and the Pacific Islands Oceanic Fisheries Management Project. These GEF-funded programs actively engage local communities as partners in managing coastal resources and watershed areas.

Ecosystem Conservation

There is little emphasis in establishing strict "protected areas" such as parks and reserves in most countries in the hotspot. New additions to the region's protected area network are mainly through community-based conservation areas promoting conservation through sustainable resource use. CBCAs have had some success in curbing the over-harvest of resources in many islands and this trend is set to continue based on recent successful experiences in several places. However, seriously threatened endemic species and ecosystems demanding strict protection may not always be adequately protected in the CBCAs.

Terrestrial ecosystem conservation is not well supported at a regional level in the hotspot, and few initiatives exist to protect terrestrial areas of regional or global significance. One exception is the Sovi Basin Nature Reserve and endowment fund in Fiji. The Global Conservation Fund has supported the establishment of the Nature Reserve and the development of a village trust fund for the management of the reserve and to support village development efforts.

The only regional terrestrial conservation program to speak of, aside from *ad hoc* support for ex-SPBCP projects came under the recent RNHP program through CEPF. However, there is continuing interest and funding for coastal ecosystems and coral reef conservation in many parts of the hotspot as evidenced by the French-funded Coral Reef Initiative for the South Pacific (CRISP), the Moore Foundation-funded Marine Managed Areas Science program, and support from CI's Global Conservation Fund for creation of the Phoenix Islands Protected Area in Kiribati.

On 18 August 2006, the World Heritage Centre approved the Phoenix Islands inclusion on Kiribati's Tentative List during the Cabinet meeting (No. 37/2006). This was largely the result of efforts by the Kiribati Ministry of Environment and Social Development with support provided by Conservation International and the New England Aquarium.

Of the 14 countries in the Polynesia-Micronesia Hotspot eligible for CEPF grants, only Fiji has a specific indicative allocation under the GEF's new Resource Allocation Framework. The amount tentatively indicated for Fiji is $5.1 million over the next four years. All the other small Pacific island states are part of the "group allocation" of $146.8 million, which will be divided among 93 countries not receiving a specific amount. While none of these allocations is guaranteed, they all will be made to governments, and the

prospect of funds reaching civil society organizations is small. The average amount available to countries in the group allocation is about $1.6 million through phase four of the GEF. While CEPF investments will need to be closely coordinated with the specific decisions about spending GEF funds in this region, the potential overlap is small.

Species Research and Conservation

There are relatively few terrestrial species research and conservation efforts in the hotspot. Furthermore, current efforts focus on birds with few initiatives targeting the conservation of other highly threatened groups especially flying foxes, land snails and plants. In addition, much of the terrestrial species conservation effort is being conducted in only two countries- Fiji and French Polynesia, with relatively little species conservation work occurring in the smaller countries, especially the atoll states. A similar geographic focus exists with respect to research into species populations, distribution, threats and conservation requirements.

In Fiji, WCS has coordinated a number of research and conservation projects on some of the more threatened endemic species, such as the crested iguana, giant long horn beetles and landsnails. Much of the research is being conducted with the assistance of University of the South Pacific students. In French Polynesia, a number of biotic surveys and biogeographical studies have been conducted in recent years, much of it coordinated by the Délégation à la Recherche (the research division of the Environment Ministry) in collaboration with a number of partners. Examples of recent plant research include the preparation of the Flora of French Polynesia (Florence, 1997), the Vascular Flora of the Marquesas, studies into the impact of *Miconia calvescens* and other invasive plants on native flora (e.g., Meyer and Florence, 1996), scientific expeditions to assess the terrestrial biodiversity of the Austral Islands, botanical field-trips in the Society Islands and conservation plans for protected plants. Most of the research remains unpublished (Meyer, pers.comm, 2004). At the current time, the Délégation is working on a revised list of threatened plants in French Polynesia, the exact location of their populations, and current threats. Other taxonomic groups well studied in French Polynesia include the freshwater fish and crustacea (Keith, P. *et al* 2002), land snails (Cowie *et al* and Coote *et al*) and terrestrial arthropods (Gillespie, R.G. *et al*).

A conservation program is being developed by the Zoological Society of London with local partners on the highly threatened land snail fauna of French Polynesia, but no major land snail conservation programs have been conducted anywhere else. Plant conservation initiatives show a similar pattern. There is a regional AusAID funded project on the conservation of forest genetic resources, but this only targets species of high timber value and not other plant species or native ecosystems in the hotspot region.

BirdLife International's Pacific IBA program is a key regional bird conservation program. The project aims to build NGO capacity, perform research and initiate community based conservation action through their well-established IBA process. The program is based in Fiji and has funds for work in Fiji, Palau, New Caledonia and French Polynesia from 2003 to 2007. There are a number of small bird conservation projects being coordinated in Fiji (by WCS and others) in French Polynesia (mostly by SOP-

Manu) and in Samoa (coordinated by the Ministry of Environment with support from CI and funding from RNHP). The bulk of these projects target conservation, translocation and habitat restoration (such as control of invasives) of critically endangered bird species especially monarch, pigeon and ground dove species.

A number of regional and national species conservation projects target marine mammals and turtle species with the result that terrestrial species conservation efforts in general, and flying fox, plant and land snail conservation in particular, represent a significant funding gap.

Invasive Species

Invasive alien species are well documented to be one of the major threats to biodiversity in the hotspot. While a number of global and regional initiatives conduct research on invasive species, disseminate knowledge and skills on invasives and develop new techniques for invasives control, relatively few projects currently underway for actively eradicating or controlling invasive species in the hotspot. Rat control projects have begun on a number of islands with important bird populations, especially in the Cook Islands, Fiji, French Polynesia, Tonga and Samoa. Brown tree snake control, eradication and prevention projects in Guam and the Commonwealth of the Northern Marianas are being coordinated by the U.S. Forest Service. Some research into the impact of other predators, such as the impact of the mongoose and cane toad in outer Fiji islands, is underway. With regard to the control of plant invaders, very few projects exist other than an ongoing program on a number of islands in French Polynesia targeting *Miconia calvascens* and a few small weed control projects in Samoa, Fiji, FSM and elsewhere.

SPREP is executing a regional invasive species program titled Pacific Invasive Learning Network (PILN) that focuses on conducting training workshops in different sub regions along with pilot projects such as offshore island weed and rat eradication in Samoa and testing of mynah control and eradication techniques. The project aims to build Pacific Island country and territory capacity to control, prevent and eradicate priority invasive species through strengthening national legal and institutional frameworks to prevent the arrival of new invasive species and through improving individual and collective understanding, skills and organization. The project will also undertake some customized island restoration activities. However, given the scale of the threat posed by invasive species, the fact that the GEF project requires co-financing for project implementation and that it will not include the French Territories, Pitcairn Islands, Tokelau and Easter Island, there is still significant scope for CEPF investment in this area.

An important new initiative relating to invasive species is the pilot Pacific Invasives Learning Network (PILN). This initiative aims to empower more effective invasive species management through a participatory driven network of conservation area managers. PILN, which held the inaugural meeting in Palau in May 2006 has created a network to foster the development of innovative and adaptive approaches to invasive species, help prevent, detect and respond rapidly to invasives and serves as a learning vehicle and peer review of practitioner’s work. The network is a partnership venture with

TNC taking the operational lead, but with SPREP, the Pacific Invasive Initiative, and the Invasive Species Specialist Group of IUCN as partners.

Biodiversity Conservation Planning

Many countries in the hotspot have undertaken national biodiversity strategies and actions and are in the midst of implementing add-on projects emanating from these plans. These have been driven by obligations under the CBD and supported by funding received through the GEF. Most of these planning documents are general in nature and are strategic only within the context of national priorities. Funding received through existing sources may well contribute to the protection of species and areas of national significance but may not necessarily contribute to regional or international conservation priorities. However, TNC's pilot ecoregional planning project in FSM (and another underway in Palau) should contribute significantly to conservation planning for terrestrial biodiversity in Micronesia. SPREP has also formulated with its member countries regional strategies for invasive species and birds but need funding to implement priority actions.

Pacific Biological Survey

A major constraint to biodiversity conservation planning at all levels is the lack of up-to-date information on the status of the region's biodiversity. NZAID has contributed to the development of the Cook Islands biodiversity database and Samoa has developed a similar database and undertaken an ecosystem mapping exercise including the identification of priorities for conservation. However, few countries in the region have thorough biodiversity inventories or databases and even fewer have current data on the conservation status of threatened species. Furthermore, data that does exist is scattered widely in museum collections, in the scientific literature and elsewhere, making it difficult to access and use.

Recognizing the lack of up-to-date information on the region's biodiversity and difficulties in accessing it has led to the development of the Pacific Biological Survey by the Pacific Science Association. The Survey will include regional biological inventories and taxonomic capacity building (Allison pers.comm. 2003). The survey will be modeled on the highly successful Hawaii Biological Survey and will involve developing comprehensive web accessible bibliographic databases, comprehensive species checklists, development of species databases and improved interconnection among them, along with the use of literature and specimen databases to identify research and survey priorities. Survey data will be linked with U.S. National Biological Information Infrastructure (NBII)/Pacific Basin Information Node (PBIN). PBIN will seek to integrate data for the region and to make data available to a wide range of users over the internet (Allison, 2003). PABITRA will provide the ecosystem framework for the Pacific Biological Survey (Mueller-Dombois, pers. comm., 2004) while the Bishop Museum will be the executing agency (Eldredge, pers.comm, 2004).

GEF Small Grants Program for the Pacific

The GEF Small Grants Program (SGP) for the Pacific follows on from the successful implementation of SGPs in other regions. The Pacific program has established programs in Fiji, Marshall Islands, Micronesia, Palau, and Samoa. The SGP awards grants of up to

$50,000 to NGOs and community-based organizations to deliver global environmental benefits in the areas of biodiversity conservation, climate change mitigation, protection of international waters, prevention of land degradation (primarily desertification and deforestation), and elimination of persistent organic pollutants through community-based approaches.

CEPF NICHE FOR INVESTMENT

The purpose of the CEPF investment niche is to define explicitly what CEPF is best placed to target in CEPF eligible countries in the hotspot. Niche development was based on an analysis of information gathered as part of the profile preparation phase. It should be noted that while information from all countries in the hotspot has been compiled, the analysis of information has been conducted within the context of the geographic prioritization dictated by CEPF eligibility.

Three major themes have been analyzed to define the niche for the Polynesia-Micronesia Hotspot: species and site outcomes; major threats to Endangered species; and current environmental investments together with national and regional conservation strategies. A number of overarching factors have emerged from this analysis and have contributed to the definition of the niche for CEPF investment in this hotspot.

Conservation Outcomes

One of the primary factors in defining the niche is the determination of globally threatened species and site outcomes and a defined subset of these that CEPF investment will tackle. Since CEPF funding will only be available for conservation activity in the 14 eligible political units in the hotspot, species, and site outcomes have only been prepared for these political units. Species outcomes have then been prioritized based on the degree of threat to the species, whether the species requires special attention such as the control of invasives or harvesting (species focused actions), and the taxonomic distinctiveness of the species. Site outcomes have been prioritized based on whether the site is irreplaceable (contains species found in no other site), on the number of single site endemics in the site, and the alien-free status of the site.

An analysis of globally threatened species in the hotspot reveals three major findings. The first is that our knowledge of the biodiversity of the hotspot is very patchy, incomplete, and not well managed. Data are especially incomplete in terms of geographic distribution, taxonomic representation and in particular, population status of threatened species. The taxonomic groups that are least well-studied include the invertebrates, fish, and plants, while the geographic deficiency is greatest for the small, isolated islands, especially those in the less wealthy countries of the hotspot. The second major finding is that terrestrial species and ecosystem conservation are not currently well-supported in the region. Despite the urgency, there is little current investment in the protection of numerous and highly threatened terrestrial areas of regional or global significance. Greater emphasis is needed on the conservation of the most viable and least disturbed natural ecosystems, such as the larger forest blocks, based on sound conservation biology principles. A third finding is that the practice of conservation through conventional forms of protected areas throughout the Pacific Islands region appears to have been largely

ineffective, having historically been applied without due respect for customary land and resource tenure, traditional practices and rights. Recent experience indicates that co-management of protected areas by communities and government or an NGO are more effective than conventional approaches but need to include a strong communication and environmental awareness strategy to be successful.

Significant opportunity therefore exists for CEPF to:

- support action-oriented biodiversity research that has a clear management objective*;*
- improve the conservation of threatened terrestrial species, especially those that are most endangered, require species-focused action and are taxonomically distinctive;
- improve the conservation of threatened habitats and ecosystems, especially critical refugia that that are irreplaceable, distinctive, and have good viability and potential for persistence; and
- build upon recent participatory efforts for the co-management of conservation areas involving both government and civil society.

Significant Threats

As noted, the terrestrial biodiversity of the Polynesia-Micronesia Hotspot is among the most highly threatened in the world, especially when calculated per unit of land area or per capita. Oceania as a whole has had the greatest number of species extinctions of any region of the world since 1600 and many more taxa are on the verge of extinction. Furthermore, only about 20 percent of the vegetation remains in a natural state, the rest is highly degraded. The major threats to Pacific biota are anthropogenic and include invasive alien species, habitat alteration and loss, destructive harvesting, and the over-exploitation of natural resources.

Of all the threats, targeting invasive species is one of the most important areas of activity. There are a number of global and regional projects that have focused on researching, gathering, and disseminating information on invasive species but relatively little funding has been available for island restoration activities in the hotspot. A regional strategy that addresses invasive species has been developed, and a major GEF-funded program targeting invasive species, is about to commence. However, the GEF-funded program will focus on strengthening national legal and institutional frameworks rather than invasive species control and will not be executed in all countries in the hotspot. There are therefore significant opportunities for CEPF to complement and support existing initiatives, especially in countries not covered by the GEF program such as the French territories.

There are good opportunities for CEPF to:

- support targeted efforts to implement components of the regional invasive species strategy, specifically where it will secure protection for a subset of the species and site outcomes;
- promote community-based invasive species control projects and activities that provide rural employment and alleviate poverty, similar to those used by the “Working for Water” project in South Africa; and

- promote collaborative arrangements between the Invasive Species Specialist Group, the Global Invasive Species Program, the Pacific Island Ecosystems at Risk project, SPREP's Invasive Species program, the pilot Pacific Island Invasives Learning Network, and several NGOs that hold significant scientific and technical expertise for this effort in the Pacific region.

Current Investments and Strategies

CEPF's support to civil society efforts will operate within the context and framework of existing and planned regional, national, and local investments in biodiversity conservation. There are a number of such efforts in the hotspot. Efforts at the national level included the development of National Environmental Management Strategies in the 1990s, and more recently the preparation of National Biodiversity Strategies and Action Plans in many hotspot countries. The latter form a blueprint for national conservation action in each country. At the regional level, the major strategic effort is the 2003-2007 Pacific Islands Action Strategy for Nature Conservation. The theme of the current strategy is the mainstreaming of nature conservation into all development sectors involving partnerships between conservationists, governments, the private sector, and civil society. The strategy has the support of Pacific Island countries, SPREP, donors, and the regional NGO community.

An analysis of current investments and strategies indicates that significant implementation gaps remain in a number of areas. While there are many existing national and regional conservation strategies, the strategies need much stronger support for implementation. Terrestrial conservation efforts in general and species and site conservation efforts in particular, are chronically under-funded. The taxonomic groups that have been least well supported include the flying foxes, land snails, and plants. There are therefore significant opportunities for CEPF to complement existing strategies and support under-funded components that target biodiversity outcomes.

Major Action Strategy objectives that CEPF is well-placed to target include:

- the strengthening of conservation networks and partnerships, especially institutional capacity and community support essential for long-term conservation;
- empowering local people, communities, and institutions to effectively participate in decisionmaking and action;
- raising awareness and promoting conservation values;
- increasing the number of areas under effective conservation management;
- safeguarding and restoring threatened species of ecological or cultural significance;
- controlling the spread of invasive species and preventing new introductions; and
- improving knowledge and understanding of the state of the Pacific's environment and biodiversity.

CEPF Niche

The niche of CEPF in the Polynesia-Micronesia Hotspot will be to **catalyze action by civil society** to counteract threats to biodiversity, especially from invasive species, in key biodiversity areas in the Polynesia-Micronesia Hotspot. The **geographic focus** for CEPF

intervention in the hotspot will be on CEPF eligible countries only. The three **primary strategic directions** are:

- prevent, control and eradicate invasive species in key biodiversity areas;
- improve the conservation status and management of a prioritized set of key biodiversity areas; and
- Build awareness and participation of local leaders and community members in the implementation of protection and recovery plans for threatened species.

A fourth strategic direction is to provide strategic leadership and effective coordination of CEPF investment through a regional implementation team and therefore complements the three primary strategic directions.

The CEPF niche has been developed with the understanding that levels of funding support will vary according to absorptive capacity of local civil society and partners, prioritization of the species and site outcomes, political climate, biodiversity assessments, and other key factors likely to change over the course of CEPF investment.

CEPF INVESTMENT STRATEGY AND PROGRAM FOCUS

Priority Outcomes for CEPF Investment

The 244 species and 161 sites defined for this hotspot are far too many for a single investment program to handle alone. Therefore, species and site outcomes were prioritized for CEPF investment. It is hoped that other conservation funds and organizations will provide funding to achieve the remaining species and site outcomes to complement CEPF investments.

Species Prioritization

The species that are in most need of conservation action were prioritized into one of six categories based on the following three major criteria:

- *Need for species-focused action.* Species that require species-focused action such as the control of invasive species or harvesting, in addition to the conservation of habitat, are given a higher priority than species for which habitat conservation is the main activity required.
- *Red List Category.* Species were prioritized based on the degree of threat as determined by the IUCN Red List. High priority was given to Critically Endangered species, medium priority to Endangered species, and lower priority to Vulnerable species. There are 92 Critically Endangered species eligible for CEPF funds.
- *Taxonomic distinctiveness*. This is a measure of how unique a species is relative to other species. For example, species that are the only member of their entire family or even of their genus are more taxonomically distinct than species in very large families or genera. In this prioritization analysis, taxonomically unique species were considered have a higher priority than less unique species in large genera and families (the methodology for calculating taxonomic distinctiveness is shown in Appendix 4);

The methodology for prioritizing species was as follows. First species requiring species-focused action were identified. Those that are Critically Endangered are a priority one, while those that are Endangered are a priority two, and those that are Vulnerable are a priority three. Within each priority group, species were prioritized based on taxonomic distinctiveness. Species that are not known to require species-focused action, but rather can be best conserved by protecting the sites in which they occur, were also given a priority ranking. However, those species did not make the final list of species priorities, considering that CEPF investment in the region will be limited and there are many highly threatened species in need of species-focused action.

Based on this objective analysis, a total of 41 species were classified as priority one and 26 as priority two – these were selected as priorities for CEPF investment and are presented in Table 7. Five species do not have globally significant populations in the hotspot (i.e. more than 20 percent of the global population), and were not considered in the prioritization. It should be noted that given limitations in data availability and quality, the prioritization is an initial attempt and may change as more accurate data become available.

Table 7. Priorities for Species-Specific Investment by CEPF

Scientific Name	Common Name	Class	Threat Status	Taxonomic Distinctiveness *	Priority Rank
PLANTS					
Erythrina tahitensis		Magnoliopsida	CR	0.006	1
Glochidion comitum		Magnoliopsida	EN	0.002	2
Glochidion papenooense		Magnoliopsida	CR	0.002	1
Hernandia temarii		Magnoliopsida	CR	0.031	1
Lebronnecia kokioides		Magnoliopsida	EN	0.667	2
Lepinia taitensis		Magnoliopsida	CR	0.222	1
Myrsine hartii		Magnoliopsida	CR	0.004	1
Myrsine longifolia		Magnoliopsida	CR	0.004	1
Myrsine ronuiensis		Magnoliopsida	CR	0.004	1
Pisonia graciliscens		Magnoliopsida	CR	0.017	1
Polyscias tahitensis		Magnoliopsida	CR	0.004	1
Psychotria grantii		Magnoliopsida	CR	0.0007	1
Psychotria speciosa		Magnoliopsida	CR	0.0007	1
Psychotria tahitensis		Magnoliopsida	CR	0.0007	1
Psychotria trichocalyx		Magnoliopsida	CR	0.0007	1

Scientific Name	Common Name	Class	Threat Status	Taxonomic Distinctiveness *	Priority Rank
Rauvolfia sachetiae		Magnoliopsida	CR	0.011	1
ANIMALS					
Platymantis vitiana	Fijian ground frog	Amphibia	EN	0.017	2
Aplonis pelzelni	Pohnpei mountain starling	Aves	CR	0.028	1
Charmosyna amabilis	red-throated lorikeet	Aves	EN	0.048	2
Didunculus strigirostris	tooth-billed pigeon	Aves	EN	0.667	2
Ducula aurorae	Polynesian pigeon	Aves	EN	0.02	2
Ducula galeata	Marquesas pigeon	Aves	CR	0.02	1
Gallinula pacifica	Samoan woodhen	Aves	CR	0.074	1
Gymnomyza samoensis	Mao honeycatcher	Aves	EN	0.222	2
Gallicolumba rubescens	Marquesas ground dove	Aves	EN	0.037	2
Gallicolumba erythroptera	Polynesian ground dove	Aves	CR	0.037	1
Megapodius laperouse	Micronesian megapode	Aves	EN	0.053	2
Megapodius pritchardii	Niuafo'ou megapode	Aves	CR	0.053	1
Metabolus rugensis	Truk monarch	Aves	EN	0.667	2
Pomarea dimidiata	Rarotonga flycatcher	Aves	EN	0.111	2
Pomarea mendozae	Marquesas flycatcher	Aves	EN	0.111	2
Pomarea nigra	Tahiti flycatcher	Aves	CR	0.111	1
Pomarea whitneyi	Fatuhiva flycatcher	Aves	CR	0.111	1
Prosobonia cancellata	Tuamotu sandpiper	Aves	EN	0.333	2
Pseudobulweria macgillivrayi	Fiji petrel	Aves	CR	0.223	1
Pterodroma atrata	Henderson petrel	Aves	EN	0.023	2
Rukia ruki	Faichuk white-eye	Aves	CR	0.222	1
Todiramphus godeffroyi	Marquesas kingfisher	Aves	EN	0.032	2
Vini kuhlii	Kuhl's lorikeet	Aves	EN	0.133	2
Vini ultramarina	Ultramarine lorikeet	Aves	EN	0.133	2
Mautodontha ceuthma		Gastropoda	CR	0.056	1
Partula calypso		Gastropoda	CR	0.008	1
Partula clara		Gastropoda	CR	0.008	1
Partula emersoni		Gastropoda	CR	0.008	1
Partula filosa		Gastropoda	CR	0.008	1

Scientific Name	Common Name	Class	Threat Status	Taxonomic Distinctiveness *	Priority Rank
Partula guamensis		Gastropoda	CR	0.008	1
Partula hyalina		Gastropoda	CR	0.008	1
Partula leucothoe		Gastropoda	CR	0.008	1
Partula martensiana		Gastropoda	CR	0.008	1
Partula otaheitana		Gastropoda	CR	0.008	1
Partula rosea		Gastropoda	CR	0.008	1
Partula thetis		Gastropoda	CR	0.008	1
Partula varia		Gastropoda	CR	0.008	1
Samoana annectens		Gastropoda	EN	0.03	2
Samoana attenuate		Gastropoda	EN	0.03	2
Samoana diaphana		Gastropoda	EN	0.03	2
Samoana solitaria		Gastropoda	EN	0.03	2
Thaumatodon hystricelloides		Gastropoda	EN	0.067	2
Emballonura semicaudata	Polynesian sheathtail-bat	Mammalia	EN	0.02	2
Pteropus insularis	Chuuk flying-fox	Mammalia	CR	0.011	1
Pteropus mariannus	Marianas flying-fox	Mammalia	EN	0.011	2
Pteropus molossinus	Caroline flying-fox	Mammalia	CR	0.011	1
Pteropus phaeocephalus	Mortlock flying-fox	Mammalia	CR	0.011	1
Brachylophus fasciatus	banded iguana	Reptilia	EN	0.335	2
Brachylophus vitiensis	crested iguana	Reptilia	CR	0.335	1
Chelonia mydas	green turtle	Reptilia	EN	0.343	2
Eretmochelys imbricata	hawksbill turtle	Reptilia	CR	0.676	1

* Taxonomic distinctiveness is a composite calculation based on the number of species in a genus and the global number of species and genera in a family. For the full methodology please refer to Appendix 4.

Site Prioritization

To focus the investment of CEPF in the Polynesia-Micronesia Hotspot, a prioritization of the key biodiversity areas was undertaken. The 162 sites were prioritized based on the criteria of irreplaceability and vulnerability. Due to a lack of comprehensive threat data for each site, the threat status of species found within the site was used as a proxy for vulnerability. An explicit aim of this analysis was to make sure that all irreplaceable sites were captured among the priorities, which must attract the attention of the global conservation community in order to prevent biodiversity loss. The following step-wise process was used to identify the irreplaceable sites.

1. Identify key biodiversity areas containing Critically Endangered or Endangered species restricted to those sites (33 sites).
2. Identify key biodiversity areas, not listed above, containing Critically Endangered or Endangered species restricted to only two sites (14 additional sites).
3. Identify key biodiversity areas, not listed above, containing Vulnerable species listed for only one site (13 additional sites). Given that a few of the Vulnerable species recorded for only one key biodiversity area are not site endemics (i.e. we expect them to occur in other areas but lacked information during the timeframe of this profile), we treated these as a lower priority than the second site for a Critically Endangered or Endangered species.

Only one additional site was needed to ensure that all Critically Endangered and Endangered species were represented, and so this site was included as well. Henderson Island emerged as irreplaceable in the first tier, but was dropped due to expert opinion that it is not threatened and should not be a priority. Thus, there are 60 sites prioritized for intervention by CEPF in the Polynesia-Micronesia Hotspot (Table 8, Figure 3).

Table 8. Priorities for Site-Level Investment by CEPF

Site No[1]	Site Name	Country	Land Area (Ha)	Existing protected area in the site?	Number of globally threatened species*	Number of site endemics
1	Atiu Island	Cook Islands	2700	Yes	4	1
2	Mangaia	Cook Islands	5180	No	2	1
4	Takitumu Conservation Area	Cook Islands	155	Yes	2	
60	Gau Island	Fiji	12150	No	3	2
61	Hatana Island	Fiji	10	No	2	
63	Laucala Island	Fiji	1350	No	3	
65	Monuriki Island	Fiji	100	No	1	
66	Mt Evans Range-Koroyanitu	Fiji	5400	Yes	8	2
67	Mt Kasi	Fiji	n.d.	No	3	2
68	Mt Korobaba	Fiji	n.d.	No	5	2
69	Mt Navtuvotu	Fiji	n.d.	Now	2	
70	Mt Nubuiloa	Fiji	n.d.	No	6	1
71	Nabukelevu/Mt Washington	Fiji	1800	Yes	5	1
72	Naicobocobo dry forests	Fiji	1800	No	3	

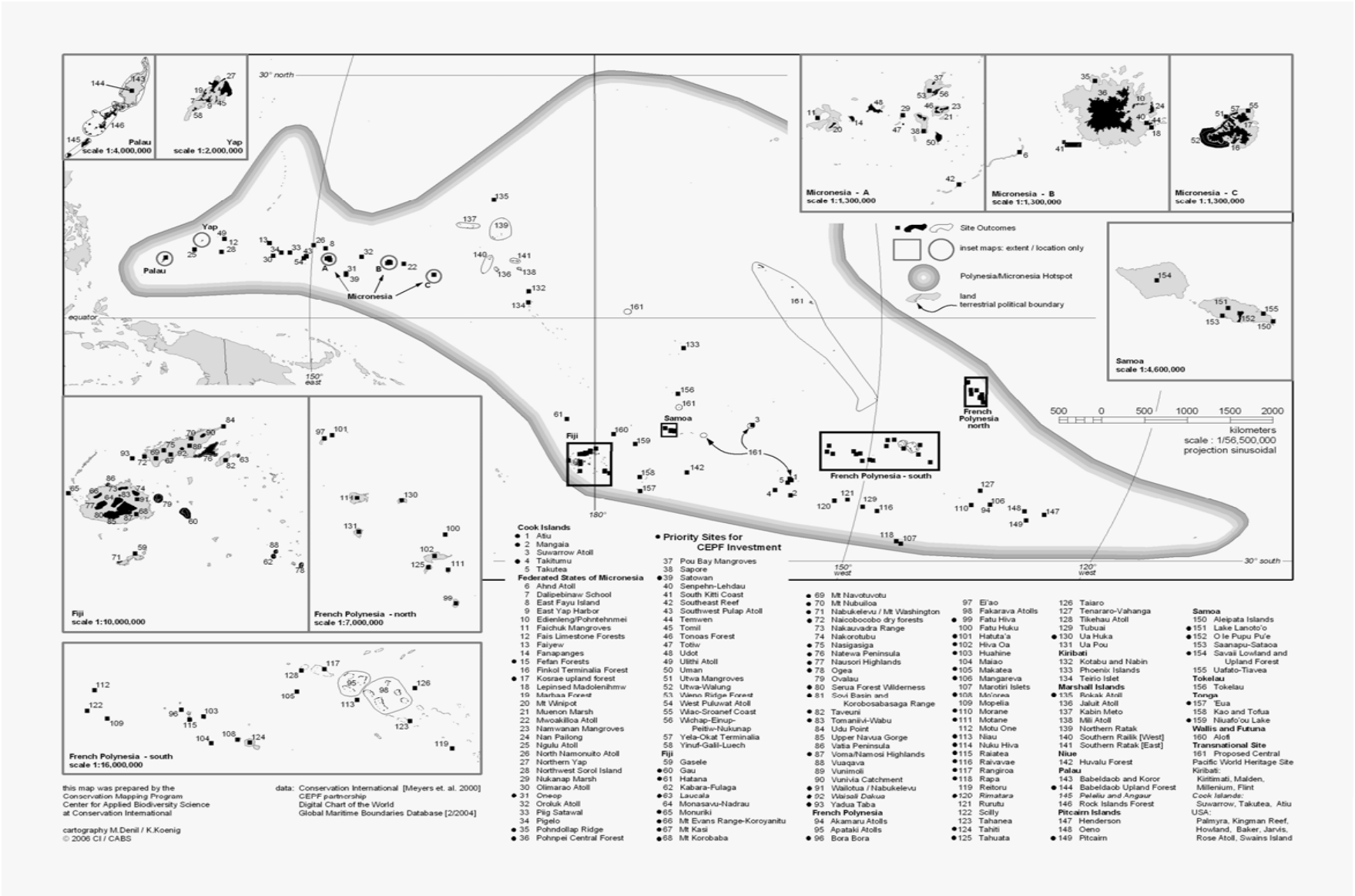
Site No[1]	Site Name	Country	Land Area (Ha)	Existing protected area in the site?	Number of globally threatened species*	Number of site endemics
75	Nasigasiga	Fiji	1800	No	4	
76	Natewa Peninsula	Fiji	9000	Yes	11	
77	Nausori Highlands	Fiji	8100	No	14	1
78	Ogea	Fiji	1350	No	4	1
80	Serua forest wilderness	Fiji	20700	No	19	2
81	Sovi Basin and Korobosabasaga Range	Fiji	19800	No	24	
82	Taveuni	Fiji	48510	Yes	24	7
83	Tomaniivi-Wabu Nature and Forest Reserve complex	Fiji	7200	Yes	21	1
87	Voma/Namosi Highlands	Fiji	1170	No	15	
91	Wailotua/Nabukelevu bat caves	Fiji	1080	No	3	1
92	Waisali Dakua National Trust Forest Reserve	Fiji	2430	Yes	6	
93	Yadua Taba Island	Fiji	153	Yes	2	
96	Bora Bora	French Polynesia	3760	No	4	3
99	Fatu Hiva	French Polynesia	7770	No	6	2
101	Hatuta'a Island	French Polynesia	1810	Yes	3	
102	Hiva Oa	French Polynesia	24090	No	5	
103	Huahine	French Polynesia	7480	No	4	4
105	Makatea	French Polynesia	2896	No	2	2
106	Mangareva	French Polynesia	1300	No	2	1
108	Mo'orea	French Polynesia	13200	No	6	4
110	Morane	French Polynesia	200	No	3	
111	Motane Island	French Polynesia	1554	Yes	4	
113	Niau	French	5582	No	3	1

Site No[1]	Site Name	Country	Land Area (Ha)	Existing protected area in the site?	Number of globally threatened species*	Number of site endemics
		Polynesia				
114	Nuku Hiva	French Polynesia	33600	No	5	2
115	Raiatea	French Polynesia	17200	No	4	1
116	Raivavae	French Polynesia	2007	No	13	5
117	Rangiora	French Polynesia	7900	Now	4	
118	Rapa	French Polynesia	1000	No	24	19
120	Rimatara	French Polynesia	878	No	2	1
124	Tahiti	French Polynesia	20000	Yes	28	19
125	Tahuata	French Polynesia	7512	No	3	
130	Ua Huka	French Polynesia	8100	Yes	4	2
15	Fefan Forests	FSM	200	No	5	
17	Kosrae upland forest	FSM	4640	No	3	1
31	Oneop Island	FSM	327	No	1	
35	Pohndollap Ridge	FSM	83	No	3	
36	Pohnpei Central Forest	FSM	10372	Yes	9	4
39	Satowan Island	FSM	60	No	1	
135	Bokak Atoll	Marshall Islands	324	Yes	3	
144	Babeldaob Upland Forest (broad-leafed tropical forest)	Palau	21000	No	10	1
149	Pitcairn	Pitcairn Islands	486	No	9	8
151	Lake Lanoto’o National Park	Samoa	60	Yes	5	
152	O le Pupu Pu’e National Park	Samoa	2857	Yes	5	
154	Savaii Lowland and Upland Forest	Samoa	25000	No	10	2
157	'Eua	Tonga	8700	Yes	1	1
159	Niuafo'ou Freshwater	Tonga	5300	No	1	

Site No[1]	Site Name	Country	Land Area (Ha)	Existing protected area in the site?	Number of globally threatened species*	Number of site endemics
	Lake					

Notes: n.d. = no data
1. Site numbers are the same as those shown in Figure 3 and Appendix 3
2. Land area is approximate only
3. Invasive free status is a qualitative assessment of how free the site is of major invasive species (such as the ship rat, mongoose, vertebrate browsers, and invasive weeds)

Figure 3. Site Outcomes in the Polynesia-Micronesia Hotspot and Priority Sites for CEPF Investment



Program Focus

The programmatic focus of CEPF in the Polynesia-Micronesia Hotspot will be on reducing the risks of extinction of a prioritized set of 41 globally threatened species and on improving the conservation of 60 key biodiversity areas as indicated above. The investment strategy and programmatic focus are *on actions in CEPF eligible countries only*.

The approach for achieving this focus in the Pacific context necessarily involves strengthening the capacity of resource stewards to manage and conserve threatened species and sites. This will require the application of practical conservation science to improve our knowledge of biological systems and the tools to conserve it, along with the development of collaborative partnerships between civil society organizations and the local communities and governments who are the stewards of the biological resources. To maximize leverage and impact from all investment priorities, CEPF will strive to develop partnerships that strengthen existing initiatives with similar objectives.

The specific strategic directions and necessary interventions or investment priorities required to achieve the program focus are discussed in the following section.

Strategic Directions

Four strategic directions have been developed for the Polynesia-Micronesia Hotspot based on three subregional roundtable meetings (in Western Polynesia, Fiji, and Micronesia) and two meetings of regional conservation experts (in Apia) along with an analysis of species outcomes, threats, current and planned investments, and strategies and infrastructural frameworks in the hotspot.

The strategic directions, along with the investment priorities under each, are summarized in Table 9, and are described in more detail in the text following the table.

Table 9. CEPF Strategic Directions and Investment Priorities for the Polynesia-Micronesia Hotspot

Strategic Directions	Investment Priorities
1. Prevent, control, and eradicate invasive species in key biodiversity areas	1.1 Strengthen defences against the introduction and spread of invasive species and pathogens that threaten biodiversity 1.2 Control or eradicate invasive species in key biodiversity areas, particularly where they threaten native species with extinction 1.3 Perform research, provide training in management techniques, and develop rapid response capacity against particularly serious invasive species
2. Strengthen the conservation status and management of 60 key biodiversity areas	2.1 Develop and manage conservation areas that conserve currently unprotected priority sites, especially critical refugia such as large forest blocks and alien-free habitats 2.2 Improve the management of existing protected areas that are priority site outcomes
3. Build awareness and participation of local leaders and community members in the implementation of protection and recovery plans for threatened species	3.1 Develop and implement species recovery plans for highly threatened species requiring species-focused action, especially those that have received little effort to date 3.2 Strengthen leadership and effectiveness of local conservation organizations by developing peer-learning networks and promoting exchanges and study tours 3.3 Raise the environmental awareness of communities about species and sites of global conservation concern through social marketing and participatory planning and management approaches
4. Provide strategic leadership and effective coordination of CEPF investment through a regional implementation team	4.1 Build a broad constituency of civil society groups working across institutional and political boundaries toward achieving the shared conservation goals described in the ecosystem profile.

Strategic Direction 1: Prevent, control, and eradicate invasive species in key biodiversity areas

It has already been stated that invasive species pose the dominant threat to the native biota and ecosystems of the hotspot. Dealing more effectively with invasive species, especially by preventing their introduction to alien-free islands and habitats, must be a major goal of the CEPF investment strategy. Implementation of this strategic direction will be performed in close collaboration with a number of regional initiatives including the GEF-funded Pacific Invasive Species Management Program, the IUCN Invasive Species Specialist Group's (ISSG) Cooperative Initiative on Invasive Alien Species on Islands, the Pacific Island Ecosystems at Risk project, SPREP's Invasive Species program, and others. The Cooperative Islands Initiative and other ISSG activities provide baseline support for the CEPF program.

1.1 Strengthen defences against the introduction and spread of invasive species and pathogens that threaten biodiversity
Preventing the introduction of new invasive species is the ideal practice for vulnerable island ecosystems, followed by eradication and then control of invasives (Sherley and Lowe 2000). Prevention requires strong, well-resourced quarantine systems that are the responsibility of governments. Currently, few countries and territories have developed adequate guarantee systems to defend themselves from invasive organisms, but efforts are underway in most places, with international support, to improve official enforcement, staff, and infrastructure.

The role of civil society organizations will be to foster improved legislation as well as public support for and participation in surveillance and monitoring programs.

1.2 Control or eradicate invasive species in key biodiversity areas particularly where they threaten native species with extinction
Many of the invasive species in the hotspot are on the IUCN's list of 100 of the world's worst invasive species (ISSG, n.d). It is impossible to control or remove all these alien invasive species from native ecosystems; there are simply far too many invasives and they are far too well established and distributed. However, projects should be developed in key biodiversity sites that target particularly serious invasive pests and pathogens. CEPF's experience in managing pilot efforts supported by the Australian government's Regional Natural Heritage Program developed thorough eradication plans and provided a strong foundation for replication and other future activities because of extensive community involvement. Control programs that also provide local benefits are likely to enjoy community support and to be most effective.

1.3 Provide training in management techniques and develop rapid response capacity against particularly serious invasive species
Best available information and training are required to improve policy, legislation and implementation procedures against invasive species. There is a particular need for more information on the distribution and impact of invasive species in sensitive sites and the identification of alien-free habitats. Surveys to establish where invasive alien species occur, covering all taxa in both terrestrial and aquatic ecosystems, are a priority. Management training is also required on the tools and techniques for dealing with invasive species such as techniques for the early detection of new invasions and the assessment of risk for species proposed for import (Sherley and Lowe 2000).

Strategic Direction 2: Strengthen the conservation status and management of 60 key biodiversity areas
The conservation of key biodiversity sites and landscapes, even those that are nominally already protected, must be improved. The Pacific experience indicates that the governance model that is most likely to succeed are co-managed sites where local communities are intimately involved in the establishment and management of such areas. Investment priorities that will be supported by CEPF include the development of new protected areas to conserve priority sites; improvement in the management of existing

protected areas that are priority sites; and support for studies and information sharing research that will provide information to improve site management.

2.1 Develop and manage conservation areas that conserve unprotected priority sites, especially critical refugia such as large forest blocks and alien-free habitats
The development and management of ecologically viable and representative conservation areas is a major component of conservation strategies such as National Biodiversity Strategy and Action Plans for many countries in the hotspot. Such conservation areas are likely to be a mixture of a varied governance types depending on local circumstances. Emphasis should be given to the conservation of refugia such as the larger and more remote forest blocks and alien free habitats, which appear to have the best potential for sustainability.

2.2 Improve the management of existing protected areas that are priority sites
Many existing protected areas suffer from a lack of sound management, including adequate protection from poachers and other threats such as habitat degradation and invasive species. This is often a result of poor financial support and possibly the application of an inappropriate governance regime. The management effectiveness of these areas can be strengthened by improved resourcing and training of managers and by improving the relationship with, and commitment to conservation by, local communities.

Strategic Direction 3: Build awareness and participation of local leaders and community members in the implementation of protection and recovery plans for threatened species
The investment priority that forms the focus of this strategic direction is to develop and implement species recovery plans for the prioritized set of threatened species, especially the Critically Endangered species needing special attention in addition to conserving their habitat. In keeping with CEPF's global program the emphasis of this strategy will be on civil society and local community participation in such plans.

3.1 Develop and implement species recovery plans for highly threatened species requiring species-focused action, especially those that have received little effort to date
Species recovery plans are particularly needed for Critically Endangered species that require species-focused action, such as the control of harvesting, or dealing with threats such as invasive species. Emphasis should be placed on the species that have received little attention to date, such as some of the endemic land snails (especially *Partula* spp.), flying foxes (especially *Pteropus* spp.), and insectivorous bats and restricted range plants. Recovery plans must spell out the specific management measures required to conserve the species such as the establishment of reserves, the control of threats like habitat degradation, invasive species or hunting, along with the research needs. Most importantly, activities and overall support will be tailored to ensure implementation of the recovery plans.

3.2 Strengthen leadership and effectiveness of local conservation organizations by developing peer-learning networks and promoting exchanges and study tours
A key way to strengthen the leadership of local conservation organizations is to develop

peer-learning networks. These networks will often include government officials to build and strengthen the mutual understanding and trust that is critical to successful collaboration on conservation goals. Peer learning networks can assist conservation professionals to share successes and lessons learned, identify and address shared needs for technical assistance, training and other support and to collaborate together on local and national issues effectively. This investment priority should also include the publication of literature on conservation lessons learned and on the region's environment, written in English and local languages and at varied levels.

3.3 Raise the environmental awareness of communities about species and sites of global conservation concern through social marketing and participatory planning and management approaches

Few people in the hotspot are sufficiently aware of the uniqueness of the biodiversity of the hotspot, the severity of threats to it, and the significance of the biodiversity in maintaining the healthy structure and function of island ecosystems. Such awareness must be raised if biodiversity is to be valued properly by communities and their governments, and thereby adequately conserved. The most effective way of raising this awareness is through participatory planning and management approaches which provide information to communities to assist them to make better management decisions. The use of social marketing tools, where the goal is to elicit behavioral change rather than simply raising awareness, may be a useful approach for increasing political and social will to protect biodiversity.

Strategic Direction 4: Provide strategic leadership and effective coordination of CEPF investment through a regional implementation team

An independent evaluation of the global CEPF program found that CEPF regional implementation teams are particularly effective with the support of the CEPF grant directors in linking the key elements of comprehensive, vertically integrated portfolios such as large anchor projects, smaller grassroots activities, policy initiatives, governmental collaboration, and sustainable financing. As recommended by the evaluators, the responsibilities of these teams, formerly known as coordination units, have now been standardized to capture the most important aspects of their function.

In every hotspot, CEPF will support a regional implementation team to convert the plans in the ecosystem profile into a cohesive portfolio of grants that exceed in impact the sum of their parts. Each regional implementation team will consist of one or more civil society organizations active in conservation in the region. For example, a team could be a partnership of civil society groups or could be a lead organization with a formal plan to engage others in overseeing implementation, such as through an inclusive advisory committee.

The regional implementation team will be selected by the CEPF Donor Council based on an approved terms of reference, competitive process, and selection criteria available in PDF format at www.cepf.net/Documents/Final.CEPF.RIT.TOR_Selection.pdf.

The team will operate in a transparent and open manner, consistent with the CEPF mission and all provisions of the CEPF Operational Manual. Organizations that are

members of the Regional Implementation Team will not be eligible to apply for other CEPF grants within the same hotspot. Applications from formal affiliates of those organizations that have an independent operating board of directors will be accepted, and subject to additional external review.

4.1 Build a broad constituency of civil society groups working across institutional and political boundaries toward achieving the shared conservation goals described in the ecosystem profile

The regional implementation team will provide strategic leadership and local knowledge to build a broad constituency of civil society groups working across institutional and geographic boundaries toward achieving the conservation goals described in the ecosystem profile. The team's major functions and specific activities will be based on an approved terms of reference. Major functions of the team will be to:

- Act as an extension service to assist civil society groups in designing, implementing, and replicating successful conservation activities.
- Review all grant applications and manage external reviews with technical experts and advisory committees.
- Award grants up to $20,000 and decide jointly with the CEPF Secretariat on all other applications.
- Lead the monitoring and evaluation of individual projects using standard tools, site visits, and meetings with grantees, and assist the CEPF Secretariat in portfolio-level monitoring and evaluation.
- Widely communicate CEPF objectives, opportunities to apply for grants, lessons learned, and results.
- Involve the existing regional program of the RIT, CEPF donor and implementing agency representatives, government officials, and other sectors within the hotspot in implementation.
- Ensure effective coordination with the CEPF Secretariat on all aspects of implementation.

Specific activities and further details are available in the CEPF Regional Implementation Team Terms of Reference and Selection Process.

Sustainability

Use of natural resources is basic to every economic system, and the connection of natural ecosystems to human livelihoods is particularly immediate in rural areas. Substantial investments that are designed and adopted in distant capital cities without local participation are frequently inappropriate for local realities and are regularly thwarted, either by physical conditions or by human resistance. Without costly and inefficient enforcement, plans emanating from national and international agencies that do not have local understanding and support invite failure.

A fundamental assumption and *raison d'etre* for CEPF is that civil society commitment to conservation and sustainable development programs is necessary for them to work as planned. Experience over many years has demonstrated that top-down public sector initiatives by themselves are unlikely either to be effective or to endure. By engaging

civil society in partnerships with governments and business firms, CEPF is intended to improve the potential for sustainable effects following from the much larger investments made by public and private organizations.

In the Polynesia-Micronesia Hotspot, the sustainability of programs intended to improve the living conditions of rural and low-income people faces the particular challenges of political fragmentation among the many independent governments of small island states and the vast expanse of ocean that separates them. Regional structures clearly are necessary, but they are inherently fragile and are subject to substantial inertia and centrifugal force. Differences among people living on small islands are often exaggerated and their similarities or shared problems are often minimized. These high hurdles will lead CEPF to reinforce sub-regional links, where habits of cooperation are already present (such as in Micronesia), at the same time that it supports region-wide projects and partnerships that are needed to respond to large-scale threats (such as invasive species). A tight fabric of civil society partnerships at varied scales is needed to increase the prospect of efforts to conserve threatened ecosystems in the Pacific being maintained independent of future financing from CEPF and other international donors.

CONCLUSION

The value, uniqueness, and vulnerability of the terrestrial biodiversity of the Polynesia-Micronesia Hotspot are well recognized. The species and ecosystems of the hotspot are among the most highly threatened in the world and yet terrestrial conservation activities are severely under-funded and our biological knowledge of the hotspot is incomplete and poorly managed. There are significant opportunities for CEPF to fund actions that empower the stewards of the biodiversity of the Polynesia-Micronesia Hotspot - the island communities and institutions - to conserve biodiversity (especially those species and sites that are globally threatened) more effectively. Since Pacific communities are still highly dependent on biological resources for survival, the achievement of biodiversity conservation objectives is essential for sustaining human livelihoods as well as for the maintenance of essential ecosystem functions.

POLYNESIA-MICRONESIA HOTSPOT LOGICAL FRAMEWORK

Objective	Targets	Means of Verification	Important Assumptions
Catalyze action by civil society to counteract threats to biodiversity, especially from invasive species, in key biodiversity areas in the Polynesia-Micronesia Hotspot.	NGOs and civil society actors, including the private sector, actively participate in conservation programs guided by the CEPF ecosystem profile for the Polynesia-Micronesia Hotspot. Alliances and networks among civil society groups formed to avoid duplication of effort and maximize impact in support of the CEPF ecosystem profile for the Polynesia-Micronesia Hotspot. 60 key biodiversity areas have new or strengthened protection and management guided by a sustainable management plan.	Grantee and RIT performance reports Annual portfolio overview reports; portfolio mid-term and final assessment	The CEPF grants portfolio will effectively guide and coordinate terrestrial conservation action in the Polynesia-Micronesia Hotspot.
Intermediate Outcomes	**Intermediate Indicators**	**Means of Verification**	**Important Assumptions**
Outcome 1: Invasive species prevented, controlled or eradicated from key biodiversity areas $3,000,000	Invasive species are controlled or eradicated in key biodiversity areas where they threaten native species with extinction. Hotspot-wide approaches to prevent invasive species from colonizing new areas are implemented.	Grantee and RIT project reports and site visits.	Pilot projects supported by the Regional Natural Heritage Program through CEPF are replicated. Relevant technical knowledge on combating invasive organisms is widely available National governments maintain adequate inspection and enforcement of quarantine policies

			at ports of entry.
Outcome 2: The conservation status of 60 key biodiversity areas strengthened. $1,750,000	Percent of protected areas with strengthened protection and management. Number of hectares of key biodiversity areas with strengthened protection and management. Number of hectares in newly established or expanded protected areas.	Protected Areas Tracking Tool (SP1 METT) Productive Landscape Tracking Tool (SP2 METT) Formal legal declarations or community agreements designating new protected areas. Grantee and RIT performance reports and site visits	National governments and local community leaders will understand and support participation in biodiversity conservation projects, particularly the removal of alien species. .
Outcome 3: Local leaders and community members understand and participate in the implementation of protection and recovery plans for threatened species. $1,400,000	Number of projects that enable effective stewardship of biodiversity and ecosystem services by indigenous and local communities in focal areas. Percent of projects outside protected areas that integrate biodiversity conservation in management practices. Percentage of targeted communities involved in sustainable use projects that show socioeconomic benefits. Number of hectares in production landscapes with improved management for biodiversity	Grantee and RIT performance reports and site visits. Management plans for community managed areas	Communities establish management plans that benefit biodiversity conservation

	conservation or sustainable use.		
Outcome 4: A regional implementation team effectively coordinates the CEPF investment in the Polynesia-Micronesia Hotspot. $850,000	Number of groups receiving grants that achieve a satisfactory score on final performance scorecard RIT performance in fulfilling the approved terms of reference. At least 2 learning exchanges and/or participatory assessments hosted and documented.	Grantee and RIT performance reports CEPF Secretariat site visits and monitoring.	Qualified organizations will apply to serve as the regional implementation team in line with the approved terms of reference and the ecosystem profile. The CEPF call for proposals will elicit appropriate proposals that advance the objectives of the ecosystem profile. Civil society organizations will collaborate with each other, government agencies, and private sector actors in a coordinated regional conservation program in line with the ecosystem profile.
Strategic Funding Summary	Amount		
Total Budget Request	$7,000,000		

ABBREVIATIONS USED IN THE TEXT

AusAID	Australian Agency for International Development
BYU	Brigham Young University
BP	British Petroleum
CABS	Center for Applied Biodiversity Science
CBCA	Community Based Conservation Area
CBD	Convention on Biological Diversity
CBO	Community-based Organization
CEPF	Critical Ecosystem Partnership Fund
CI	Conservation International
CII	Cooperative Island Initiative (of ISSG)
CITES	Convention on International Trade in Endangered Species
CNMI	Commonwealth of the Northern Mariana Islands
CROP	Council of Regional Organizations of the Pacific
EBA	Endemic Bird Areas
EVI	Environmental Vulnerability Index
FAO	Food and Agriculture Organization
FFA	Forum Fisheries Agency
FSM	Federated States of Micronesia
FSPI	Foundation of the Peoples of the South Pacific International
GEF	Global Environment Facility
GIS	Geographical Information System
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit (German Aid)
IBA	Important Bird Areas
IUCN	The World Conservation Union (formerly the International Union for the Conservation of Nature and Natural Resources)
IPCC	Intergovernmental Panel on Climate Change
ISSG	Invasive Species Specialist Group (of IUCN)
MCT	Micronesia Conservation Trust
MEA	Multilateral Environmental Agreement
NBSAP	National Biodiversity Strategy and Action Plan
NCSA	National Capacity Self Assessment
NEMS	National Environmental Management Strategy
NGO	Nongovernmental organization
NZAID	New Zealand Agency for International Development
PA	Protected Area
PABITRA	Pacific Asia Biodiversity Transect Network
PBIN	Pacific Basin Information Node
PICT	Pacific Island Country or Territory
PIER	Pacific Islands Ecosystems at Risk Project
PSA	Pacific Science Association
SGP	Small Grants Program
SPC	Secretariat for the Pacific Community
SOPAC	South Pacific Applied Geoscience Commission

SPREP	Secretariat of the Pacific Regional Environment Program
TNC	The Nature Conservancy
UNCCD	United Nations Convention on Combating Desertification
UNDP	United Nations Development Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
USP	University of the South Pacific
USAID	United States Agency for International Development
WCS	Wildlife Conservation Society
WWF-SPP	World Wide Fund for Nature- South Pacific Program

REFERENCES

Asian Development Bank (ADB). 2003. *Pacific Region Environment Strategy. Discussion Draft. June 2003*. ADB, Manila.

Allison, A. 2003. Biological Surveys- new perspectives in the Pacific. *Org. Divers. Evol*. 3: 103-110.

Allison, A. Personal Communication, 2003, Honolulu.

Allison, A., and Eldredge, L. 1999. Polynesia and Micronesia. p 390-401 in Mittermier, R.A. *et al*. *Hotspots*. *Earth's Biologically Richest and most Endangered Terrestrial Ecoregions.* Cemex and Conservation International.

Allison, A., and Eldredge, L. 2004. Polynesia and Micronesia. in Mittermier, R.A. *et al*. *Hotspots Revisited.* Cemex and Conservation International.

Atkinson, I.E. and Atkinson, T. 2000. Land vertebrates as invasive species on the islands of the South Pacific Environment Program. In *Invasive Species in the Pacific: A Technical Review and Draft Regional Strategy*. Sherley, G. (Ed.). SPREP, Apia.

BirdLife 2000. *Threatened Birds of the World.* Stattersfield, A.J and Capper. D.R. (Eds.). BirdLife International, Cambridge.

Bishop Museum 2003. *Living Archipelagos- Micronesia and Polynesia* .Unpublished report. Bishop Museum, Honolulu.

Brown, M. Personal Communication, 2003, Auckland.

C.I. 1999. p 390-403 in Mittermier *et al*. *Hotspots*. *Earth's Biologically Richest and most Endangered Terrestrial Ecoregions.* Cemex and Conservation International.

C.I. 2003. *Pacific Protected Areas Database*. Prepared by Joanna Axford for Conservation International, Apia, Samoa.

Cowie, R.H. 1996. Pacific island land snails: relationships, origins, and determinants of diversity. In: Keast, A. and Miller, S.E. (Eds.), *Origin and evolution of Pacific Island biotas, New Guinea to eastern Polynesia: patterns and processes*, SPB Academic Publishing, Amsterdam, pp. 347-372.

Cowie, R.H. 2000. Non-indigenous land and freshwater molluscs in the islands of the Pacific: conservation impacts and threats. In *Invasive Species in the Pacific: A Technical Review and Draft Regional Strategy*. Sherley, G. (Ed.). SPREP, Apia.

Cowie, R.H. 2001. Invertebrate Invasions on Pacific Islands and the replacement of unique faunas: a synthesis of the land and freshwater snails. *Biological Invasions* 3:119-136.

Cowie, R.H. Personal Communication, 2003, Honolulu.

Crocombe, R. 2001. *The South Pacific*. University of the South Pacific. 790 pp.

Dahl, A. L. 1980. *Regional Ecosystems Survey of the South Pacific*. SPC Technical Paper No.179. SPC and IUCN, Noumea.

Dahl, A. L. 1984. Biogeographical Aspects of Isolation in the Pacific. *Ambio*. vol 13, No 5-6:302-305.

Dahl, A. L. 1986. *Review of the Protected Areas System in Oceania*. UNEP and IUCN, Gland, Switzerland.

Eldredge, L.G. 2000. Non indigenous freshwater fishes, amphibians, and crustaceans of the Pacific and Hawaiian islands. In *Invasive Species in the Pacific: A Technical Review and Draft Regional Strategy*. Sherley, G. (Ed.). SPREP, Apia.

Eldredge, L.G., and Evenhuis, N.L. In Press. *Hawaii's Biodiversity: A detailed assessment of the numbers of species in the Hawaiian islands.* BishopMusuem, Hawaii.

Eldredge, L.G. Personal Communication, 2004, Honolulu.

Faasao Savaii. 1998 *The Rainforest and the Flying Foxes: An Introduction to the Rain Forest Preserves on Savai'i, Western Samoa*. Elmqvist, T., Cox, P., Pierson, E.D. and Rainey, W.E. (Eds.). Faasao Savaii, Salelologa.

FAO. 2003. *State of the World's Forests 2003*. FAO, Rome.

Flannery, T.F. 1995. *Mammals of the South-West Pacific & Moluccan islands*. Reed, Sydney.

Florence, J. 1997. Flora de la Polynésie Française. in *Collection Faune et Flore Tropicales*. ORSTOM, Paris.

Frost, D.R. 2002. *Amphibian Species of the World: an Online Reference.* American Museum of Natural History, New York, USA. (http://www.research.amnh.org/herpetology/amphibia/)

Gillet, R., McCoy, M., Rodwell, L.,and Tamate, J. 2001. Tuna: A Key Economic Resource in the Pacific. *Pacific Studies Series*. Manila: ADB.

Given, D.R. 1992. *An Overview of the Terrestrial Biodiversity of Pacific Islands*. SPREP, Apia.

Goldin, M.R. 2002. *Field guide to the Samoan archipelago: fish, wildlife, and protected areas.* Bess Press.

IPCC. 1996. Climate Change 1995. *The Science of Climate Change. Summary for Policy Makers and Technical Summary of the Working Group 1. Report*. Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge: 56pp.

ISSG. n.d. *100 of the World's Worst Invasive Alien Species*. IUCN Oceania Regional Committee, Auckland.

ISSG. 2003. Global Invasive Species Database (GISD). IUCN Invasive Species Specialist Group. (http://www.issg.appfa.auckland.ac.nz/database/welcome/)

IUCN. 2003. *2003 IUCN Red List of Threatened Species*. (http://www.redlist.org/)

IUCN. 2004a. WCPA World Commission on Protected Areas. (http://www.iucn.org/themes/wcpa/wcpa/protectedareas.htm)

IUCN. 2004b. Theme on Indigenous and Local Communities, Equity and Protected Areas: A joint Theme/Working Group of WCPA and CEESP. (http://www.iucn.org/themes/ceesp/Wkg_grp/TILCEPA/TILCEPA.htm)

IUCN-UNEP. 2003. *2003 World Database on Protected Areas*. (CD-ROM). IUCN, Geneva and UNEP, Nairobi.

Keith, P., Vignieux, E., and Marquet, G. 2002. *Atlas des poissons et de crustacés d'eau douce de Polynésie Française*. Collection Patrimoines Naturels Volume 55. Muséum national d'Histoire naturelle, Paris

Lal,B.V,. and Fortune, K. 2000 (eds). *The Pacific Islands An Encyclopedia.* University of Hawaii Press, Hawaii.

Lydeard, C., Cowie, R.C., Ponder, W.F., Bogan, A.E., Bouchet, P., Clark, S.A., Cummings, K.S., Frest, T.J., Gargominy, O., Herbert, D.G., Hershler, R., Perez, K.E., Roth, B., Seddon, M., Strong, E.E., and Thompson, F.G. In Press. The Global Decline of Nonmarine Mollusks. Bioscience 54, No. 4.

Manner, H. 2003. *Ecosystem Profile, Polynesia Micronesia Hotspot Micronesia Subregion.* Unpub. report prepared for CI, Apia.

Martel, F., and Atherton, J. 1997. *Timber inventory of the ifilele resource : Uafato conservation area project*. SPREP, Apia

MacArthur, R.H., and Wilson, E.O. 1967. *The Theory of Island Biogeography*. Princeton University Press, New Jersey.

McCormack, G. 2002. *Cook Islands Biodiversity Strategy and Action Plan.* UNDP.

McIntyre, M. Personal Communication, 2004, Apia.

Meyer, J.-Y. 2000. Preliminary review of the invasive plants in the Pacific islands (SPREP member countries). In *Invasive Species in the Pacific: A Technical Review and Draft Regional Strategy*. Sherley, G. (Ed.). SPREP, Apia.

Meyer, J.-Y. and Florence, J. 1996. Tahiti's native flora endangered by the invasion of Miconia calvescens DC. (Melastomaceae). *Journal of Biogeography* 23:775-781.

Meyer, J.-Y. Personal Communication, 2004, Papeete.

Mueller-Dombois, D., and Fosberg, F. R. 1998. *Vegetation of the Tropical Pacific Islands*. Springer-Verlag, New York.

Mueller-Dombois, D. 2002. Forest vegetation across the tropical Pacific: A Biogeographically complex region with many analogous environments. *Plant Ecology* 163:155-176.

Mueller-Dombois, D. Personal. Communication, 2004, Honolulu.

Nishida, G.M. and Evenhuis, N.L. 2000. Arthropod pests of significance in the Pacific: A preliminary assessment of selected groups. In *Invasive Species in the Pacific: A Technical Review and Draft Regional Strategy*. Sherley, G. (Ed.). SPREP, Apia.

Nunn, P. 1994. *Oceanic Islands*. Blackwell, Oxford.

Olson, D, and Farley, L. 2003. *Polynesia Micronesia Hotspot Ecosystem Profile and Five-Year Investment Strategy: Fiji Sub Regional Profile*. Unpub.report prepared for CI, Apia.

Olson, D.M. Personal Communication, 2003, Fiji.

Olson, D.M. and Dinerstein, E. 1998. The Global 200: a representation approach to conserving the Earth's most biologically valuable ecoregions. *Conservation Biology* 12: 502–515.

Olson, D.M., Dinerstein, E., Wikramanayake, E.D., Burgess, N.D., Powell, G.V.N., Underwood, E.C., D'Amico, J.A., Strand, H.E., Morrison, J.C., Loucks, C.J., Allnutt, T.F., Lamoreux, J.F., Ricketts, T.H., Itoua, I., Wettengel, W.W., Kura, Y., Hedao, P. and Kassem, K. 2001. Terrestrial ecoregions of the world: a new map of life on Earth. *BioScience* 51: 933–938.

PABITRA. 2004. The Pacific Asia Biodiversity Transect Network. (http://www.botany.hawaii.edu/pabitra/)

Peteru, C. 1993. *Government of Western Samoa legislative review*. SPREP, Apia.

PIER. 2004. *Pacific Island Ecosystems at Risk (PIER).*(http://www.hear.org/pier/)

Raust, P. 2003. *French Polynesia Subregional Profile.* Unpub. report prepared for CI, Apia.

Roberts, C.M., McClean, C.J., Veron, J.E.N., Hawkins, J.P., Allen, G.R., McAllister, D.E., Mittermeier, C.G., Schueller, F.W., Spalding, M., Wells, F., Vynne, C. and Werner, T.B. 2002. Marine biodiversity hotspots and conservation priorities for tropical reefs. *Science* 295: 1280–1284.

Salinger, M.J., Renwick, J.A. and Mullan, A.B. 2001. Interdecadal Pacific Oscillation and South Pacific Climate. *International Journal of Climatology*, 21 (14), pp 1705-1722.

Scott, D.A. 1993. *A Directory of Wetlands in Oceania*. International Waterfowl and Wetlands Research Bureau, Asian Wetlands Bureau.

Sesega, S. 2003. *West Polynesia Ecosystem Profile*. Unpub. report prepared for CI, Apia.

Sherley, G and Lowe, S. 2000. Toward a regional invasive species strategy for the South Pacific: issues and options. In *Invasive Species in the Pacific: A Technical Review and Draft Regional Strategy*. Sherley, G. (Ed.). SPREP, Apia.

Smith, A. C. 1979 to 1995. *Flora Vitiensis Nova.* Volumes 1-5. Pacific Tropical Botanical Garden, Lawai, Kauai.

SOPAC 2001. *SOPAC Annual Report Summary 2000*. SOPAC, Suva.

SOPAC. 2003. Reducing Vulnerability of ACP States. (http://map.sopac.org/tiki/tiki-index.php?page=ProjectPresentation)

SPC. 2003a. Secretariat of the Pacific Community.Oceania Population Update 2003. (http://www.spc.int/demog/Demogen/English01-02/RecentStats/2003/03poster.xls)

SPC. 2003b. Secretariat of the Pacific Community. SPESS Tables. (http://www.spc.int/statsen/English/Publications/Spess14/Spess_table_menu_E.htm)

SPC. 2004. Secretariat of the Pacific Community. SPESS Tables. (http://www.spc.int/prism/publications/SPS_Final.pdf)

Space, J. Personal Communication, 2004, Honolulu.

SPREP 1992. *The Pacific Way. Pacific Island Developing Countries' Report to the United Nations Conference on Environment and Development.* SPREP, Noumea.

SPREP. 1998. *Action Strategy for Environmental Education and Training in the Pacific Region 1998-2003*. SPREP, Apia.

SPREP. 1999. *Action Strategy for Nature Conservation in the Pacific Islands Region. 1999-2002*. SPREP, Apia.

SPREP.2001. *South Pacific Regional Environment Program (SPREP) 2000 Annual Report.* SPREP, Apia.

SPREP. 2003a. *Action Strategy for Nature Conservation in the Pacific Islands Region 2003-2007 (eVersion).* SPREP, Apia.

SPREP. 2003b. *SPREP Annual Report 2002. Sustaining Pacific resources and development.* SPREP, Apia.

SPREP. 2003c. *Education and Awareness- Essential Ingredients for sustainable development.* Unpub. information paper prepared by Seema Deo. SPREP, Apia

Stattersfield, A.J., Crosby, M. J., Long, A.J. and Wege, D.C. 1998. *Endemic Bird Areas of the World: Priorities for Biodiversity Conservation*. BirdLife International, Cambridge.

Steadman, D.W. 1995. Prehistoric extinctions of Pacific island birds: biodiversity meets zooarchaeology. *Science* 267:1123-1131.

Stoddart, D.R. 1992. Biogeography of the Tropical Pacific. *Pacific Science* 46 (2): 276-293.

Timpson, S.L., Twining-Ward, T., Miles, G. and Ravuvu, A. 2003. *GEF Small Grants Program (SGP) Mission to the Pacific island region. 1-17 April, 2003.* Unpub. report prepared for UNDP, Apia.

TNC. 2003. *A Blueprint for Conserving the Biodiversity of the Federated States of Micronesia.* Micronesia Program Office, The Nature Conservancy, Pohnpei, FSM.

Twining- Ward, T. Personal Communication, 2003, Apia

UNDP. 1994. *Pacific Human Development Report: Putting People first*. UNDP, Suva.

UNDP. 2005. Human Development Report.

UNDP. 1999. *Pacific Human Development Report: Creating Opportunities.* UNDP, Suva.

UNDP. 2002. *National Biodiversity Strategy and Action Plan (NBSAP). Federated States of Micronesia*. UNDP, Suva.

UNEP 1999. *Pacific Islands Environment Outlook*. Miles, G. (compiler). SPREP, UNEP, and the European Community.

UNESCO. 2003a *Proceedings of the World Heritage Marine Biodiversity Workshop. Hanoi, Vietnam, Feb 25- Mar 5, 2002*. Hillary, A., Kokkonen, M., and Max, L. (Eds.). UNESCO, Paris.

UNESCO. 2003b.*Central Pacific World Heritage Project. International Workshop Report 2-6 June, 2003, Honolulu, Hawaii, USA*. UNESCO, Paris.

United States Census Bureau. 2003. (http://eire.census.gov/popest/estimates.php)

Van Balgooy, M.M.J. 1966-1993. *Pacific Plant Areas.* Volumes 2-5. Rijksherbarium/Hortus Botanicus, Leiden.

van Royen, P. and Davis, S.D. 1995. Regional Overview: Pacific Ocean islands. In: Davis, S.D., Heywood, V.H and Hamilton, A.C. (Eds.). *Centers of Plant Diversity. A Guide and Strategy for their Conservation.* Volume 2. Asia, Australasia and the Pacific. WWF and IUCN. IUCN Publications Unit, Cambridge (U.K.).

Veron, J.E.N. 1986. *Corals of Australia and the Indo-Pacific.* The University of Hawaii Press, Hawaii.

WCMC. 1992. *Global Biodiversity: status of the earth's living resources.* Groombridge, B (ed.). WCMC, Cambridge.

WCMC. 1994. *Biodiversity Data Sourcebook*. WCMC Biodiversity Series No.1. Groombridge, B. (Ed.). Jenkins, M. (Advisory Ed.). WCMC, Cambridge.

Whistler, A. 2002. *Samoan Rainforests. A guide to the vegetation of the Samoan Archipelago*. Isle Botanica, Hawaii.

Whistler, A. Personal Communication, 2003, Honolulu.

APPENDICES

Appendix 1. Species Outcomes in the Polynesia-Micronesia Hotspot

Species No	Scientific name	Common Name	IUCN Red List Category				DISTRIBUTION BY COUNTRY																					Priority for CEPF*
			CR*	Endangered	Vulnerable	Total	American Samoa	Cook islands	Easter Islands	FSM	Fiji islands	French Polynesia	Guam	Hawaii	Kiribati	Marshall islands	Nauru	Niue	N. Mariana islands	Palau	Pitcairn islands	Samoa	Tokelau	Tonga	Tuvalu	Wallis & Futuna	US Minor islands	
	Plants		**90**	**59**	**94**	**243**	**1**	**1**	**0**	**5**	**66**	**47**	**3**	**113**	**0**	**0**	**0**	**1**	**4**	**3**	**7**	**2**	**0**	**3**	**0**	**1**	**0**	**129**
1	*Abutilon sachetianum*				x							x																e
2	*Acacia koaia*				x									x														
3	*Acacia mathuataensis*		x								x																	e
4	*Acalypha lepinei*				x							x																e
5	*Acalypha raivavensis*		x									x																e
6	*Acmopyle sahniana*		x								x																	e
7	*Acsmithia vitiense*			x							x																	e
8	*Aglaia amplexicaulis*				x						x																	e
9	*Aglaia archiboldiana*				x						x																	e
10	*Aglaia basiphylla*				x						x																	e
11	*Aglaia evansensis*		x								x																	e
12	*Aglaia fragilis*				x						x																	e

Species No	Scientific name	Common Name	IUCN Red List Category				DISTRIBUTION BY COUNTRY																							Priority for CEPF*
			CR*	Endangered	Vulnerable	Total	Americian Samoa	Cook islands	Easter Islands	FSM	Fiji islands	French Polynesia	Guam	Hawaii	Kiribati	Marshall islands	Nauru	Niue	N. Mariana islands	Palau	Pitcairn islands	Samoa	Tokelau	Tonga	Tuvalu	Wallis & Futuna	US Minor islands	
13	*Aglaia gracilis*		x								x																			e
14	*Aglaia heterotricha*		x																					x						e
15	*Aglaia mariannensis*				x								x						x	x										e
16	*Aglaia parksii*				x						x																			e
17	*Aglaia saltatorum*				x						x							x						x		x				e
18	*Aglaia unifolia*		x								x																			e
19	*Alsmithia longipes*			x							x																			e
20	*Astronidium degeneri*				x						x																			e
21	*Astronidium floribundum*		x								x																			e
22	*Astronidium inflatum*		x								x																			e
23	*Astronidium kasiense*		x								x																			e
24	*Astronidium lepidotum*		x								x																			e
25	*Astronidium pallidiflorum*		x								x																			e
26	*Astronidium saulae*		x								x																			e
27	*Atuna elliptica*				x						x																			e
28	*Balaka macrocarpa*		x								x																			e

Species No	Scientific name	Common Name	IUCN Red List Category				DISTRIBUTION BY COUNTRY																							Priority for CEPF*
			CR*	Endangered	Vulnerable	Total	Americian Samoa	Cook islands	Easter Islands	FSM	Fiji islands	French Polynesia	Guam	Hawaii	Kiribati	Marshall islands	Nauru	Niue	N. Mariana islands	Palau	Pitcairn islands	Samoa	Tokelau	Tonga	Tuvalu	Wallis & Futuna	US Minor islands	
29	*Balaka microcarpa*			x							x																		e
30	*Bobea sandwicensis*				x									x															
31	*Bobea timonioides*				x									x															
32	*Caesalpinia kavaiensis*		x											x															
33	*Chamaesyce atoto*				x							x																	e
34	*Chamaesyce atrococca*				x									x															
35	*Chamaesyce herbstii*			x										x															
36	*Chamaesyce olowaluana*				x									x															
37	*Chamaesyce rockii*			x										x															
38	*Chamaesyce sachetiana*				x							x																	e
39	*Charpentiera densiflora*			x										x															
40	*Cheirodendron dominii*			x										x															
41	*Cheirodendron forbesii*				x									x															
42	*Clermontia drepanomorpha*			x										x															

Species No	Scientific name	Common Name	IUCN Red List Category				DISTRIBUTION BY COUNTRY																							Priority for CEPF*
			CR*	Endangered	Vulnerable	Total	American Samoa	Cook islands	Easter Islands	FSM	Fiji islands	French Polynesia	Guam	Hawaii	Kiribati	Marshall islands	Nauru	Niue	N. Mariana islands	Palau	Pitcairn islands	Samoa	Tokelau	Tonga	Tuvalu	Wallis & Futuna	US Minor islands		
43	*Clermontia hawaiiensis*				x									x															
44	*Clermontia lindseyana*			x										x															
45	*Clermontia peleana*		x											x															
46	*Clermontia pyrularia*		x											x															
47	*Clermontia tuberculata*			x										x															
48	*Clinostigma samoense*			x																		x							e
49	*Colubrina oppositifolia*			x										x															
50	*Cyanea aculeatiflora*				x									x															
51	*Cyanea hardyi*				x									x															
52	*Cyanea horrida*				x									x															
53	*Cyanea leptostegia*				x									x															
54	*Cyanea procera*		x											x															
55	*Cyanea stictophylla*		x											x															
56	*Cyanea tritomantha*				x									x															
57	*Cycas seemanii*				x						x													x					e

Species No	Scientific name	Common Name	IUCN Red List Category				DISTRIBUTION BY COUNTRY																						Priority for CEPF*
			CR*	Endangered	Vulnerable	Total	American Samoa	Cook islands	Easter Islands	FSM	Fiji islands	French Polynesia	Guam	Hawaii	Kiribati	Marshall islands	Nauru	Niue	N. Mariana islands	Palau	Pitcairn islands	Samoa	Tokelau	Tonga	Tuvalu	Wallis & Futuna	US Minor islands	
58	*Cynometra falcata*		x								x																		e
59	*Cyphosperma tanga*		x								x																		e
60	*Cyphosperma trichospadix*				x						x																		e
61	*Cyrtandra denhamii*				x						x																		e
62	*Cyrtandra giffardii*			x										x															
63	*Cyrtandra kandavuensis*				x						x																		e
64	*Cyrtandra natewaensis*				x						x																		e
65	*Cyrtandra spathacea*				x						x																		e
66	*Cyrtandra tavinunensis*				x						x																		e
67	*Cyrtandra tempestii*				x						x																		e
68	*Dacrydium nausoriense*			x							x																		e
69	*Degeneria vitiensis*				x						x																		e
70	*Dendroceros japonicus*				x					x																			e
71	*Drymophloeus samoensis*		x																			x							e
72	*Dubautia arborea*			x										x															

Species No	Scientific name	Common Name	IUCN Red List Category				DISTRIBUTION BY COUNTRY																						Priority for CEPF*
			CR*	Endangered	Vulnerable	Total	American Samoa	Cook islands	Easter Islands	FSM	Fiji islands	French Polynesia	Guam	Hawaii	Kiribati	Marshall islands	Nauru	Niue	N. Mariana islands	Palau	Pitcairn islands	Samoa	Tokelau	Tonga	Tuvalu	Wallis & Futuna	US Minor islands		
73	*Dubautia microcephala*			x										x															
74	*Dubautia reticulata*				x									x															
75	*Erythrina tahitensis*		x									x																	**Y**
76	*Eugenia koolauensis*			x										x															
77	*Euphorbia haeleeleana*			x										x															
78	*Eurya sandwicensis*				x									x															
79	*Exocarpos gaudichaudii*			x										x															
80	*Fitchia cordata*		x									x																	e
81	*Fitchia nutans*				x							x																	e
82	*Fitchia tahitensis*				x							x																	e
83	*Flueggea neowawraea*		x											x															
84	*Gardenia anapetes*		x								x																		e
85	*Gardenia brighamii*		x											x															
86	*Gardenia candida*		x								x																		e
87	*Gardenia grievei*			x							x																		e
88	*Gardenia hillii*				x						x																		e

Species No	Scientific name	Common Name	IUCN Red List Category				DISTRIBUTION BY COUNTRY																						Priority for CEPF*
			CR*	Endangered	Vulnerable	Total	American Samoa	Cook islands	Easter Islands	FSM	Fiji islands	French Polynesia	Guam	Hawaii	Kiribati	Marshall islands	Nauru	Niue	N. Mariana islands	Palau	Pitcairn islands	Samoa	Tokelau	Tonga	Tuvalu	Wallis & Futuna	US Minor islands	
89	*Gardenia mannii*		x											x														
90	*Gardenia remyi*				x									x														
91	*Gardenia vitiensis*		x								x																	e
92	*Geissois imthurnii*			x							x																	e
93	*Geissois stipularis*			x							x																	e
94	*Geissois superba*				x						x																	e
95	*Geniostoma clavigerum*		x								x																	e
96	*Geniostoma stipulare*			x							x																	e
97	*Glochidion comitum*			x																	x							**Y**
98	*Glochidion grantii*				x							x																**e**
99	*Glochidion manono*				x							x																e
100	*Glochidion nadeaudii*				x							x																e
101	*Glochidion papenooense*		x									x																**Y**
102	*Glochidion pitcairnense*				x																x							e
103	*Glochidion raivavense*			x								x																e
104	*Gulubia microcarpa*				x						x																	e

Species No	Scientific name	Common Name	IUCN Red List Category				DISTRIBUTION BY COUNTRY																							Priority for CEPF*
			CR*	Endangered	Vulnerable	Total	American Samoa	Cook islands	Easter Islands	FSM	Fiji islands	French Polynesia	Guam	Hawaii	Kiribati	Marshall islands	Nauru	Niue	N. Mariana islands	Palau	Pitcairn islands	Samoa	Tokelau	Tonga	Tuvalu	Wallis & Futuna	US Minor islands	
105	*Heritiera longipetiolata*				x					x			x						x										e
106	*Hernandia stokesii*				x							x									x								e
107	*Hernandia temarii*		x									x																	**Y**
108	*Hesperomannia arborescens*		x											x															
109	*Hesperomannia arbuscula*		x											x															
110	*Hesperomannia lydgatei*		x											x															
111	*Hibiscadelphus distans*		x											x															
112	*Hibiscadelphus giffardianus*		x											x															
113	*Hibiscadelphus hualalaiensis*		x											x															
114	*Hibiscadelphus woodii*		x											x															
115	*Hibiscus clayi*		x											x															
116	*Homalium taypau*				x																x								e
117	*Intsia bijuga*				x		x			x	x											x		x					e
118	*Kokia drynarioides*		x											x															
119	*Kokia kauaiensis*		x											x															
120	*Lebronnecia kokioides*			x								x																	**Y**

Species No	Scientific name	Common Name	IUCN Red List Category				DISTRIBUTION BY COUNTRY																							Priority for CEPF*
			CR*	Endangered	Vulnerable	Total	Americian Samoa	Cook islands	Easter Islands	FSM	Fiji islands	French Polynesia	Guam	Hawaii	Kiribati	Marshall islands	Nauru	Niue	N. Mariana islands	Palau	Pitcairn islands	Samoa	Tokelau	Tonga	Tuvalu	Wallis & Futuna	US Minor islands			
121	*Lepinia taitensis*		x									x																		**Y**
122	*Macaranga huahineensis*				x							x																		e
123	*Macaranga raivavaeensis*		x									x																		e
124	*Melicope balloui*			x										x																
125	*Melicope christophersenii*			x										x																
126	*Melicope cinerea*			x										x																
127	*Melicope fatuhivensis*		x									x																		e
128	*Melicope haupuensis*		x											x																
129	*Melicope hawaiensis*				x									x																
130	*Melicope kaalaensis*				x									x																
131	*Melicope knudsenii*		x											x																
132	*Melicope macropus*			x										x																
133	*Melicope makahae*			x										x																
134	*Melicope mucronulata*		x											x																
135	*Melicope orbicularis*			x										x																

Species No	Scientific name	Common Name	IUCN Red List Category				DISTRIBUTION BY COUNTRY																							Priority for CEPF*
			CR*	Endangered	Vulnerable	Total	American Samoa	Cook islands	Easter Islands	FSM	Fiji islands	French Polynesia	Guam	Hawaii	Kiribati	Marshall islands	Nauru	Niue	N. Mariana islands	Palau	Pitcairn islands	Samoa	Tokelau	Tonga	Tuvalu	Wallis & Futuna	US Minor islands	
136	*Melicope ovalis*			x										x															
137	*Melicope pallida*			x										x															
138	*Melicope puberula*			x										x															
139	*Melicope quadrangularis*		x											x															
140	*Melicope saint-johnii*			x										x															
141	*Melicope sandwicensis*			x										x															
142	*Melicope waialealae*			x										x															
143	*Melicope wawraeana*				x									x															
144	*Melicope zahlbruckneri*		x											x															
145	*Meryta brachypoda*		x									x									x								e
146	*Meryta choristantha*				x							x																		e
147	*Meryta lucida*				x							x																		e
148	*Meryta salicifolia*		x									x																		e
149	*Metrosideros ochrantha*				x						x																			e
150	*Metroxylon amicarum*	Caroline island ivory nut palm			x					x																				e
151	*Munroidendron*		x											x															

Species No	Scientific name	Common Name	IUCN Red List Category				DISTRIBUTION BY COUNTRY																						Priority for CEPF*
			CR*	Endangered	Vulnerable	Total	Americian Samoa	Cook islands	Easter Islands	FSM	Fiji islands	French Polynesia	Guam	Hawaii	Kiribati	Marshall islands	Nauru	Niue	N. Mariana islands	Palau	Pitcairn islands	Samoa	Tokelau	Tonga	Tuvalu	Wallis & Futuna	US Minor islands	
	racemosum																												
152	*Myoporum stokesii*		x									x																e
153	*Myrsine andersonii*		x									x																e
154	*Myrsine brownii*		x									x																e
155	*Myrsine degeneri*				x									x														
156	*Myrsine fosbergii*				x									x														
157	*Myrsine hartii*		x									x																**Y**
158	*Myrsine hosakae*				x																x							e
159	*Myrsine knudsenii*			x										x														
160	*Myrsine longifolia*		x									x																**Y**
161	*Myrsine mezii*		x											x														
162	*Myrsine petiolata*			x										x														
163	*Myrsine ronuiensis*		x									x																**Y**
164	*Neoveitchia storckii*			x							x																	e
165	*Neraudia melastomifolia*				x									x														
166	*Neraudia ovata*		x											x														
167	*Nesoluma polynesicum*				x			x				x		x														e
168	*Nesoluma st.-*				x																x							e

Species No	Scientific name	Common Name	IUCN Red List Category				DISTRIBUTION BY COUNTRY																						Priority for CEPF*
			CR*	Endangered	Vulnerable	Total	American Samoa	Cook islands	Easter Islands	FSM	Fiji islands	French Polynesia	Guam	Hawaii	Kiribati	Marshall islands	Nauru	Niue	N. Mariana islands	Palau	Pitcairn islands	Samoa	Tokelau	Tonga	Tuvalu	Wallis & Futuna	US Minor islands	
	johnianum																												
169	*Neuburgia macroloba*			x							x																		e
170	*Nothocestrum breviflorum*		x											x															
171	*Nothocestrum latifolium*			x										x															
172	*Nothocestrum peltatum*		x											x															
173	*Osmoxylon mariannense*		x																x										
174	*Pandanus joskei*				x						x																		e
175	*Pandanus taveuniensis*				x						x																		e
176	*Parkia korom*				x					x																			e
177	*Parkia parrii*		x								x																		e
178	*Parkia parvifoliola*				x															x									e
179	*Pelagodoxa henryana*		x									x																	e
180	*Pericopsis mooniana*				x					x										x									e
181	*Pipturus schaeferi*				x							x																	e
182	*Pisonia graciliscens*		x									x																	**Y**
183	*Pisonia wagneriana*			x										x															

Species No	Scientific name	Common Name	IUCN Red List Category				DISTRIBUTION BY COUNTRY																						Priority for CEPF*
			CR*	Endangered	Vulnerable	Total	American Samoa	Cook islands	Easter Islands	FSM	Fiji islands	French Polynesia	Guam	Hawaii	Kiribati	Marshall islands	Nauru	Niue	N. Mariana islands	Palau	Pitcairn islands	Samoa	Tokelau	Tonga	Tuvalu	Wallis & Futuna	US Minor islands		
184	*Pittosporum napaliense*			x										x															
185	*Pittosporum orohenense*				x							x																	e
186	*Pittosporum raivavaeense*		x									x																	e
187	*Pittosporum terminalioides*				x									x															
188	*Platydesma remyi*			x										x															
189	*Pleomele auwahiensis*				x									x															
190	*Pleomele fernaldii*			x										x															
191	*Pleomele forbesii*			x										x															
192	*Pleomele halapepe*				x									x															
193	*Pleomele hawaiiensis*			x										x															
194	*Podocarpus affinis*				x						x																		e
195	*Polyscias tahitensis*		x									x																	**Y**
196	*Pritchardia affinis*		x											x															
197	*Pritchardia aylmer-robinsonii*		x											x															
198	*Pritchardia forbesiana*				x									x															
199	*Pritchardia*				x									x															

Species No	Scientific name	Common Name	IUCN Red List Category				DISTRIBUTION BY COUNTRY																							Priority for CEPF*
			CR*	Endangered	Vulnerable	Total	American Samoa	Cook islands	Easter Islands	FSM	Fiji islands	French Polynesia	Guam	Hawaii	Kiribati	Marshall islands	Nauru	Niue	N. Mariana islands	Palau	Pitcairn islands	Samoa	Tokelau	Tonga	Tuvalu	Wallis & Futuna	US Minor islands		
	glabrata																													
200	*Pritchardia hardyi*		x											x															
201	*Pritchardia kaalae*		x											x															
202	*Pritchardia lanaiensis*				x									x															
203	*Pritchardia lanigera*				x									x															
204	*Pritchardia limahuliensis*		x											x															
205	*Pritchardia lowreyana*				x									x															
206	*Pritchardia munroi*		x											x															
207	*Pritchardia perlmanii*			x										x															
208	*Pritchardia remota*			x										x															
209	*Pritchardia schattaueri*		x											x															
210	*Pritchardia viscosa*		x											x															
211	*Pritchardia waialealeana*				x									x															
212	*Psychotria grandiflora*			x										x															
213	*Psychotria grantii*		x									x																	**Y**
214	*Psychotria greenwelliae*				x									x															

Species No	Scientific name	Common Name	IUCN Red List Category				DISTRIBUTION BY COUNTRY																						Priority for CEPF*
			CR*	Endangered	Vulnerable	Total	Americian Samoa	Cook islands	Easter Islands	FSM	Fiji islands	French Polynesia	Guam	Hawaii	Kiribati	Marshall islands	Nauru	Niue	N. Mariana islands	Palau	Pitcairn islands	Samoa	Tokelau	Tonga	Tuvalu	Wallis & Futuna	US Minor islands		
215	*Psychotria hobdyi*			x										x															
216	*Psychotria lepiniana*				x							x																	e
217	*Psychotria speciosa*		x									x																	**Y**
218	*Psychotria tahitensis*		x									x																	**Y**
219	*Psychotria trichocalyx*		x									x																	**Y**
220	*Rauvolfia sachetiae*		x									x																	**Y**
221	*Santalum haleakalae*				x									x															
222	*Sapindus oahuensis*				x									x															
223	*Schefflera costata*				x						x																		e
224	*Serianthes nelsonii*		x										x						x										
225	*Serianthes rurutensis*		x									x																	e
226	*Serianthes vitiensis*				x						x																		e
227	*Sophora mangarevaensis*			x								x																	e
228	*Sophora raivavaeensis*			x								x																	e
229	*Spiraeanthemum*			x							x																		e

Species No	Scientific name	Common Name	IUCN Red List Category				DISTRIBUTION BY COUNTRY																							Priority for CEPF*
			CR*	Endangered	Vulnerable	Total	Americian Samoa	Cook islands	Easter Islands	FSM	Fiji islands	French Polynesia	Guam	Hawaii	Kiribati	Marshall islands	Nauru	Niue	N. Mariana islands	Palau	Pitcairn islands	Samoa	Tokelau	Tonga	Tuvalu	Wallis & Futuna	US Minor islands	
	graeffei																													
230	*Spiraeanthemum serratum*			x							x																		e
231	*Storckiella vitiensis*				x						x																		e
232	*Syzygium amplifolium*				x						x																		e
233	*Syzygium minus*			x							x																		e
234	*Syzygium phaeophyllum*		x								x																		e
235	*Syzygium wolfii*				x						x																		e
236	*Tetraplasandra gymnocarpa*		x											x															
237	*Urera kaalae*		x											x															
238	*Veitchia pedionoma*				x						x																		e
239	*Veitchia simulans*				x						x																		e
240	*Weinmannia exigua*		x								x																		e
241	*Weinmannia vitiensis*				x						x																		e
242	*Wikstroemia bicornuta*			x										x															
243	*Xylosma crenatum*		x											x															
	Molluscs		**68**	**31**	**7**	**106**	**5**	**0**	**0**	**3**	**0**	**29**	**5**	**54**	**0**	**0**	**0**	**0**	**2**	**3**	**5**	**2**	**0**	**0**	**0**	**0**	**0**	**42**

Species No	Scientific name	Common Name	IUCN Red List Category				DISTRIBUTION BY COUNTRY																							Priority for CEPF*
			CR*	Endangered	Vulnerable	Total	Americian Samoa	Cook islands	Easter Islands	FSM	Fiji islands	French Polynesia	Guam	Hawaii	Kiribati	Marshall islands	Nauru	Niue	N. Mariana islands	Palau	Pitcairn islands	Samoa	Tokelau	Tonga	Tuvalu	Wallis & Futuna	US Minor islands		
244	*Achatinella apexfulva*		x											x															
245	*Achatinella bellula*		x											x															
246	*Achatinella bulimoides*		x											x															
247	*Achatinella byronii*		x											x															
248	*Achatinella cestus*		x											x															
249	*Achatinella concavospira*		x											x															
250	*Achatinella curta*		x											x															
251	*Achatinella decipiens*		x											x															
252	*Achatinella fulgens*		x											x															
253	*Achatinella fuscobasis*		x											x															
254	*Achatinella leucorrhaphe*		x											x															
255	*Achatinella lila*		x											x															
256	*Achatinella lorata*		x											x															
257	*Achatinella mustelina*		x											x															
258	*Achatinella phaeozona*		x											x															
259	*Achatinella pulcherrima*		x											x															

Species No	Scientific name	Common Name	IUCN Red List Category				DISTRIBUTION BY COUNTRY																							Priority for CEPF*
			CR*	Endangered	Vulnerable	Total	Americian Samoa	Cook islands	Easter Islands	FSM	Fiji islands	French Polynesia	Guam	Hawaii	Kiribati	Marshall islands	Nauru	Niue	N. Mariana islands	Palau	Pitcairn islands	Samoa	Tokelau	Tonga	Tuvalu	Wallis & Futuna	US Minor islands		
260	*Achatinella pupukanioe*		x											x															
261	*Achatinella sowerbyana*		x											x															
262	*Achatinella stewartii*		x											x															
263	*Achatinella swiftii*		x											x															
264	*Achatinella taeniolata*		x											x															
265	*Achatinella turgida*		x											x															
266	*Achatinella viridans*		x											x															
267	*Achatinella vulpina*		x											x															
268	*Amastra cylindrica*		x											x															
269	*Amastra micans*		x											x															
270	*Amastra rubens*		x											x															
271	*Amastra spirizona*		x											x															
272	*Armsia petasus*		x											x															
273	*Cookeconcha contorta*		x											x															
274	*Diastole tenuistriata*				x																x								e
275	*Endodonta apiculata*		x											x															

Species No	Scientific name	Common Name	IUCN Red List Category				DISTRIBUTION BY COUNTRY																						Priority for CEPF*
			CR*	Endangered	Vulnerable	Total	Americian Samoa	Cook islands	Easter Islands	FSM	Fiji islands	French Polynesia	Guam	Hawaii	Kiribati	Marshall islands	Nauru	Niue	N. Mariana islands	Palau	Pitcairn islands	Samoa	Tokelau	Tonga	Tuvalu	Wallis & Futuna	US Minor islands		
276	*Eua zebrina*			x			x																						
277	*Gulickia alexandri*		x											x															
278	*Kondoconcha othnius*		x									x																	e
279	*Laminella sanguinea*		x											x															
280	*Leptachatina lepida*			x										x															
281	*Mautodontha boraborensis*		x									x																	e
282	*Mautodontha ceuthma*		x									x																	**Y**
283	*Newcombia canaliculata*			x										x															
284	*Newcombia cumingi*			x										x															
285	*Newcombia lirata*	Newcomb's tree snail		x										x															
286	*Newcombia perkinsi*			x										x															
287	*Newcombia pfeifferi*			x										x															
288	*Newcombia sulcata*			x										x															
289	*Opanara altiapica*		x									x																	e
290	*Opanara areaensis*		x									x																	e

Species No	Scientific name	Common Name	IUCN Red List Category				DISTRIBUTION BY COUNTRY																							Priority for CEPF*
			CR*	Endangered	Vulnerable	Total	American Samoa	Cook islands	Easter Islands	FSM	Fiji islands	French Polynesia	Guam	Hawaii	Kiribati	Marshall islands	Nauru	Niue	N. Mariana islands	Palau	Pitcairn islands	Samoa	Tokelau	Tonga	Tuvalu	Wallis & Futuna	US Minor islands	
291	*Opanara bitridentata*		x									x																	e
292	*Opanara caliculata*		x									x																	e
293	*Opanara depasoapicata*		x									x																	e
294	*Opanara duplicidentata*		x									x																	e
295	*Opanara fosbergi*		x									x																	e
296	*Opanara megomphala*		x									x																	e
297	*Opanara perahuensis*		x									x																	e
298	*Orangia cookei*			x								x																	e
299	*Orangia maituatensis*		x									x																	e
300	*Orangia sporadica*			x								x																	e
301	*Partula calypso*	large Palau tree snail	x																	x									**Y**
302	*Partula clara*	Tahiti tree snail	x									x																	**Y**
303	*Partula emersoni*	Pohnpei tree snail	x							x																			**Y**
304	*Partula filosa*		x									x																	**Y**
305	*Partula gibba*	Humped tree snail	x										x						x										

Species No	Scientific name	Common Name	IUCN Red List Category				DISTRIBUTION BY COUNTRY																							Priority for CEPF*
			CR*	Endangered	Vulnerable	Total	American Samoa	Cook islands	Easter Islands	FSM	Fiji islands	French Polynesia	Guam	Hawaii	Kiribati	Marshall islands	Nauru	Niue	N. Mariana islands	Palau	Pitcairn islands	Samoa	Tokelau	Tonga	Tuvalu	Wallis & Futuna	US Minor islands	
306	*Partula guamensis*		x							x																			**Y**
307	*Partula hyalina*		x									x																	**Y**
308	*Partula langfordi*	Langford's tree snail	x																x										
309	*Partula leucothoe*		x																	x									**Y**
310	*Partula martensiana*		x							x																			**e**
311	*Partula otaheitana*		x									x																	**e**
312	*Partula radiolata*	Guam tree snail	x										x																
313	*Partula rosea*		x									x																	**Y**
314	*Partula thetis*		x																	x									**Y**
315	*Partula varia*		x									x																	**Y**
316	*Partulina confusa*		x											x															
317	*Partulina dubia*	Waianae tree snail	x											x															
318	*Partulina mighelsiana*			x										x															
319	*Partulina perdix*			x										x															
320	*Partulina physa*			x										x															
321	*Partulina proxima*			x										x															
322	*Partulina redfieldi*			x										x															
323	*Partulina*			x										x															

Species No	Scientific name	Common Name	IUCN Red List Category				DISTRIBUTION BY COUNTRY																						Priority for CEPF*
			CR*	Endangered	Vulnerable	Total	Americian Samoa	Cook islands	Easter Islands	FSM	Fiji islands	French Polynesia	Guam	Hawaii	Kiribati	Marshall islands	Nauru	Niue	N. Mariana islands	Palau	Pitcairn islands	Samoa	Tokelau	Tonga	Tuvalu	Wallis & Futuna	US Minor islands		
	semicarinata																												
324	*Partulina splendida*			x										x															
325	*Partulina tappaniana*			x										x															
326	*Partulina tessellata*			x										x															
327	*Partulina variabilis*			x										x															
328	*Perdicella helena*			x										x															
329	*Philonesia filiceti*				x																x								e
330	*Philonesia pitcairnensis*				x																x								e
331	*Rhysoconcha atanuiensis*				x							x																	e
332	*Rhysoconcha variumbilicata*		x									x																	e
333	*Ruatara koarana*		x									x																	e
334	*Ruatara oparica*				x							x																	e
335	*Samoana abbreviata*		x				x																						
336	*Samoana annectens*			x								x																	**Y**
337	*Samoana attenuata*			x								x																	**Y**
338	*Samoana conica*			x			x																						

Species No	Scientific name	Common Name	IUCN Red List Category				DISTRIBUTION BY COUNTRY																								Priority for CEPF*
			CR*	Endangered	Vulnerable	Total	American Samoa	Cook islands	Easter Islands	FSM	Fiji islands	French Polynesia	Guam	Hawaii	Kiribati	Marshall islands	Nauru	Niue	N. Mariana islands	Palau	Pitcairn islands	Samoa	Tokelau	Tonga	Tuvalu	Wallis & Futuna	US Minor islands				
339	*Samoana diaphana*			x								x																			**Y**
340	*Samoana fragilis*	fragile tree snail	x										x																		
341	*Samoana solitaria*			x								x																			Y
342	*Samoana thurstoni*			x			x																								
343	*Sinployea pitcairnensis*				x																x										e
344	*Succinea piratarum*			x									x																		
345	*Succinea quadrasi*			x									x																		
346	*Thaumatodon hystricelloides*			x																		x									**Y**
347	*Trochomorpha apia*			x			x															x									e
348	*Tropidoptera heliciformis*		x											x																	
349	*Tubuaia fosbergi*				x																x										e
	Birds		**21**	**25**	**50**	**96**	**4**	**7**	**2**	**5**	**13**	**24**	**5**	**30**	**4**	**1**	**2**	**1**	**8**	**2**	**7**	**8**	**1**	**3**	**1**	**1**	**1**	**58**			
350	*Acrocephalus caffer*	Tahiti reed warbler			x							x																			e
351	*Acrocephalus familiaris*	millerbird	x											x																	
352	*Acrocephalus luscinia*	Nightingale reed warbler		x															x												

Species No	Scientific name	Common Name	IUCN Red List Category				DISTRIBUTION BY COUNTRY																							Priority for CEPF*
			CR*	Endangered	Vulnerable	Total	American Samoa	Cook islands	Easter Islands	FSM	Fiji islands	French Polynesia	Guam	Hawaii	Kiribati	Marshall islands	Nauru	Niue	N. Mariana islands	Palau	Pitcairn islands	Samoa	Tokelau	Tonga	Tuvalu	Wallis & Futuna	US Minor islands	
353	*Acrocephalus rehsei*	Nauru reed warbler			x												x											
354	*Acrocephalus rimatarae*	Rimatara reed warbler			x							x																e
355	*Acrocephalus taiti*	Henderson reed warbler			x																x							e
356	*Acrocephalus vaughani*	Pitcairn reed warbler			x																x							e
357	*Anas laysanensis*	Laysan teal			x									x														
358	*Anas wyvilliana*	Hawaiian duck		x										x														
359	*Aplonis cinerascens*	Rarotonga starling			x			x																				e
360	*Aplonis pelzelni*	Pohnpei mountain starling	x							x																		**Y**
361	*Branta sandvicensis*	Hawaiian goose			x									x														
362	*Charmosyna amabilis*	red-throated lorikeet		x							x																	**Y**
363	*Chasiempis sandwichensis*	elepaio			x									x														
364	*Cleptornis marchei*	golden white-eye			x														x									
365	*Clytorhynchus nigrogularis*	black-throated shrikebill			x						x																	e
366	*Collocalia bartschi*	Mariana swiftlet		x									x						x									

Species No	Scientific name	Common Name	IUCN Red List Category				DISTRIBUTION BY COUNTRY																						Priority for CEPF*
			CR*	Endangered	Vulnerable	Total	American Samoa	Cook islands	Easter Islands	FSM	Fiji islands	French Polynesia	Guam	Hawaii	Kiribati	Marshall islands	Nauru	Niue	N. Mariana islands	Palau	Pitcairn islands	Samoa	Tokelau	Tonga	Tuvalu	Wallis & Futuna	US Minor islands		
367	*Collocalia leucophaeus*	Tahiti swiftlet			x							x																	e
368	*Collocalia sawtelli*	Atiu swiftlet			x			x																					e
369	*Corvus hawaiiensis*	Hawaiian crow	x											x															
370	*Corvus kubaryi*	Mariana crow		x									x						x										
371	*Didunculus strigirostris*	tooth-billed pigeon		x																		x							**Y**
372	*Ducula aurorae*	Polynesian pigeon		x								x																	**Y**
373	*Ducula galeata*	Marquesas pigeon	x									x																	**Y**
374	*Erythrura kleinschmidti*	pink-billed parrotfinch		x							x																		e
375	*Fulica alai*	Hawaiian coot			x									x															
376	*Gallicolumba erythroptera*	Polynesian ground dove	x									x																	**Y**
377	*Gallicolumba kubaryi*	Caroline Is Ground Dove			x					x																			e
378	*Gallicolumba rubescens*	Marquesas ground dove		x								x																	**Y**
379	*Gallicolumba stairi*	shy ground dove			x		x				x											x		x		x			e
380	*Gallinula pacifica*	Samoan woodhen	x																			x							**Y**
381	*Gorsachius goisagi*	Japanese night-heron		x																x									e

Species No	Scientific name	Common Name	IUCN Red List Category				DISTRIBUTION BY COUNTRY																							Priority for CEPF*
			CR*	Endangered	Vulnerable	Total	American Samoa	Cook islands	Easter Islands	FSM	Fiji islands	French Polynesia	Guam	Hawaii	Kiribati	Marshall islands	Nauru	Niue	N. Mariana islands	Palau	Pitcairn islands	Samoa	Tokelau	Tonga	Tuvalu	Wallis & Futuna	US Minor islands	
382	*Gymnomyza samoensis*	Mao honeyeater		x			x															x							**Y**
383	*Gymnomyza viridis*	giant forest honeyeater			x						x																		e
384	*Hemignathus flavus*	Oahu amakihi			x									x															
385	*Hemignathus kauaiensis*	Kauai amakihi			x									x															
386	*Hemignathus lucidus*	Nukupuu	x											x															
387	*Hemignathus munroi*	akiapolaau		x										x															
388	*Hemignathus parvus*	lesser amakihi			x									x															
389	*Lamprolia victoriae*	Silktail			x						x																		e
390	*Loxioides bailleui*	Palila		x										x															
391	*Loxops caeruleirostris*	Akekee		x										x															
392	*Loxops coccineus*	Akepa		x										x															
393	*Mayrornis versicolor*	versicolor Flycatcher			x						x																		e
394	*Megapodius laperouse*	Micronesian megapode		x															x	x									**Y**
395	*Megapodius pritchardii*	Niuafo'ou megapode	x																					x					**Y**
396	*Melamprosops*	black-faced	x											x															

Species No	Scientific name	Common Name	IUCN Red List Category				DISTRIBUTION BY COUNTRY																						Priority for CEPF*
			CR*	Endangered	Vulnerable	Total	American Samoa	Cook islands	Easter Islands	FSM	Fiji islands	French Polynesia	Guam	Hawaii	Kiribati	Marshall islands	Nauru	Niue	N. Mariana islands	Palau	Pitcairn islands	Samoa	Tokelau	Tonga	Tuvalu	Wallis & Futuna	US Minor islands		
	phaeosoma	honeycreeper																											
397	*Metabolus rugensis*	Truk monarch		x						x																			**Y**
398	*Monarcha takatsukasae*	Tinian monarch			x														x										
399	*Myadestes lanaiensis*	Molokai thrush	x											x															
400	*Myadestes myadestinus*	large Kauai thrush	x											x															
401	*Myadestes obscurus*	Hawaiian thrush			x									x															
402	*Myadestes palmeri*	small Kauai thrush	x											x															
403	*Myiagra albiventris*	Samoan broadbill			x																	x							e
404	*Myzomela chermesina*	Rotuma honeyeater			x						x																		e
405	*Nesofregetta fuliginosa*	Polynesian storm-petrel			x		x		x		x	x			x							x							e
406	*Numenius tahitiensis*	bristle-thighed curlew			x		x	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x		x		e
407	*Oreomystis bairdi*	Kauai creeper	x											x															
408	*Oreomystis mana*	Hawaii creeper		x										x															
409	*Palmeria dolei*	crested honeycr eeper			x									x															

Species No	Scientific name	Common Name	IUCN Red List Category				DISTRIBUTION BY COUNTRY																							Priority for CEPF*
			CR*	Endangered	Vulnerable	Total	American Samoa	Cook islands	Easter Islands	FSM	Fiji islands	French Polynesia	Guam	Hawaii	Kiribati	Marshall islands	Nauru	Niue	N. Mariana islands	Palau	Pitcairn islands	Samoa	Tokelau	Tonga	Tuvalu	Wallis & Futuna	US Minor islands		
410	*Paroreomyza maculate*	Oahu creeper	x											x															
411	*Paroreomyza Montana*	Maui creeper			x									x															
412	*Phoebastria nigripes*	black-footed albatross			x									x		x													e
413	*Pomarea dimidiate*	Rarotonga flycatcher		x				x																					**Y**
414	*Pomarea iphis*	Iphis monarch			x							x																	e
415	*Pomarea mendozae*	Marquesas flycatcher		x								x																	**Y**
416	*Pomarea nigra*	Tahiti flycatcher	x									x																	**Y**
417	*Pomarea whitneyi*	Fatuhiva flycatcher	x									x																	**Y**
418	*Porzana atra*	Henderson Island crake			x																x								e
419	*Prosobonia cancellata*	Tuamotu sandpiper		x								x			x														**Y**
420	*Prosopeia personata*	masked shining-parrot			x						x																		e
421	*Prosopeia splendens*	Kadavu shining parrot			x						x																		e
422	*Pseudobulweria macgillivrayi*	Fiji petrel	x								x																		**Y**
423	*Pseudonestor xanthophrys*	Maui parrotbill			x									x															

Species No	Scientific name	Common Name	IUCN Red List Category				DISTRIBUTION BY COUNTRY																							Priority for CEPF*
			CR*	Endangered	Vulnerable	Total	American Samoa	Cook islands	Easter Islands	FSM	Fiji islands	French Polynesia	Guam	Hawaii	Kiribati	Marshall islands	Nauru	Niue	N. Mariana islands	Palau	Pitcairn islands	Samoa	Tokelau	Tonga	Tuvalu	Wallis & Futuna	US Minor islands	
424	*Psittirostra psittacea*	Ou	x											x															
425	*Pterodroma alba*	Phoenix Petrel			x							x																	e
426	*Pterodroma atrata*	Henderson petrel		x								x									x								**Y**
427	*Pterodroma leucoptera*	Gould's petrel			x							x																	e
428	*Pterodroma sandwichensis*	Hawaiian petrel			x																								
429	*Ptilinopus chalcurus*	Makatea fruit-dove			x							x																	e
430	*Ptilinopus huttoni*	Rapa fruit-dove			x							x																	e
431	*Ptilinopus insularis*	Henderson Is fruit-dove			x																x								e
432	*Ptilinopus rarotongensis*	Cook Islands fruit-dove			x			x																					e
433	*Puffinus newelli*	Hawaiian shearwater			x																								
434	*Rukia ruki*	Faichuk white-eye	x							x																			**Y**
435	*Telespiza cantans*	Laysan finch			x									x															
436	*Telespiza ultima*	Nihoa finch	x											x															
437	*Todiramphus gambieri*	Tuamotu kingfisher			x							x																	e

438	*Todiramphus godeffroyi*	Marquesas kingfisher		x								x																	**Y**
439	*Todiramphus ruficollaris*	Mangaia kingfisher			x			x																					e
440	*Vini kuhlii*	Kuhl's lorikeet		x								x			x														**Y**
441	*Vini peruviana*	Blue lorikeet			x			x				x																	e
442	*Vini stepheni*	Henderson Island lory			x																x								e
443	*Vini ultramarina*	Ultramarine lorikeet		x								x																	**Y**
444	*Zosterops rotensis*	Rota bridled white-eye	x																x										
445	*Zosterops samoensis*	Savaii white-eye			x																	x							e
	Arthropods		**0**	**2**	**13**	**15**	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
446	*Adelocosa anops*	Kauai cave wolf spider		x										x															
447	*Banza nihoa*													x															
448	*Caconemobius howarthi*													x															
449	*Caconemobius schauinslandi*													x															
450	*Caconemobius varius*													x															
451	*Enconocephalus remotus*													x															
452	*Megalagrion adytum*				x									x															
453	*Megalagrion leptodemas*			x										x															
454	*Megalagrion nigrolineatum*				x									x															
455	*Megalagrion oahuense*				x									x															
456	*Megalagrion oceanicum*				x									x															

457	*Megalagrion pacificum*				x									x															
458	*Megalagrion xanthomelas*				x									x															
459	*Thaumatogryllus cavicola*				x									x															
460	*Thaumatogryllus variegatus*				x									x															
	Mammals		**4**	**3**	**2**	**9**	**2**	**0**	**0**	**5**	**4**	**0**	**2**	**1**	**0**	**0**	**0**	**0**	**1**	**2**	**0**	**2**	**0**	**1**	**0**	**0**	**0**	**8**
461	*Emballonura semicaudata*	Polynesian sheathtail-bat		x			x			x	x									x		x		x				**Y**
462	*Monachus schauinslandi*	Hawaiian monk seal		x										x														
463	*Notopteris macdonaldi*	long-tailed fruit bat			x						x																	e
464	*Pteralopex acrodonta*	Fijian monkey-faced bat	x								x																	e
465	*Pteropus insularis*	Chuuk flying-fox	x							x																		**Y**
466	*Pteropus mariannus*	Marianas flying-fox		X						x			x						x	x								**Y**
467	*Pteropus molossinus*	Caroline flying-fox	x							x																		**Y**
468	*Pteropus phaeocephalus*	Mortlock flying-fox	x							x																		**Y**
469	*Pteropus samoensis*	Samoan flying-fox			x		x				x											x						e
	Reptiles		**3**	**2**	**1**	**6**	**2**	**2**	**0**	**2**	**6**	**2**	**2**	**1**	**2**	**2**	**0**	**1**	**2**	**2**	**0**	**2**	**2**	**3**	**2**	**0**	**2**	**6**
470	*Brachylophus fasciatus*	banded iguana		X							x													x				**Y**
471	*Brachylophus vitiensis*	crested iguana									x																	**Y**
472	*Ogmodon vitianus*	Fijian snake			x						x																	e
473	*Chelonia mydas*	green turtle		X			x	x		x	x	x	x	x	x	x		x	x	x		x	x	x	x		x	**Y**

474	*Dermochelys coriacea*	leatherback turtle									x									x								e
475	*Eretmochelys imbricata*	hawksbill turtle					x	x		x	x	x	xx		x	x			x	x		x	x	x	x		x	**Y**
	Amphibians			**1**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**
476	*Platymantis vitiana*	Fijian ground frog		X							x																	**Y**
TOTALS			**186**	**123**	**167**	**476**	**14**	**10**	**2**	**20**	**90**	**102**	**17**	**214**	**6**	**3**	**2**	**3**	**17**	**12**	**19**	**16**	**3**	**10**	**3**	**2**	**3**	**244**

* CR= Critically Endangered; Y = Priority species for CEPF investment; e = Species is in a CEPF eligible country but was not selected as the highest priority for CEPF investment.

Appendix 2. Provisional List of Species Believed Threatened in the Polynesia-Micronesia Hotspot

Scientific Name	Common name or taxonomic group	Distribution by country																			
		American Samoa	Cook islands	Easter Islands	FSM	Fiji islands	French Polynesia	Guam	Kiribati	Marshall islands	Nauru	Niue	N. Mariana islands	Palau	Pitcairn islands	Samoa	Tokelau	Tonga	Tuvalu	Wallis & Futuna	US Minor islands
Abutilon mangarevicum	plant						x														
Achyranthes mangarevica	plant						x														
Achyranthes marchionica	plant						x														
Acochlidium fifiensi	freshwater "nudibranch"					x															
Acrophorus leucorhachis	Aspidaceae		x																		
Agathis macrophylla	gymnosperm					x															
Aglaia palauensis	plant													x							
Anas supercellatus	bird				x																
Antecaridina lauensis	anchialine shrimp									x											
Apetahia longistigmata	plant						x														
Apetahia seigelii	plant						x														
Apostates rapae (syn. Olearia rapae)	plant						x														
Artamus leucorhynchus	bird													x							
Asio flammeus ponapensis	owl				x																
Aspastus spp.	land snails					x															
Astronidium ponapensis	plant				x																
Avicennia alba	mangrove plant													x							
Balaka "robusta"	palm					x															
Balaka streptostachys	Palm					x															
Balanophora wilderi	Rarotonga balanophora (herb)		x																		
Bidens aoraiensis	plant						x														
Bidens orofenensis	plant						x														
Birgus latro	coconut crab	x	x		x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x
Calamus vitiensis	palm					x															
Calanthe tahitensis var. marquesensis	plant						x														

Scientific Name	Common name or taxonomic group	Distribution by country																			
		American Samoa	Cook islands	Easter Islands	FSM	Fiji islands	French Polynesia	Guam	Kiribati	Marshall islands	Nauru	Niue	N. Mariana islands	Palau	Pitcairn islands	Samoa	Tokelau	Tonga	Tuvalu	Wallis & Futuna	US Minor islands
Calanthe tahitensis var. tahitensis	plant						x														
Caprimulgus indicus	bird													x							
Ceriops tagal	plant													x							
Cettia annae	bird													x							
Chaerephon bregullae	free-tailed bat					x															
Charpentiera australis	Amaranthaceae		x																		
Cinnamomum carolinse	plant																				
Cinnamomum pedatinervium	plant													x							
Collocalia inquieta	bird				x																
Colluricincla tenebrosa	bird													x							
Coprosma velutina	plant						x														
Coracina tenuroctris	bird				x																
Corybas minutus	plant						x														
Crinum bakeri	Marshall Islands false spider lily									x											
Crocodilus porosus	crocodile													x							
Crytandra rarotongensis	Gesneriaceae		x																		
Cyphosperma "naboutini"	palm					x															
Cyrtandra biflora	plant						x														
Cyrtandra connata	plant						x														
Cyrtandra jonesii	plant						x														
Cyrtandra lillianae	Gesneriaceae		x																		
Cyrtandra toviana	plant						x														
Dicliptera clavata	plant						x														
Dicliptera forsteriana	plant						x														
Ducula oceanica	Micronesia pigeon				x					x				x							
Ducula teraokai	pigeon				x																

Scientific Name	Common name or taxonomic group	Distribution by country																				
		American Samoa	Cook islands	Easter Islands	FSM	Fiji islands	French Polynesia	Guam	Kiribati	Marshall islands	Nauru	Niue	N. Mariana islands	Palau	Pitcairn islands	Samoa	Tokelau	Tonga	Tuvalu	Wallis & Futuna	US Minor islands
Emoia arnoensis	arno skink				x					x											
Erythrura trichroa	bird													x							
Exocarpos psilotiformis	plant						x														
Gallicolumba xanthonura	fruit dove				x																
Gallinula chloropus	bird													x							
Garcinia matudai	plant													x							
Garnotia cheesemanii	Poaceae		x																		
Garypus ornata	bikini psuedoscorpion									x											
Glochidion hivaoaense	plant						x														
Gouania mangarevica	plant						x														
Grewia tahitensis	plant						x														
Gulubia "taveuni"	palm					x															
Gulubia palauensis	palm													x							
Habenaria amplifolia	Orchidaceae		x																		
Habenaria cryptostyla	plant						x														
Habenaria marquesensis	plant						x														
Habenaria tahitensis	plant						x														
Habenaria tahitensis var. marquisensis	plant						x														
Haloragis sp. Nov (B.Sykes)	Haloragaceae		x																		
Haloragis stokesii	plant						x														
Haroldiella rapaensis	plant						x														
Haroldiella sykesii	plant						x														
Hedyotis grantii	plant						x														
Hedyotis lucei	plant						x														
Hedyotis nukuhivensis	plant						x														
Hedyotis raiateensis	plant						x														

Scientific Name	Common name or taxonomic group	Distribution by country																			
		American Samoa	Cook islands	Easter Islands	FSM	Fiji islands	French Polynesia	Guam	Kiribati	Marshall islands	Nauru	Niue	N. Mariana islands	Palau	Pitcairn islands	Samoa	Tokelau	Tonga	Tuvalu	Wallis & Futuna	US Minor islands
Heterospathe phillipsii	Palm					x															
Hibiscus australensis	Malvaceae		x																		
Horsfieldia palauensis	Plant													x							
Lairdina hopletupus	freshwater fish					x															
Leiolopisma alazon	Lauan ground skink					x															
Lentipes spp.	freshwater fish					x															
Lepidium sp. Nov. (B.Sykes)	Brassicaceae		x																		
Lepidodactylus gardineri	Rotuman forest gecko					x															
Lepinia marquesensis	Plant						x														
Liparis cuspidata	Plant						x														
Liparis revoluta	Plant						x														
Lipocarpha mangarevica	Plant						x														
Megazosterops palauensis	Bird													x							
Melicope bracteata	Plant						x														
Melicope inopinata	Plant						x														
Metatrophis margaretae	Plant						x														
Metroxylon vitiense	Palm					x															
Moerenhoutia plantaginea	Plant						x														
Myiagra erythrops	Bird													x							
Myoporum rapense	Plant						x														
Myotis insularum	insular mouse eared bat	x?														x?					
Nesoclopeus poecilopterus	barred-wing rail					x															
Nesoluma nadeaudii	Plant						x														
Nicotiana fragrans var. fatuhivensis	Plant						x														
Oparanthus teikiteetinii	Plant						x														
Ophiorrhiza nelsonii	Plant						x														

Scientific Name	Common name or taxonomic group	Distribution by country																				
		American Samoa	Cook islands	Easter Islands	FSM	Fiji islands	French Polynesia	Guam	Kiribati	Marshall islands	Nauru	Niue	N. Mariana islands	Palau	Pitcairn islands	Samoa	Tokelau	Tonga	Tuvalu	Wallis & Futuna	US Minor islands
Ophiorrhiza platycarpa	Plant						x														
Ophiorrhiza scorpioidea	Plant						x														
Ophiorrhiza setosa	Plant						x														
Oxalis gagneorum	Plant						x														
Pacifigeron rapensis (syn. Erigeron rapensis)	Plant						x														
Papilio schmeltzi	Fiji swallowtail buttery					x															
Partula assimilis	Partulidae		x																		
Pavonia domatiifera	Plant						x														
Pavonia papilionacea	Plant						x														
Peperomia ponapense	herbaceous pepper									x											
Pericopsis mooniana	Plant													x							
Peristylus societatis	Plant						x														
Perochirus scutellatus	shielded tropical gecko				x																
Phyllanthus aoraiensis	Plant						x														
Phyllostegia tahitensis	plant						x														
Phymatosorus katuii	Polypodiaceae		x																		
Physokentia petiolatus	palm					x															
Physokentia thurstonii	palm					x															
Pilea bisepala	plant						x														
Pilea occulta	plant						x														
Pilea sancti-johannis	plant						x														
Pilea solandri	plant						x														
Pileabisepala St. John	Urticaceae		x																		
Pisonia coronata	plant						x														
Pisonia rapaensis	plant						x														

Scientific Name	Common name or taxonomic group	Distribution by country																				
		American Samoa	Cook islands	Easter Islands	FSM	Fiji islands	French Polynesia	Guam	Kiribati	Marshall islands	Nauru	Niue	N. Mariana islands	Palau	Pitcairn islands	Samoa	Tokelau	Tonga	Tuvalu	Wallis & Futuna	US Minor islands
Placosylus spp.	land snails					x																
Plakothira parviflora	plant						x															
Plakothira perlmanii	plant						x															
Platymantis vitiensis	Fijian tree frog					x																
Podocarpus pallidus	Podocarpaceae																	x				
Porphyrio porphyrio	bird													x								
Pouteria grayana var. florencei (syn. Planchonella tahitensis)	plant						x															
Pritchardia mitiaroana	Arecaceae		x																			
Pritchardia thurstonii	palm					x																
Prosopeia tabuensis	red shining parrot					x																
Prosoplus xyalopus	longhorn beetle									x												
Psychotria franchetiana	plant						x															
Psychotria marauensis	plant						x															
Psychotria tubuaiensis	plant						x															
Pteropus pilosus	Palau fruit bat													x								
Pteropus tonganus	Tongan flying fox	x	x			x						x				x		x				
Ptilinopus pelewensis	bird													x								
Ptychosperma palauensis	plant													x								
Pupina complantana	landsnail									x												
Pyrroglaux podargina	bird													x								
Rhipidura lepida	bird													x								
Rhixophora lamarkii	plant													x								
Rukia longirostra	white-eye				x																	
Santalum insulare var. margaretae	plant						x															
Santalum yasi	sandalwood					x																

Scientific Name	Common name or taxonomic group	Distribution by country																				
		American Samoa	Cook islands	Easter Islands	FSM	Fiji islands	French Polynesia	Guam	Kiribati	Marshall islands	Nauru	Niue	N. Mariana islands	Palau	Pitcairn islands	Samoa	Tokelau	Tonga	Tuvalu	Wallis & Futuna	US Minor islands
Scaevola tahitensis	plant						x														
Sclerotheca forsteri	plant						x														
Sclerotheca magdalenae	plant						x														
Sclerotheca oreades	plant						x														
Sclerotheca viridiflora	Campanulaceae		x																		
Semecarpus kraemeri	plant				x																
Serianthes rurutensis	plant						x														
Sesbania coccinea subsp. atollensis var. marchionica	plant						x														
Sesbania coccinea subsp. atollensis var. quaylei	plant						x														
Sicyopus spp.	freshwater fish					x															
Sicyoteterus endentatus	gobie				x																
Sophora rapaensis	plant						x														
Taeniophyllum elegantissimum	plant						x														
Tekoulina pricei	Achatinellidae		x																		
Terminalia crassipes	plant													x							
Terminalia glabrata var. glabrata	plant						x														
Terminalia glabrata var. haroldii	plant						x														
Terminalia glabrata var. koariki	plant						x														
Terminalia samoensis	plant													x							
Trichocichla rufa	long-legged warbler					x															
Trukia tahitensis	plant						x														
Vini australis	blue-crowned lory					x										x		x			
Xixuthrus ganglebaueri	Fijian giant longhorn beetle					x															
Xixuthrus heros	Fijian giant longhorn beetle					x															

Scientific Name	Common name or taxonomic group	Distribution by country																			
		American Samoa	Cook islands	Easter Islands	FSM	Fiji islands	French Polynesia	Guam	Kiribati	Marshall islands	Nauru	Niue	N. Mariana islands	Palau	Pitcairn islands	Samoa	Tokelau	Tonga	Tuvalu	Wallis & Futuna	US Minor islands
Xixuthrus heyrovski	Fijian giant longhorn beetle					x															
Xixuthrus terribils	Fijian giant longhorn beetle					x															
Xylocarpus moluccensis	mangrove tree													x							
Zanthoxylum nadeaudii	plant						x														
181	TOTALS	3	18	0	14	33	84	1	1	9	1	2	1	29	0	4	1	3	1	1	1

Key: DD = Data Deficient

Appendix 3. Site Outcomes (Key Biodiversity areas) in the Polynesia-Micronesia Hotspot*

Site No[1]	Site Name	Approx Land Area (Hectares)	Existing Protected Area in the site?	Invasive Free Status[3]	Priority Site for CEPF investment
Cook Islands					
1	Atiu Island	2700	Yes	Medium	Y
2	Mangaia	5180	No	Low	Y
3	Suwarrow Atoll	168	Yes	Medium	
4	Takitumu Conservation Area	155	Yes	Medium	Y
5	Takutea Wildlife Sanctuary	120	Yes	n.d.	
Federated States of Micronesia					
6	Ahnd Atoll	150	Yes	Low	
7	Dalipebinaw School Forest Reserve	41	Yes	Low	
8	East Fayu Island	381	No	Low	
9	East Yap Harbor Mangroves	418	Yes	Low	
10	Edienleng/Pohntehnmei Ridge	154	No	Low	
11	Faichuk Mangroves	3018	No	Low	
12	Fais Limestone Forests	342	No	Low	
13	Faiyew Island	42	No	Low	
14	Fanapanges Island	159	No	Low	
15	Fefan Forests	200	No	Low	Y
16	Finkol Terminalia Forest	196	No	Low	
17	Kosrae upland forest	4640	No	Low	Y
18	Lepinsed Madolenihmw	1109	No	Low	
19	Marbaa Forest	507	No	Low	
20	Mt Winipot	125	Yes	n.d.	
21	Muenon Marsh	25	No	n.d.	
22	Mwoakilloa Atoll	655	No	n.d.	
23	Namwanan Mangroves	158	No	n.d.	
24	Nan Pailong	264	No	n.d.	
25	Ngulu Atoll	43	No	n.d.	
26	North Namonuito Atoll	76	No	n.d.	
27	Northern Yap Channels and Mangrove	2212	Yes	Low	
28	Northwest Sorol Island	262	No	n.d.	
29	Nukanap Freshwater Marsh	33	No	n.d.	
30	Olimarao Atoll	88	No	n.d.	
31	Oneop island	327	No	n.d.	Y
32	Oroluk Atoll	40	Yes	n.d.	
33	Piig Satawal Island	89	No	n.d.	

Site No[1]	Site Name	Approx Land Area (Hectares)	Existing Protected Area in the site?	Invasive Free Status[3]	Priority Site for CEPF investment
34	Pigelo Island	11.5	No	n.d.	
35	Pohndollap Ridge	83	No	Low	Y
36	Pohnpei Central Forest	10372	Yes	Low	Y
37	Pou Bay Mangroves	51	No	n.d.	
38	Sapore	161	No	n.d.	
39	Satowan Island	60	No	n.d.	Y
40	Senpehn-Lehdau Mangroves	1023	Yes	n.d.	
41	South Kitti Coast	1745	No	n.d.	
42	Southeast Reef	22	No	n.d.	
43	Southwest Pulap Atoll	4476	No	n.d.	
44	Temwen Island	58	No	n.d.	
45	Tomil Marsh/Mangrove	156	Yes	Low	
46	Tonoas Forest	168	No	n.d.	
47	Totiw Island	26	No	n.d.	
48	Udot Island	453	No	n.d.	
49	Ulithi Atoll	226	No	Low	
50	Uman Island	397	No	n.d.	
51	Utwa Mangroves	198	No	Low	
52	Utwa-Walung Mangroves	1639	Yes	Low	
53	Weno Ridge Forest	233	No	Low	
54	West Puluwat Atoll	31	No	n.d.	
55	Wiac-Sroanef Coastal Area	428	No	Low	
56	Wichap-Einup-Peitiw-Nukunap Mangroves	242	No	Low	
57	Yela-Okat Terminalia/Mangrove Forests	587	Yes	Low	
58	Yinuf-Galil-Luech Mangrove	160	Yes	Low	
Fiji					
59	Gasele	360	No	Low	
60	Gau Island	12150	Yes	Medium	Y
61	Hatana Island	10	No	n.d.	Y
62	Kabara-Fulaga coastal vesi forest	4050	Yes	n.d.	
63	Laucala Island	1350	No	Low	Y
64	Monasavu-Nadrau Plateau	2430	Yes	Low	
65	Monuriki Island	100	No	Low	Y
66	Mt Evans Range-Koroyanitu	5400	Yes	Low	Y
67	Mt Kasi	n.d.	No	Low	Y
68	Mt Korobaba	n.d.	No	Low	Y

Site No[1]	Site Name	Approx Land Area (Hectares)	Existing Protected Area in the site?	Invasive Free Status[3]	Priority Site for CEPF investment
69	Mt Navotuvotu	n.d.	No	Low	Y
70	Mt Nubuiloa	n.d.	No	Low	Y
71	Nabukelevu/Mt Washington	1800	Yes	Low	Y
72	Naicobocobo dry forests	1800	No	Low	Y
73	Nakauvadra Range	7200	No	Low	
74	Nakorotubu	7200	No	Low	
75	Nasigasiga	1800	No	Low	Y
76	Natewa Peninsula	9000	Yes	Low	Y
77	Nausori Highlands	8100	No	Low	Y
78	Ogea	1350	No	Low	Y
79	Ovalau Island	8100	No	Low	
80	Serua forest wilderness	20700	No	Low	Y
81	Sovi Basin and Korobosabasaga Range	19800	Yes	Low	Y
82	Taveuni	48510	Yes	Medium	Y
83	Tomaniivi-Wabu Nature and Forest Reserve complex	7200	Yes	Low	Y
84	Udu Point	720	No	Low	
85	Upper Navua Gorge	48510	Yes	Low	
86	Vatia Peninsula	2700	No	Low	
87	Voma/Namosi Highlands	1170	No	Low	Y
88	Vuaqava Island	990	No	n.d.	
89	Vunimoli	1350	Yes	Low	
90	Vunivia Catchment	9000	Yes	Low	
91	Wailotua/Nabukelevu bat caves	1080	No	Low	Y
92	Waisali Dakua National Trust Forest Reserve	2430	Yes	Low	Y
93	Yadua Taba Island	153	Yes	Medium	Y
French Polynesia					
94	Akamaru Atolls	390	No	Low	
95	Apataki Atolls	4900	No	n.d.	
96	Bora Bora Island	3760	No	Low	Y
97	Ei'ao Island	5200	Yes	Low	
98	Fakarava Atolls	10900	No	n.d.	
99	Fatu Hiva Island	7770	No	Medium	Y
100	Fatu Huku Island	101	No	High	
101	Hatuta'a Island	1810	Yes	High	Y
102	Hiva Oa Island	24090	No	Low	Y
103	Huahine Island	7480	No	Low	Y

Site No[1]	Site Name	Approx Land Area (Hectares)	Existing Protected Area in the site?	Invasive Free Status[3]	Priority Site for CEPF investment
104	Maiao Island	900	No	n.d.	
105	Makatea Island	2896	No	Medium	Y
106	Mangareva Island	1300	No	Low	Y
107	Marotiri Islets	<50	No	High	
108	Mo'orea Island	13200	No	Low	Y
109	Mopelia Island	350	No	n.d.	
110	Morane Island	200	No	High	Y
111	Motane Island	1554	Yes	Medium	Y
112	Motu One Island (Bellinghausen)	1240	Yes	High	
113	Niau Island	5582	No	n.d.	Y
114	Nuku Hiva Island	33600	No	Low	Y
115	Raiatea Island	17200	No	Low	Y
116	Raivavae Island	2007	No	Low	Y
117	Rangiroa Atoll	7900	No	Medium	Y
118	Rapa Island	1000	No	Low	Y
119	Reitoru Island	200	No	Low	
120	Rimatara Island	878	No	Low	Y
121	Rurutu Island	3600	No	Low	
122	Scilly Island	400	Yes	High	
123	Tahanea Atoll	1000	No	Low	
124	Tahiti Island	20000	Yes	Low	Y
125	Tahuata Island	7512	No	Medium	Y
126	Taiaro Atoll	1000	Yes	n.d.	
127	Tenararo-Vahanga Atolls	400	No	n.d.	
128	Tikehau Atoll	1700	No	n.d.	
129	Tubuai Island	4500	No	Low	
130	Ua Huka Island	8100	Yes	Medium	Y
131	Ua Pou Island	12500	No	Medium	
Kiribati					
132	Kotabu and Nabini islet	n.d.	No	n.d.	
133	Phoenix Islands	2800	Yes	High	
134	Teirio Islet	n.d.	No	n.d.	
Marshall Islands					
135	Bokak Atoll	324	Yes	n.d.	Y
136	Jaluit Atoll Conservation Area	363	Yes	Low	
137	Kabin Meto [North-western atolls]	3408	No	n.d.	
138	Mili Atoll Nature Conservancy	250	Yes	n.d.	
139	Northern Ratak [Eastern chain]	2538	Yes	n.d.	

Site No[1]	Site Name	Approx Land Area (Hectares)	Existing Protected Area in the site?	Invasive Free Status[3]	Priority Site for CEPF investment
140	Southern Railik [Western chain]	3597	No	n.d.	
141	Southern Ratak [Eastern chain]	6376	No	n.d.	
Niue					
142	Huvalu Forest Conservation Area	6029	Yes	Low	
Palau					
143	Babeldaob and Koror Mangrove Forests	4200	No	n.d.	
144	Babeldaob Upland Forest (broad-leafed tropical forest on volcanic soils)	21000	No	n.d.	Y
145	Peleliu and Angaur Forests	2200	No	n.d.	
146	Rock islands Forest (limestone forest)	960	Yes	Medium	
Pitcairn Islands					
147	Henderson	3730	Yes	High	
148	Oeno	150	No	High	
149	Pitcairn	486	No	Medium	Y
Samoa					
150	Aleipata Islands	300	Yes	Medium	
151	Lake Lanoto'o National Park	60	Yes	Low	Y
152	O le Pupu Pu'e National Park	2857	Yes	Low	Y
153	Saanapu-Sataoa Mangrove forest	75	Yes	Low	
154	Savaii Lowland and Upland Forest	25000	Yes	Medium	Y
155	Uafato-Tiavea Coastal Forest	1300	Yes	Low	
Tokelau					
156	Tokelau	n.d.	No	n.d.	
Tonga					
157	'Eua	8700	Yes	n.d.	Y
158	Kao and Tofua National Parks	4990	Yes	Medium	
159	Niuafo'ou Freshwater Lake	5300	No	Low	Y
Wallis and Futuna					
160	Alofi	3500	No	High	
Transnational Site					
161	Proposed Central Pacific World Heritage Site	8320	Yes	Mixed	

Notes:
n.d. = no data available
1. Site numbers are the same as those shown in Figure 3
2. Land area are approximate only
3. Invasive free status is a qualitative assessment of how free the site is of major invasive species (such as the ship rat, mongoose, vertebrate browsers and invasive weeds)

Appendix 4. Calculation of Taxonomic Distinctiveness

This taxonomic distinctiveness score is a measure of how special or unique the species is on a global scale.

For a given Family, we need:
Global number of genera (G)
Global number of species (S)

For a given Genus, we need:
Global number of species (Y)

The taxonomic distinctiveness equation is then

=((2*(1/Y))+(1/(G*S)))/3

The double weighting of Y is to draw out the monotypic genera along the scale of 0 to 1

The expression used in the query is:

((2*(1/[TaxGenus].[Global No of Species]))+(1/([Global No of Genera]*[TaxFam].[Global No of Species])))/3